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A Cognitive Approach to Teaching a Comprehension Skill to Spanish-Speaking Adolescents

Marguerite M. McInnes

Introduction

Although a considerable amount of research has been conducted in the area of cognition and reading among elementary school-level, monolingual children, limited research has been conducted in this area with bilingual adolescents. Very little is known about either the thinking processes or effective instructional methods for teaching reading skills to these students.

By the time students enter high school, regardless of their linguistic or cultural

Marguerite M. McInnes, PhD, is an assistant professor of secondary education at Glassboro State College, Glassboro, New Jersey.

background, they are faced with many cognitive tasks that vary from subject to subject. Most of these tasks involve reading and writing skills which are critical for success in school.

Reading is a symbolic and abstract experience. The symbols represent sounds which in turn represent concrete or abstract ideas. Readers must then process these ideas within their own experiential framework. The concepts of classification and schemata are important in many models of reading. Downing and Leong (1982) write that a schema is an abstract representation of a generic concept for an object, an event, or a situation. Schema theory has been applied by researchers to the study of how students learn to read. In a schema-theoretic view of first or native language reading, Adams and Collins (1979) define the goal of schema theory:

to specify the interface between the reader and the text -- to specify how the reader's knowledge interacts with and shapes the information on the page and to specify how that knowledge must be organized to support the interaction.
(p. 3)

One skill that the reader may use to organize knowledge is that of classification. Barrett (1968) and Gerhard (1975) write that classification is one cognitive skill necessary in developing higher level reading skills. They contend that in order for students to read at the inferential level, they must be able to classify at the abstract or symbolic level. Other researchers including Gelman (1978), Petrey (1977), Smith, Shoben, and Rips (1974) have found correlations between the ability to categorize and semantic development. Other researchers have found a link between certain Piagetian cognitive tasks, e.g., operational tasks and conservation, and reading achievement among elementary school children (Stack, 1976; Raven & Salzer, 1971; Macomber, 1972).

Other studies have been conducted on the relationship between reading achievement and classification among elementary school students. These studies suggest a relationship between reading and class-inclusion skills. Smith-Burke (1976) asserts that the cognitive structures which underlie the ability to perform class-inclusion tasks also underlie understanding of the main idea. The ability to classify at the class-inclusion level means that the individual can distinguish between a superordinate class and its related subordinate classes (Inhelder & Piaget, 1964). In a related study, Caldwell (1975) found a significant correlation between class-inclusion performance and reading achievement. Williams (1984) argues that the process one follows in reading a paragraph in order to understand the main idea is similar to referring to a class of objects by means of a summary or category level. In addition, a study by Perkins and Angelis (1985) suggests that adult English as a Second Language students who

could find the common features (category) of a set of stimuli were more proficient in reading comprehension skills than similar students who could not demonstrate this skill.

Other researchers have applied classification tasks to learning situations. Lowery (1981) contends that most of the instructional models implemented by American schools do not fully use each student's particular cognitive skills. He therefore developed a teaching and learning model which allows students at an identified level of development, e.g., class-inclusion, to explore many experiences within and near that level. Students, Lowery argues, learn something most readily when they are provided with concrete, pictorial and, finally, symbolic or abstract experiences during the learning process.

Several researchers have contributed to the validation of this model in teaching science (Askham, 1972; Loggins, 1974; Lowery & Allen, 1973) and in teaching mathematics (Collis, 1971; Flavell, 1963). In an attempt to validate the model in teaching reading skills, research has been conducted with English-speaking elementary and secondary school students. Lowery's model was used to teach them the strategies necessary to successfully identify the main idea of paragraphs (Hadsell, 1978; Stein, 1979; Berget & Valverde, 1983). These studies have shown that experiences based on the concept of Lowery's instructional model have helped English-speaking students improve their comprehension skills.

In a related study, Williams (1986) used a similar classification model to teach learning disabled students how to identify the main idea of paragraphs. Her learning model included having the students classify objects and the pictures of objects into subordinate and superordinate classes. The students also used this strategy to generate category labels for word lists and sentences. The students next applied these classification skills to successfully identify the general and specific topics in short paragraphs.

In addition, research indicates that there is a positive relationship between Spanish and English reading. In studies with third and fourth grade students, Escamilla (1986) found significant correlations between Spanish and English reading achievement. In a study with Spanish-speaking seventh grade students, Kaufman (1986) found that instruction in Spanish reading skills made a significant difference in teaching word and paragraph meaning in English. Therefore, it seems reasonable that Spanish-speaking students would benefit from being taught classification and reading concepts in their native language.

Purpose of the Study

Research suggests a relationship between certain Piagetian cognitive skills and first language reading. It seems reasonable to assume that such a relationship would also exist for students for whom English is not their primary language. Previous studies have demonstrated that sequentially developed classification lessons were successful in teaching English-speaking elementary and secondary students inferential reading skills. I reasoned that this instructional model also should be successful in teaching a reading skill to Spanish-speaking secondary students. In addition, research suggests a positive correlation between Spanish and English reading. The purpose of this exploratory study, therefore, was to investigate three major questions: (a) What is the relationship between the students' classification skills (class-inclusion) and implied main idea tasks; (b) what is the effect of sequentially developed classification lessons in teaching the students how to identify the implied main idea; and (c) does language of instruction, i.e., monolingual or bilingual, make a difference in the students' ability to learn a comprehension skill?

Method

Subjects

The sample population investigated in this study consisted of limited English-speaking, Spanish-language dominant high school students who were enrolled in a bilingual program. A bilingual program was defined for the purposes of this study as one which provides "instruction in two languages and the use of two languages as mediums for instruction for any part or all of the school curriculum" (Andersson & Boyer, 1978, p. 32).

The participants in the study attended a high school with a student population of about 3,000. Approximately thirty percent of the total school population reported that English was not their first language. Some of the languages spoken by the school population include Spanish, Vietnamese, Tagalog, and Tongan. The school is located in an urban, multicultural school district in the San Francisco Bay Area.

The 63 participants in the study came from four bilingual reading classes of approximately 15 students per class. To participate in the study, the students were native speakers of Spanish and had to be limited in English reading as measured by a standardized reading test (a score of below 7.0 on *The Nelson*

Reading Test, Level 3, Form C).

The range in age for the subjects was 15-20 years. The mean age was 16.9 years. Twenty-two of the students participating in the study were older than 17. While at home, 40 students spoke only Spanish, twenty-two only English, and one spoke both languages. Eighty percent of the students were born in Spanish-speaking countries, and most of them came from Mexico. The average length of residence in the United States was 6.8 years, with a range of 4.2 to 7.1 years. More males (57%) than females (43%) took part in the study, and almost half of the students were freshmen.

Because of the school setting, it was impossible to randomly assign the students to the treatments. As a result, intact classes were randomly assigned to the four treatments.

Four classes of students participated in the study. Two of the classes received instruction in how to identify the main idea of paragraphs by means of sequentially developed classification lessons. The paragraphs were written in English and were about 45 words in length. One of these classes was taught bilingually and the other only in English. The other two classes of students received instruction in identifying the main idea but not by means of classification lessons. The method used was that followed by the regular classroom teacher using exercises and explanations found in published textbooks and workbooks. One of the control classes was taught bilingually and one only in English. I taught all four classes.

Each class of students received ten 50-minute periods of instruction. A pretest was administered before the treatment. The pretest, written in English, consisted of four parts: three picture classification tasks, two word classification tasks, two sentence classification tasks, and six paragraphs for which the students were instructed to write the implied main idea. The written directions were in English; oral directions were given in English and in Spanish. The day following the completion of the treatments, each class responded to a similarly constructed but different posttest. The posttest also was written in English, and the same procedures were followed. Both tests took 50 minutes to complete. I developed both tests.

The dependent variables were the posttest scores on tests of picture, word, and sentence classification tasks and scores on main idea tasks. Six paragraphs made up this part of the posttest. Three paragraphs had concrete topics, and three had abstract topics. The word and sentence tasks also had concrete and abstract topics.

Concrete topics included anything that could be touched, heard, or seen. Some examples of these topics include a house, vehicles, and a farm. Abstract topics

included anything that could not be touched, heard, or seen. Some examples of these topics include emotions, historical events, and illness.

The Classification Lessons

In a Piagetian model, students progress from dealing with concrete experiences to abstract experiences. The exercises implemented in this study, by providing both abstract and concrete subject matter, gave the students the opportunity to deal with both types of topics.

The development of the lessons followed Lowery's instructional model of providing the students with concrete, pictorial, and abstract classification experiences. The application of this model to the construction of lessons in identifying the main idea was based on previous research (Hadsell, 1978; McInnes, 1980; Stein, 1979). The method used in all the classification lessons was to introduce the students to the concept of part-whole (general-specific) relationships. This concept was taught by providing the students with a variety of classification tasks. The concrete, pictorial, and abstract classification tasks enabled the students to explore the common attributes of groups of objects and pictures, as well as words, sentences, and finally, paragraphs.

Table 1 displays the experimental bilingual instructional model.

Table 1. Instructional Model: Experimental Bilingual Classification Lessons

| Level | Number of Exercises | | Description |
|--------------------------------------|---------------------|---------|------------------------------------|
| | Spanish | English | |
| A. Concrete Object Tasks | 3 | 0 | Classification of Concrete Objects |
| B. Pictorial Tasks | 3 | 1 | Classification of Pictures |
| C. Written Language Tasks (Abstract) | 6 | 4 | Classification of Words |
| | 2 | 8 | Main Idea-Sentences |
| | 2 | 10 | Main idea-Paragraphs |

Concrete Topic Lessons

The purpose of these lessons and exercises was to introduce to the students the

concept of a superordinate class and the corresponding subordinate classes of objects. The students grouped and classified objects such as colored shapes, beads, and various types of leaves.

Pictorial Experiences

The students were given envelopes containing pictures which could be arranged in subordinate classes which in turn belonged to a superordinate class. The students needed to group the pictures that were part of the subcategories or classes. They were then asked to write the topic or superordinate class for each group of pictures on the appropriate envelope. Other picture exercises included whole-class activities in which students looked at one picture, listed the details, and then inferred from the details the subject or topic of the picture.

Word Classification

The lessons and exercises began by having the students read three or four lists of related words and then write them on a piece of paper. The category headings were provided. As the lessons progressed, the students not only wrote lists of classes of related words but also generated a category heading or label for each list. The lessons became progressively more difficult. In the last series of exercises, the students read a selection of related words, listed them, then generated the subcategories as well as the general category or superordinate class. None of the categories was provided.

Sentences

The students next worked with groups of related sentences in preparation for working with paragraphs. In the beginning exercises, the students read four related sentences and then circled the topic sentence. In the last type of sentence exercises, the students read a group of related sentences and then wrote the main idea of the groups of sentences. They identified a main idea in the same way they identified a main idea or category heading or label, that is, by considering the details as subclasses and the main idea as the label for a class of sentences.

Paragraphs

The students were instructed that identifying the main idea of a reading

passage was similar to locating a label which has been mixed in with a list of items. The paragraph lessons began with the students reading paragraphs and circling the explicit main ideas which were provided in multiple choice selections. As the lessons progressed, they became more difficult. The students were required to read paragraphs, write a list of details, and then write the explicit main idea. Next, the students listed the details and then wrote the implied main idea. Finally, they read a series of paragraphs and then wrote the implied main idea.

The Comparison Lessons

The comparison lessons were developed from textbooks and workbooks which dealt with inference and how to identify stated and implied main ideas. These were the materials that the regular classroom teacher used when teaching these reading skills. The two control classes received instruction using readings and exercises from *Main Idea and Details* and *Inference and Conclusions* (Pescosolido, 1977) and *Reading Tactics* (Niles, 1977). The students completed and discussed 10 worksheets from *Main Idea and Detail* and 12 worksheets from *Inference and Conclusions*. The students also completed approximately three chapters in *Reading Tactics* which dealt with concepts in main idea, inference, and how to infer the main idea. The worksheets and the textbook exercises were alternated during each class period.

I translated 12 of these lessons into Spanish and then presented them to the bilingual control class. The students were instructed to look for clue words to help them identify the main idea. These words included who, what, when, and where. They also were instructed to look for clues in paragraphs to help them make inferences or judgements based on facts. These lessons consisted of material that also had both abstract and concrete topics.

The Bilingual Lessons

The objective of the bilingual lessons was to enable the students to develop skills in classification, inference, and main idea, while not dealing simultaneously with problems of English vocabulary. The lessons for the experimental and control bilingual classes, therefore, consisted of lessons in which concepts were presented in Spanish. During one 50-minute instruction period, the students in the two bilingual treatment classes usually completed two or three lessons presented in Spanish and one or two in English. Gradually, the procedure was

reversed, with two or three lessons presented in English and one or two in Spanish. After approximately six days of the bilingual treatment, all the students were working with paragraphs, and the exercises and lessons were presented entirely in English.

The Measures

All the students participating in the study were administered a pre and a posttest which I wrote. These tests consisted of four parts: picture, word, and sentence classification, as well as main idea tasks. The written and oral instructions for the measures, as well as the tests themselves, were in English. These tests were checked for reliability and validity by means of a pilot study of the test instruments. The administration of each test took approximately 50 minutes.

Results

Only the major findings of the study will be discussed in this section. An interpretation of the results will begin with a discussion of the first research question concerning the relationship between class-inclusion skills and test scores on inference as well as word and sentence classification.

Table 2 displays the correlations between the picture classification scores and the reading task scores on the pretest.

Table 2. Correlation coefficients between picture classification and concrete and abstract topic writing tasks: pretest, n = 63

| | Concrete | | Abstract | |
|-------------------------|----------|-------|----------|--------|
| | r | p | r | p |
| Pictures and Words | | | | |
| Kendall's τ = | .207 | .102 | .228 | .055 |
| Pictures and Sentences | | | | |
| Phi = | .159 | .435 | .103 | .481 |
| Pictures and Paragraphs | | | | |
| Kendall's τ = | .256 | .033* | .451 = | .002** |

*p < .05 ** p < .01

The correlation between the picture classification scores and the concrete paragraph scores was significant -- .256, $p < .05$. Similarly, the correlation between the picture classification scores and the abstract paragraph scores was significant -- .451, $p < .01$. The correlation between the scores on abstract word classification and picture classification scores was not significant -- .228, $p < .055$.

The interrelationships between all the abstract topic and concrete topic written tasks were examined. (This analysis was conducted only for the pretest scores, since the treatment might affect the posttest scores.)

Analyses of the pretest scores suggest several types of relationships between the abstract and concrete topic word and sentence classification tasks. There appear to be significant correlations between these classification tasks and tasks involving identification of the implied main idea.

Table 3 displays the correlations between the various classification tasks.

Table 3. Correlation coefficients between abstract and concrete topic classification tasks: pretest, $n = 63$

| | | Abstract | | | Concrete | | |
|----------|------|----------|----------|-----------|----------|----------|-----------|
| | | Word | Sentence | Paragraph | Word | Sentence | Paragraph |
| ABSTRACT | Word | .240 | .406 | .353 | .303 | .230 | |
| | | .016* | .000*** | .000*** | .003** | .017* | |
| | Sent | | .199 | .136 | .187 | .167 | |
| | | | .070 | .119 | .073 | .123 | |
| | Para | | | .307 | .250 | .352 | |
| | | | | .002** | .024* | .002** | |
| CONCRETE | Word | | | | .268 | .016 | |
| | | | | | .010* | .869 | |
| | Sent | | | | | | .058 |
| | | | | | | | .593 |
| | Para | | | | | | |

* $p < .05$ ** $p < .01$ *** $p < .001$

Note: The following procedures were used in the construction of this table: Pearson r - paragraphs with paragraphs; Phi - sentences with sentences; Kendall's τ - the remaining analyses.

Many of the classification tasks and the paragraph tasks appear to be moderately related. The correlations range from .016 to .406. The next set of analyses deals with the second and third research questions, which concern the effect of classification and language of instruction on the students' ability to infer the main idea.

Tables 4 and 5 display the means, standard deviations, and pre-to-posttest differences for the scores for the concrete paragraph tasks.

Table 4. Means, standard deviations, and pre-to-posttest differences: tests of implied paragraph main ideas, concrete topics

| Classes | pretest | | Concrete posttest | | difference | |
|-----------|-----------|------|-------------------|------|------------|------|
| | \bar{X} | S | \bar{X} | S | \bar{X} | S |
| 1 n=19 | 5.78 | 4.19 | 7.84 | 3.62 | 2.05 | 4.91 |
| 2 n=14 | 6.85 | 4.38 | 7.78 | 3.78 | .93 | 4.98 |
| 3 n=16 | 7.25 | 3.04 | 7.87 | 2.68 | .62 | 3.38 |
| 4 n=14 | 6.07 | 3.29 | 8.64 | 2.98 | 2.57 | 3.15 |

Classes: 1 = Control Bilingual
2 = Control English

3 = Experimental English
4 = Experimental Bilingual

Note: Maximum Score = 12; Minimum Score = 0

An examination of the pre-to-post differences indicates that all four classes showed an improvement from pretest to posttest. The Experimental Bilingual class had the largest pre-to-posttest difference among the four classes for both the abstract and concrete topic paragraphs. The Experimental English class had a slightly larger difference on the abstract paragraphs than the Control English class.

An analysis of variance examined the pre-to-posttest scores to test for any

differences in the means between the classes. The analysis results indicate that there were no significant differences between the classes in their ability to identify the main idea of paragraphs. For abstract paragraph gains, an effect was more evident for language, $f(1,59) = 2.80, p < .099$, and treatment, $f(1,59) = 3.01, p < .088$. However, the results did not support the expectation that the two classes of students who received the experimental classification lessons would exhibit significantly higher gains on the posttest than the two control groups.

Table 5. Means, standard deviations, and pre-to-posttest differences: tests of implied paragraph main ideas, abstract topics

| N=63 Classes | pretest | | Abstract posttest | | difference | |
|-----------------|-----------|------|----------------------|------|------------|------|
| | \bar{X} | S | \bar{X} | S | \bar{X} | S |
| 1 n=19 | 4.42 | 3.62 | 6.68 | 3.26 | 2.26 | 4.58 |
| 2 n=14 | 6.00 | 4.55 | 6.71 | 3.33 | .71 | 4.89 |
| 3 n=16 | 5.93 | 2.64 | 8.25 | 2.95 | 2.32 | 3.03 |
| 4 n=14 | 2.78 | 3.30 | 7.07 | 4.19 | 4.29 | 3.69 |

Classes: 1 = Control Bilingual 3 = Experimental English
 2 = Control English 4 = Experimental Bilingual

Note: Maximum Score = 12; Minimum Score = 0

Tables 6 and 7 display the means, standard deviations, and pre-to-posttest differences for the word classification tasks.

Table 6. Means, standard deviations, and pre-to-posttest differences: word classification tasks, concrete topics.

| N=63 Classes | pretest | | Concrete posttest | | difference | |
|-----------------|-----------|------|----------------------|------|------------|------|
| | \bar{X} | SD | \bar{X} | SD | \bar{X} | SD |
| 1 n=19 | 6.58 | 2.24 | 7.11 | 1.66 | .53 | 2.56 |
| 2 n=14 | 7.36 | 1.28 | 7.21 | 1.05 | -.15 | 1.35 |
| 3 | 7.44 | 1.15 | 8.25 | 2.80 | .81 | 1.17 |

| | | | | | | |
|---|------|------|------|----------------------------|-----|------|
| n=16 | | | | | | |
| 4 | 6.50 | 1.91 | 7.36 | 2.13 | .86 | 1.51 |
| n=14 | | | | | | |
| Classes: 1 = Control Bilingual | | | | 3 = Experimental English | | |
| 2 = Control English | | | | 4 = Experimental Bilingual | | |
| Note: Maximum Score = 12; Minimum Score = 0 | | | | | | |

Table 7. Means, standard deviations, and pre-to-posttest differences: word classification tasks, abstract topics

| N=63 Classes | pretest | | Concrete posttest | | difference | |
|--|-----------|------|----------------------|------|----------------------------|------|
| | \bar{X} | S | \bar{X} | S | \bar{X} | S |
| 1 | 5.37 | 2.89 | 6.90 | 1.24 | 1.53 | 2.65 |
| n=19 | | | | | | |
| 2 | 7.21 | 1.62 | 6.50 | 1.99 | -.71 | 2.52 |
| n=14 | | | | | | |
| 3 | 7.38 | 1.62 | 8.25 | 1.30 | .87 | 1.87 |
| n=16 | | | | | | |
| 4 | 5.71 | 2.05 | 7.57 | 1.09 | 1.86 | 2.24 |
| n=14 | | | | | | |
| Classes: 1 = Control Bilingual | | | | | 3 = Experimental English | |
| 2 = Control English | | | | | 4 = Experimental Bilingual | |
| Note: Maximum Score = 9; Minimum Score = 0 | | | | | | |

An examination of the differences in means between the classes on their scores on the classification of concrete topic words indicates the Experimental English and the Experimental Bilingual classes had higher means than the two control classes. On the classification of abstract words posttest, the Experimental Bilingual and the Experimental English classes had higher mean scores than the control classes. The mean for the control English class declined on the posttest.

An analysis of variance examined the pre-to-posttest differences on the word classification scores in order to test for any differences in the means between the classes. The analysis of variance indicated that for gains on the concrete word classification tasks, neither main effect for treatment, nor language, nor their interaction were found to be significant. For abstract word classification tasks, the analysis of variance showed a significant treatment effect for language, $f(1,59) = 7.75, p < .01$, but it did not indicate significance for treatment or the interaction effect of language and treatment. An inspection of the gain scores

corroborates that the bilingual treatment classes had the largest differences from pre to posttest.

Conclusions and Implications

The first question investigated by the study was the relationship between the students' performance on picture classification tasks and their performance on comprehension tasks requiring inferring the main idea. The data indicate moderate support for the hypothesis that there is a correlation between the students' performance on picture classification tasks and implied main idea tasks. There were statistically significant correlations among the variables.

In addition, the study also found several moderate correlations between several of the written abstract and concrete topic classification tasks. These classification tasks were, for the most part, significantly related to the inferential main idea tasks. The data appear to support the hypothesis that performance on word and sentence classification tasks is significantly related to performance on the inferential main idea tasks.

The next question investigated by the study was the effect of using sequentially developed classification lessons to teach the implied main idea, as well as word and sentence classification. The data indicate no statistical support for the hypothesis that classification lessons make a difference in teaching Spanish-language dominant students how to infer the main idea of paragraphs requiring part-whole decisions. However, the pre-to-posttest differences favor a treatment effect, although not statistically significant, for the abstract rather than the concrete tasks. The direction of the pre-to-posttest differences favors the classes that received the classification treatments.

Although the reasons for the results are unclear, there are some possible explanations. It might be that classification skills are more important in teaching students how to identify the implied main idea of abstract topic paragraphs than those with implied concrete topics. It is possible that the cognitive strategies involved in identifying the abstract main idea require a more complex schemata or processing model and that these strategies were more sensitive to the treatment.

The treatment effects for the abstract tasks followed a consistent pattern throughout the study. The overall treatment effect for the abstract tasks was consistently more evident than the effect for the concrete tasks. This was not anticipated. It is not clear why this occurred, but one explanation may be that the concrete tasks were simply too easy for the population.

Another question with which the study was concerned was the effect of bilingual instruction on teaching inference of the main idea and the classification of words, sentences, and pictures. The study found that bilingual instruction made a statistically significant difference between the classes in their ability to classify abstract words. The two classes that received the bilingual treatments had the larger pre-to-posttest differences. The data support the hypothesis that bilingual instruction makes a difference in teaching abstract word classification.

The overall results of the study appear to indicate a relationship between performance on picture classification tasks and performance on tasks requiring identification of the implied main idea. The results of the study appear to support Lowery's hypothesis that there is a relationship between students' attainment of classification skills and students' performance on tasks involving concepts in reading. However, the study did not support earlier research that classification lessons made a difference in teaching students how to infer the main idea (Berget & Valverde, 1983; Hadsell, 1979; McInnes, 1980). An examination of the data indicates that the classification treatment classes did perform better than the control classes on most of the criterion tests, although the differences were not statistically significant. The data support the hypothesis that bilingual instruction makes a difference in teaching students abstract word classification.

Limitations

The study has several limitations. One of these is the lack of individual random assignments to the treatments. This limitation was not a factor in the investigation of the relationship between the students' performance on nonverbal classification tasks and reading tasks. Other limitations include the quality of some of the measures, and the small number of students per treatment class (15), and no measure of the students' reading ability in Spanish. The results of the investigation must be carefully interpreted. Since one cannot generalize from this study to teaching practices, or from the sample population to any other population, the implications must be tentative. As previously stated, this was an exploratory study in an area about which very little is known. Consequently, the principal implications of the research findings concern directions for further research.

Implications for Future Research

Very few studies have investigated teaching reading strategies to Spanish-

speaking high school students. In order to verify the results of this study, a similar study should be carried out with a larger sample size and with modifications.

In all four classes of students, approximately 10 to 20 percent of the students were not able to classify pictures in part-whole groupings. This was not expected. Although the directions were given in English to each class, they were also given individually in Spanish. However it is possible that the students could not understand the English instructions. Therefore, in a future study, both the written and oral directions should be given in Spanish and English rather than only in English. This study focused on paragraphs that required part-whole decisions in order to identify the main idea. Future research might investigate other types of classification skills, e.g., hierarchical and other types of paragraphs.

Another change would be a more open-ended analysis of the categories generated by the students' picture classification tasks. In the present study, the picture categories were established before administration of the tasks. In a future study, the students could be allowed to classify pictures into categories other than those previously established. The students, however, would need to provide a rationale for their choices.

In addition, Piagetian tasks are usually administered on an individual basis. In the strictest interpretation of Piagetian practice, tests should not be group administered. Piaget's method involved a one-to-one technique. The nonverbal tasks should be administered individually to more accurately test the students' ability to classify pictures.

This study found a significant relationship between main idea tasks and classification tasks. Poor performance on picture classification was related to poor performance on tasks requiring identification of the implied main idea. The results merit further study.

Conclusion

Very little research, if any, has investigated the role of classification skills in teaching inferential reading skills to Spanish-speaking adolescents. However, in their review of research on learning strategies among second language learners, Chamot and O'Malley (1984) suggest that students do apply particular strategies to learning a second language. The authors also suggest that intervention by the teacher can help students at all levels of English skill development replace less effective strategies with more effective ones. In a related article, however, Chamot and O'Malley (1985) write that not only are teachers generally unaware

that students use learning strategies, but they rarely introduce them while teaching.

The strategies used in the work reported here were bilingual as well as innovative. The results of the study suggest that Spanish-speaking adolescents used schemata during the process of learning English reading skills. The ability to classify in part-whole relationships appears to be one part of the schemata used by these students during this skill development.

It is my opinion, and one shared by many other researchers, that students need to be able to classify. It is a skill that is necessary in many learning activities. It is one way through which we mentally structure the sensory stimuli from our environment. Consequently, teachers may want to consider some strategies which would assist students in the development of these skills. This may be one way of encouraging a basic cognitive ability, i.e., how to classify. However, the exact manner of implementing such instruction is not clear from the present study. The present research explores one approach to implementing such instruction; there may be others.

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