

行政院國家科學委員會專題研究計畫成果報告

後設認知、閱讀策略與閱讀能力間之相關性探討

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一、 中文摘要

本研究之目的為調查大學生對中英文閱讀過程之後設認知、可能影響後設認知的因素、及不同後設認知的層面與中英文閱讀策略的使用及閱讀能力之間的關係。

本研究使用『後設認知問卷』(Carrell 1989年研究中所使用的問卷的改編版)、有聲思考紀錄、與訪談三種方式來收集資料。受測者為來自台灣五所大學的344位大一新生。所有的受測者將需填寫問卷，但僅有八位受測者接受有聲思考紀錄的測試及接受訪談。問卷調查的目的在收集受測者的背景資料(包括性別、系別、開始學英文的年齡、大學入學考試之國文、英文的成績等等)，並探知他們對所使用的中英文閱讀策略之後設認知。而其中之大學入學測驗的國文及英文成績則作為受測者閱讀能力的指標。有聲思考紀錄測試的目的是在確認受測者所使用的閱讀策略。最後，訪談的目的在獲得受測者對中英文閱讀過程之後設認知的更詳細的資料。

研究結果顯示：(1)這些受測者對中文閱讀過程之後設認知是認為『整體式』的(global)或是『由上而下』(top-down)的閱讀策略是比較有效的。相對地，閱讀英文時，他們則認為『由下而上』(bottom-up)或是『局部性』的閱讀策略(local strategies)在閱讀理解上是必須的。另外，雖然他們也認為一些『整體式』的(global)閱讀策略在英文閱讀過程中具有重要性，但他們對於使用這些策略在英文閱讀過程中的信心遠不如他們使用這些策略在中文閱讀過程中時所具有之信心。(2)這些受測者必須在解析字、句方面不能有太多的困難，否則無法有效地使用『整體式』的閱讀策

略(global strategies)。(3)本研究發現一個人開始學習英文的年齡、系別、以及是否有閱讀英文課外讀物的習慣皆會影響其判斷有效閱讀策略之後設認知。(4)八位接受有聲思考紀錄的測試及接受訪談的自願者在問卷資料上顯現他們認為『整體式』的閱讀策略(global strategies)比『局部性』的閱讀策略(local strategies)有效或一樣有效。然而，他們的有聲思考紀錄顯現當他們實際閱讀英文時，他們卻是比較依賴『局部性』的閱讀策略(local strategies)。一個可能原因是，當他們回答問卷上有關『整體式』閱讀策略的問題時，是根據他們應該如何做才能有效閱讀，而非他們實際閱讀的狀況。事實上，訪談的資料顯示這些受測者對於『整體式』閱讀策略的認識與知覺十分有限。

本研究的成果兼具學理與實際應用上的涵義。在學理上，此研究成果不僅使我們瞭解台灣大學生對中英文閱讀過程之後設認知，同時也使我們更進一步瞭解後設認知如何影響閱讀策略的運用與閱讀能力。在實際應用上，本研究之成果顯示我們必須要增加台灣大學生對各種『整體式』閱讀策略的認識與知覺。但為增加他們使用這些『整體式』閱讀策略的能力與信心，我們還需加強他們解碼的技巧(decoding skills)。也就是說，必須使他們能夠很迅速地了解字、句的意思，才能使他們有信心去有效地使用『整體式』的閱讀策略。

關鍵詞：後設認知、閱讀策略、有聲思考紀錄、閱讀能力。

ABSTRACT

This study was intended to investigate EFL college students' metacognitive

awareness about reading in Chinese and English, the factors that may have affected their metacognitive awareness, and the interrelationships among different metacognitive factors, strategy use, reading abilities in Chinese and English,

In this study, data were collected through an adapted version of Carrell's (1989) metacognitive questionnaire, a think-aloud task, and interviews. The subjects of the study were 344 college freshmen from 5 different universities in Taiwan. All the subjects responded to the questionnaire, but only 8 volunteers performed the think-aloud task and were interviewed. The questionnaire was used to elicit relevant demographic information from subjects (including gender, major, the age of starting to learn English, their scores on the Chinese and English subtests of the Joint College Entrance Examination, etc.), and to tap their metacognitive conceptualization or awareness about their reading strategies in both Chinese and English. The scores on the Chinese and English subtests of the Joint College Entrance Examination were used to determine the subjects' reading abilities in Chinese and English. The purpose of the think-aloud task was to identify the reading strategies used by the subjects. Finally, the purpose of the interview was to get further information about the subjects' metacognitive perceptions about reading in English and Chinese.

The findings of this study are: (1) These subjects' metacognitive conceptualizations about reading in Chinese tended to be more global or top-down in their perceptions of effective strategies. In contrast, when they read in English, they tended to consider bottom-up, local strategies as essential to their comprehension. In addition, although they recognized the importance of some global strategies in reading English, they did not have as much confidence to use these strategies effectively as they did when they read in Chinese. (2) For these subjects to use global strategies effectively when reading in English, they could not have too much difficulty understanding word-level or sentence level meaning. (3) The age of

starting to learn English, subjects' majors, and the habit of reading English materials for fun were found to have significant effects on the subjects' metacognitive perceptions about effective strategies in their reading in English. (4) While the eight volunteers who participated in the think-aloud task and interview perceived the global, top-down strategies as either equally effective or more effective than local, bottom-up strategies, they tended to rely more on local strategies than global strategies when they actually conducted reading in English. One possible explanation was that when they responded to the items concerning the global strategies on the questionnaire, they probably responded based on what they were supposed to do to read effectively rather than on what they actually did in reading. In fact, the interview data showed that these subjects' knowledge and awareness of their use of specific global strategies were quite limited.

The findings of this study have both theoretical and practical implications. Theoretically, the findings of this study have not only revealed how EFL college students in Taiwan perceive their reading processes in English and Chinese but also contribute to our knowledge of how metacognition affects reading strategies and abilities. Practically, the results of this study suggested that we need to increase college students' knowledge and awareness of different types of global strategies. However, to increase students' confidence and abilities to use global strategies effectively, we need to continue to help our students improve their decoding skills so that they can process texts automatically.

Keywords: Metacognition, Reading Strategies, Think-aloud procedure, Reading ability

BACKGROUND AND PURPOSES

Metacognition refers to one's knowledge of his/her own cognitive processes and self-regulation of those processes (Flavell, 1979; Brown, 1980). Recent research on metacognition has revealed that a reader's

metacognition or metacognitive awareness of strategies is related in important ways to effectiveness of strategy use and reading ability. However, we still know very little about exactly what role metacognition plays in the reading process. In fact, different researchers have different interpretations of what metacognition is, which makes it difficult to compare the results or to synthesize the findings. Furthermore, most studies investigated only one aspect of metacognition; very few studies compare or contrast the effects of different metacognitive factors on strategy use and reading ability. In addition, previous research tended to focus on the effects of metacognition; little effort was made to find out what factors may cause different readers to have different degrees of metacognitive awareness. Finally, most of the research studies on metacognition used only one research tool--either through questionnaires or the think-aloud method or interviews--to collect data; very few studies used multiple research measures for investigation. Nonetheless, each measure has its own limitations; therefore, using only one data-collection measure may result in a limited, and sometimes distorted, view of the research topic. Thus, this study was intended to investigate the metacognitive awareness of EFL college students in Taiwan, the factors that affected their metacognitive awareness, and the interrelationships among different metacognitive factors, strategy use and reading ability in Chinese and English. In addition, multiple measures were used to achieve these research purposes.

More specifically, three sets of data were collected. First, all the subjects responded to a metacognitive questionnaire. This questionnaire was an adapted form of Carrell's (1989). The first part of the questionnaire contained questions to elicit relevant demographic information from subjects, such as gender, the age of beginning to learn English, major, scores on the Chinese and English subtests of the Joint College Entrance Examination, duration of residence in an English-speaking country, previous strategy training, reading interests, etc. In particular, the scores on the Chinese

and English subtests of the Joint College Entrance Examination were used to determine the subjects' reading abilities in Chinese and English. The information obtained through other questions was used to identify the variables that may have affected these subjects' metacognitive awareness.

The second and third part of the questionnaire were developed to measure subjects' metacognitive conceptualization or awareness of their reading processes in English and Chinese. In each of these two parts, subjects were asked to judge thirty-three statements about silent reading strategies in the language in question, English or Chinese, on a 1-5 Likert Scale (1=strongly agree, 5=strongly disagree). Six of these items are concerned with subjects' abilities in reading in that language, to provide a measure of their confidence as readers in that language; five statements pertain to what they do when they do not understand something, to provide a measure of their awareness of repair strategies; sixteen statements are about what they focus on in order to read more effectively and about reading behaviors of the best readers they know, to tap their perception of effective/efficient strategies; and finally, six statements are about things which may make reading in that language difficult for them, to measure their awareness of difficulty.

Then, the researcher asked for eight volunteers to perform the think-aloud task and to be interviewed. Four of these volunteers scored higher than the national average of the scores on the English subtest of the College Entrance Exam, and the other four volunteers scored lower than the national average. When these eight volunteers performed the think-aloud task, they were asked to read and report their thoughts while reading an English text. The purpose of the think-aloud task was to identify the reading strategies used by the subjects.

Finally, these eight volunteers were interviewed individually by the researcher. The questions in the interview were mainly based on Burke's interview guide(1978). The purpose of this interview was to get further

information about the subjects' metacognitive perceptions about reading in English and Chinese.

Specific research questions addressed in this study were:

- (1) What are these students' perceptions about their reading abilities (i.e., their confidence), about their repair strategies, about effective strategies, and about what causes them difficulty when reading in Chinese and English?
- (2) What are the relationships between these four categories of metacognition (Confidence, Repair, Effective, and Difficulty) and these students' reading abilities in Chinese and English?
- (3) How are factors--such as gender, major, the age of starting to learn English, previous training on reading strategies, the experience of living in an English-speaking country, and reading interests (i.e., whether the subject reads English materials for fun outside the class)--related to these subjects' metacognitive conceptualizations about effective reading strategies in English?
- (4) Are the data on readers' strategy use (i.e., think-aloud data) consistent with the data on readers' metacognitive perceptions of their reading strategies (i.e., the data obtained through questionnaires and interviews)?

RESULTS AND DISCUSSION

1. Subjects' Metacognitive Perceptions about Their Reading in Chinese and English

To determine and compare subjects' metacognitive perceptions about their reading in Chinese and English, the researcher calculated the number and percentage of subjects who either *strongly agreed* or *agreed* with each of the items on the second and third parts of the questionnaire. The data revealed that for reading in Chinese, these subjects' metacognitive conceptualizations tended to

be more global or top-down. In contrast, when reading in English, they tended to consider bottom-up decoding skills as essential to their comprehension. In addition, though they recognize the importance of some global strategies in reading English, they did not have enough confidence to use them effectively. For example, the result on item 17 showed that while the majority of subjects (64%) considered looking up words in the dictionary as an effective strategy when they read in English, only 21% of subjects felt the same way about this strategy when they read in Chinese. Similarly, 93% of the subjects agreed that the ability to recognize words makes someone a good reader in English, while only 48% of subjects felt that the ability to recognize words is important to be a good reader in Chinese. In addition, when reading in English, 83% of the subjects tended to agree that word meaning is something that makes the reading difficult, but only 38% of the subjects felt that word meaning makes the reading difficult when they read in Chinese. Moreover, subjects' responses to items 20 and 22 show that these subjects also tended to be much more concerned with pronunciation and grammar when they read in English than when they read in Chinese (33% versus 13 and 53 versus 17 respectively). Furthermore, when reading in English, only 30% of the subjects would focus on text organization (item 19), but the percentage got much higher (54%) when it came to reading in Chinese. On the other hand, the results also indicate that the global strategies such as getting the overall meaning of the text (item 13) and relating the text to what they already know about the topic (item 16) were considered effective in both English and Chinese (93% versus 96% and 74% versus 90%). Thus, these results implied that although these EFL college students perceived the importance of bottom-up decoding skills in reading English, they also considered it important to get the overall meaning of the text and to relate the

text to what they already know. However, their responses to the Confidence items showed that when reading in English, they had much less confidence in using the global strategies than when they read in Chinese. For example, while 90% of the subjects felt that they were able to relate information which comes next in the text to previous information in the text when reading in Chinese, only 49% of the subjects thought that they could do so when reading in English. Similarly, although 71% of the subjects either *strongly agreed* or *agreed* that they were able to question what the author says when they read in Chinese, only 30% of the subjects felt the same way about their reading ability in English.

2. The Relationships Between the Four Metacognitive Factors and Subjects' Reading Abilities in Chinese and English

The information obtained from the second and third parts of the questionnaire, along with subjects' scores on the English and Chinese subtests on the Entrance Exam, allowed the researcher to determine and compare the relationships between the four different categories of metacognition (Confidence, Repair, Effective, and Difficulty) and subjects' reading in their L1 and L2.

First, the items were categorized into four groups: (1) Confidence items (items 1-6), (2) Repair items (items 7-11), (3) Difficulty items (items 20-25), and (4) Effective items (items 12-19 & 26-23). Then, separate simple regressions were run to determine if there are any significant relationships between the four different categories of metacognition (Confidence, Repair, Effective, and Difficulty) and subjects' scores on the Chinese and English subtests of the College Entrance Exam. These simple regressions were run with an alpha level of .05 chosen as the significance level. The results indicated that only three items emerged as significantly related to their reading ability in Chinese, but

there were 17 items significantly related to these subjects' reading ability in English.

In the category of the Confidence items, only one confidence item, item 2, emerges as significantly related to their reading ability in Chinese. That is, the more subjects agreed with the statement that they are able to recognize the difference between main points and supporting details, the better they performed on the Chinese subtest of the Joint College Entrance Exam. In contrast, all the confidence items were significantly related to their reading performance on the English subtest of the JCEE. That is, the more subjects agreed that they are able to do the things stated in these six statements (able to anticipate content, recognize the difference between main points and supporting details, integrate information, question author, use prior knowledge, have a good sense of understanding or lack of understanding), the higher their scores were on the English subtests of JCEE.

In the category of the repair strategies, the strategy of giving up when they don't understand something was negatively correlated with both L1 reading ability and L2 reading ability. To put it in a positive way, the more persistent the subjects were when facing reading difficulties, the better they performed in reading in Chinese as well as in English. No other strategies were significantly related to their reading ability in Chinese. However, three more strategies were positively correlated with their reading ability in English. They were strategies of "keep on reading and hope for clarification further on," "reread the problematic part," and "go back to a point before the problematic part and reread from there."

In the category of what makes reading difficult (items 20-25), sentence syntax (item 22) was negatively related to subjects' reading performance in Chinese. That is, the more subjects tended to disagree with the statement that the grammatical structures caused them difficulty, the better they read in Chinese. Thus, to put it in a positive way, if

they tended to agree that sentence structures did not cause them particular difficulty, then their reading performance in Chinese tended to be better. For reading in their second language (English), pronunciation of the words, word meaning, sentence syntax, and text organization emerged as significant factors. More specifically, the more subjects tended to disagree with the statement that any of these four things made reading English difficult for them, the better they read in English. To put it in a positive way, if they tended to agree that the pronunciation of the words, word meaning, sentence syntax, and text organization did not cause them difficulty in reading English, the better they read in English.

In the category of items on effective strategies, no strategy was significantly related to subjects' reading ability in Chinese. In contrast, for reading in English, the global strategies--text gist and background knowledge--were positively related to subjects' reading ability in English. In addition, sentence syntax, a local strategy, was also positively related to their reading ability in English.

These results suggested that when reading in English, these subjects were more concerned with decoding difficulties than when they read in Chinese. On the other hand, they also recognized the importance of some global strategies in their reading in English. However, for them to use these global strategies effectively, they could not have too much difficulty understanding word-level or sentence-level meaning.

3. Factors that May Have Affected Subjects' Metacognitive Awareness about reading in English

To investigate the factors that may have affected the subjects' metacognitive awareness about reading in English, the researcher first categorized 16 items on the "effective strategies" into two subgroups of items; the 10 items concerning pronunciation

of words, word meaning, sentence syntax, and text details were classified as "local items, and the other six items regarding background knowledge, text gist, and textual organization were classified as "global" items. The subjects were then divided into mutually exclusive subgroups based on their genders (male versus female), majors (Science/Engineering majors versus Humanities/Education majors), the age of starting to learn English (before 11 years old or junior high school versus after 12 years old), previous training on reading strategies (subjects who received reading strategy training before versus subjects who never received such kind of training) and the experience of living in an English-speaking country (subjects who never lived in an English-speaking country versus those who had this experience), and reading interests (i.e., whether subjects read English materials for fun outside the class). Finally, two-tailed t-tests were conducted to determine if these different subgroups of subjects differed in their views toward the effectiveness of global and local strategies.

A significant difference was found between subjects who started learning English before 11 years old and subjects who started learning English after 12 years old in their views toward the effectiveness of local strategies ($t=2.11$, $p=0.035$). That is, subjects who started learning English after 12 years old tended to agree to a greater extent that local strategies were effective strategies than subjects who started learning English at an earlier age.

The results also showed that subjects of different majors were significantly different in their perceptions about the effectiveness of local strategies ($t=3.35$, $p=0.001$). More specifically, humanities/education majors agreed to a greater extent that local strategies were effective strategies than science/engineering majors.

Finally, subjects who read English for fun outside the class were significantly different from those who didn't. More specifically, subjects who often read English outside the class tended to agree to a greater extent that global strategies were effective strategies than subjects who did not read English

outside readings ($t=3.26$, $p=0.001$). In addition, subjects with the habit of reading English for fun also agreed to a greater extent that local strategies were effective than subjects without this habit ($t=2.77$, $p=0.006$). In other words, for subjects who often read English for fun, both global and local strategies were considered essential to their comprehension.

No other factors had significant effects on subjects' perceptions about the effectiveness of reading strategies in English.

4. Comparing Data from Different Sources

To identify the actual strategy use of the eight volunteers, their think-aloud data were transcribed, analyzed and coded with a coding system used in Cheng's (1998) study. The following table was the results of the analysis.

Table 1. The eight volunteer's actual strategy use

	Volunteers			
Strategy Type	V1	V2	V3	V4
Global Strategies	28%	5%	24%	52%
Local Strategies	72%	95%	76%	48%
Strategy Type	V5	V6	V7	V8
Global Strategies	57%	31%	42%	31%
Local Strategies	43%	69%	58%	69%

Then, based on these subjects' average responses to the Effective items on the second part of the questionnaire, these subjects were classified as either interactive strategizers (readers who perceived the global strategies as equally effective as local strategies) or global strategizers (readers who perceived the global strategies as more effective than local strategies). None of them were classified as local strategizers (readers who perceived the local strategies as more effective than global strategies) See Table 2 for the classification.

Table 2. The eight volunteers' metacognitive

perceptions about effective strategies in English

	Volunteers			
Metacognitive Perceptions	V1	V2	V3	V4
	Inter-active	Inter-active	Global	Inter-active
	V5	V6	V7	V8
	Inter-active	Inter-active	Inter-active	Inter-active

By comparing these two sets of data, we can see that although these eight subjects perceived the global strategies as either equally effective or more effective than local strategies, six of them tended to rely more on the local strategies than the global strategies when they actually conducted reading in English.

To resolve this seemingly conflict between the data on actual strategy use and the data on these subjects' metacognitive perceptions, the researcher examined the interview data for possible explanations. As a result, the researcher found that while the interview data were generally consistent with the data obtained through the metacognitive questionnaire on the items concerning local strategies, these subjects seldom commented on global strategies during the interviews. When asked about their reading difficulties or ways to improve their English reading ability, almost all of their answers were concerned with vocabulary and grammar. The only global strategy commented by these eight volunteers was the strategy of getting the main idea of the article. This implies that when asked specifically about the effectiveness of each global strategy on the questionnaire, these subjects probably responded based on what they were supposed to do to read effectively rather than on what

they actually did in reading. The interview data also revealed that these subjects' knowledge and awareness of their use of specific global strategies were quite limited. During the interviews, several of the subjects were puzzled by a follow-up question posed by the researcher—"what else can you do other than increasing your vocabulary and grammar knowledge if you want to be a better reader?" As a result, some commented that as long as they improved their vocabulary and grammar knowledge, they would become a better reader; still, others replied that they did not know what else they could do to read better in English.

CONCLUSION

The findings of this study suggested that Chinese EFL college students in Taiwan tended to perceive reading in Chinese as a global or top-down process. In contrast, they consider local or bottom-up strategies as essential to their reading in English. In addition, though they recognized the importance of some global strategies in reading, they did not have as much confidence in using these strategies as they did when they read in Chinese. For them to use these global strategies effectively, they could not have too much difficulty decoding word or sentence-level meaning.

As for the factors that may have affected these subjects' metacognitive awareness about reading in English, three significant factors were found: the age of starting to learn English, major, and reading interests.

Finally, by comparing the data obtained from the three different measures (questionnaire, think-aloud procedure, and interview), the researcher found that although the eight volunteers perceived the global

strategies as either equally effective or more effective than local strategies, they tended to rely more on local strategies when they actually conducted reading in English. One possible explanation was that when they responded to the items concerning the global strategies on the questionnaire, they probably responded based on what they were supposed to do to read effectively rather than on what they actually did in reading. In fact, the interview data showed that these subjects' knowledge and awareness of their use of specific global strategies were quite limited.

The teaching implications of this study are: (1) Since many college students in Taiwan are still not able to process texts automatically, it is necessary to continue to include local strategies or decoding skills as part of the English curriculum in college. (2) We need to introduce to college students in Taiwan different types of global strategies required for effective reading comprehension. (3) Metacognitive training should be conducted to teach students how to monitor their reading process and to adjust it to promote more effective comprehension.

As for the research implications, the researcher has the following suggestions for future research: (1) This study has revealed that the age of starting to learn English, majors, and the habit of reading English for fun have significant effects on Taiwanese college students' metacognitive conceptualizations of effective reading strategies in English. Further research needs to be conducted to investigate why these factors have significant effects. (2) The Confidence items on the questionnaire are mainly concerned with readers' confidence in using some global strategies.

However, the subjects of this study showed great concern with their ability to use local strategies. Therefore, in the future research the confidence items should be expanded to include items on local strategies so that we can be more sure about readers' conceptualization of their ability to use local strategies. (3) Using multiple research measures in this study has proved to be very beneficial in uncovering different aspects of the reading process and compensating for the problems inherent in each method. Thus, it is recommended that future research be conducted in a similar manner.

This study has been conducted as planned in the proposal and has achieved all the purposes it was intended to accomplish. An abstract of this report has been accepted by AILA 2002, the 13th World Congress of Applied Linguistics, to be held in Singapore from December 16 to 21. In the near future a full paper will be sent to the Hwa Kang Journal of Foreign Languages & Literature at the Chinese Culture University or other academic journals for publication.

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後設認知、閱讀策略與閱讀能力間之相關性探討

計畫類別：個別型計畫 整合型計畫

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計畫主持人：鄭錦桂

計畫參與人員：楊清麟

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國際合作研究計畫國外研究報告書一份

執行單位：中國文化大學英國語文學系

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