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## The Effects Of Chinese Character Recognition Instruction On The English Reading Readiness Skills Of Chinese- And Non-Chinese-Speaking Kindergarten Students

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THE EFFECTS OF CHINESE CHARACTER RECOGNITION INSTRUCTION  
ON THE ENGLISH READING READINESS SKILLS OF  
CHINESE- AND NON-CHINESE-SPEAKING  
KINDERGARTEN STUDENTS

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A Dissertation  
Presented to  
the Graduate Faculty of the  
University of the Pacific

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In Partial Fulfillment  
of the Requirements for the Degree  
Doctor of Education

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by  
Victoria Wai Jew  
July 1981

A STUDY OF THE EFFECTS OF CHINESE CHARACTER RECOGNITION  
INSTRUCTION ON THE ENGLISH READING READINESS SKILLS  
OF CHINESE AND NON-CHINESE-SPEAKING  
KINDERGARTEN STUDENTS

Abstract of Dissertation

The Problem: Presently Chinese bilingual educators are divided in their opinions on the desirability of introducing initial reading in Chinese in an American school setting. A review of research studies found that data on the effects of Chinese reading instruction in a bilingual program was lacking. The present study was designed to examine the effects of Chinese character recognition instruction on the English reading readiness of Chinese and non-Chinese speaking kindergarten students. The study attempted to provide baseline data, information and recommendations for further research for Chinese bilingual education programs.

Procedures: A quasi-experimental design using control and experimental groups was utilized. Chinese and non-Chinese-speaking experimental and control kindergarten students were pretested with The Metropolitan Readiness and The Slingerland Pre-reading Screening Procedures.

The experimental students were given Chinese character recognition instruction over a six week period. Twenty-two Chinese characters were taught during fifteen instructional sessions. Post tests were given to all the students. A Chinese character recognition test was developed and given to the experimental students. The collected data were analyzed using the Analysis of Covariance and the Pearson Product Moment Correlation Analysis.

Findings: Results of data analysis supported positive effects of Chinese character instruction on student skills in letter recognition, copying of patterns and copying from memory. Positive correlation between Chinese character recognition ability and overall English reading readiness, letter recognition, and intellectual maturity as measured by the draw-a-man test were also found.

Conclusions and Recommendations: Findings of the study indicated that Chinese character instruction is probably more effective than English reading readiness instruction commonly practiced in the classroom for the improvement of certain reading readiness skills. A cause and effect relationship is probable between Chinese character instruction and the improvement in skills in letter recognition and pattern copying.

Since the sample of the study was small, larger sample studies are recommended to determine the generalizability of the findings of this study. Studies using structured observations of student behaviors in utilizing strategies learned from Chinese instruction in English reading readiness activities were also recommended.

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<sup>1</sup>Victoria Wai Jew, op. cit., citing Mommy in "At Last" (Sacramento, 1981), pp. 0-0 (sic).

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## Chapter 1

### INTRODUCTION

According to the California State Department of Education's Limited-English-Speaking Student Census of January 1980, the second-largest population of minority language children in California is Chinese-speaking. Yet a search into reference sources reveals no body of research regarding Chinese reading in bilingual situations. Program assumptions for Chinese bilingual programs are based on those established previously by Spanish bilingual programs. Such assumptions do not necessarily provide a sound basis for program decision-making, implementation or evaluation. This is particularly true if one considers the vast differences between an ideographic language such as Chinese and a phonemic-alphabetic language such as Spanish.

The program assumption that has created the most controversy among Chinese bilingual educators by far has been the assumption that initial reading instruction is best introduced in the child's native or primary language. From studies that are currently available, it can be expected that this controversy cannot be resolved on a rational basis since no reasonably conclusive data are available, particularly for introducing reading in Chinese.

Cummins pointed out that one of the weaknesses of the many evaluations conducted on bilingual programs in the U.S. was failure to incorporate into design the interactions between programs and student input factors.<sup>1</sup> He further stated:

However, in the United States where there is enormous diversity within different groups of minority language children in terms of motivational, cognitive and linguistic characteristics, evaluations have taken little or no account of possible interactions between these child input factors and educational treatment.<sup>2</sup>

Cummins' suggestion can also be used to provide a rationale for a new direction and approach to research related to bilingual education programs and bilingualism. One of the emphases for research under this new direction may be that research needs to become more language and culture specific than it has been up to the present. Generalizations regarding bilingualism, program implementation, methodology and evaluation may not be validly made without considering the cognitive, linguistic and motivational characteristics of different cultural and linguistic groups.

Within the context of cultural and language specific research into bilingualism and bilingual education, reading research needs to be given priority. The reason is that a child's long-term school achievement is dependent upon his

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<sup>1</sup>James Cummins, "Linguistic Interdependence and the Educational Development of Bilingual Children," Review of Educational Research, 49 (Spring, 1979), pp. 222-6.

<sup>2</sup>Ibid., p. 226.

or her ability to read adequately. In addition, because bilingual programs involve teaching cognitive skills in two different languages, language specific research in reading may provide useful information to those who implement and evaluate programs.

The most often cited research for those who advocate introducing initial reading instruction in the native language is the Modiano Study.<sup>3</sup> This study involved two groups of Indian students in Mexico. One group of students was introduced to reading using the national language (Spanish). The other group received their initial reading instruction in their native language and subsequently transferred to Spanish reading. The native language group was found to be able to read Spanish with greater comprehension.<sup>4</sup>

A reversed language situation from the Modiano Study, generally referred to as the St. Lambert experiment, was conducted in Canada by Lambert and others.<sup>5</sup> This was a language switch experiment in which English-speaking students received the first two years of their schooling completely in French in a curriculum designed for native French speakers. After five years of instruction it was

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<sup>3</sup>Nancy Modiano, "National or Mother Language in Beginning Reading, A Comparative Study," Research in Teaching English, 1 (1968), pp. 32-43.

<sup>4</sup>Ibid.

<sup>5</sup>Wallace E. Lambert and G. Richard Tucker, Bilingual Education of Children (Rowley, Mass.: Newberry House, 1972).

found that the experimental group was equal to the control group in their ability to read, write and speak English. Although the St. Lambert study was conducted in a situation that is the reverse of the Modiano Study, both findings indicate that reading skills taught in one language can be transferred to another language. However, the two studies discussed above involved basically alphabetic and phonemic languages. No study has shown if such generalizations can be made regarding the transfer of skills between an alphabetic and phonemic language and a non-alphabetic, non-phonemic language.

Cowan and Sarmad conducted a study on the Persian and English reading ability of Iranian bilingual school students.<sup>6</sup> A comparison was made between the reading scores of students who attended three different types of schools: (1) mono-lingual English, (2) mono-lingual Persian, and (3) bilingual. When reading scores of the three types of schools were compared, it was found that the mean scores of bilingual school students were lower in both English and Persian as compared to the mean score of students in the respective mono-lingual schools. The investigators hypothesized that the lower reading scores may be attributed to the vast difference between English and Persian reading and the possibility that students developed two distinct strategies for

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<sup>6</sup>J. Ronayne Cowan and Zohreh Sarmad, "Reading Performance of Bilingual Children According to Type of School and Home Language," Language Learning, 26 (December, 1976), pp. 353-76.



reading in the two languages. The effect of this parallel reading strategy may be that the children do not read as well in either language.

Although Persian is a phonemic language, the Persian alphabet is much more complicated than the English alphabet. Written Chinese also contains an orthography which is visually more complex to discriminate than English. In a study on the reading processes of proficient readers in many languages, Gray found that the eye movement of readers in Hebrew, Arabic and Chinese revealed a longer fixation than most of the languages studied.<sup>7</sup> This may be attributed to the visual complexity of each of the orthography. The Persian study also points to the possibility that the effects of teaching reading in one language on the reading skills of another between languages with vastly different orthography may be different from the findings in languages that have similar orthography, such as Spanish, French and English.

Contrary to the findings in Persian bilingual schools, two studies by Symonds and Ma both found that Chinese students who attended Chinese language schools in Hawaii and San Francisco did not have lower English reading

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<sup>7</sup>William Gray, The Teaching of Reading and Writing, Enlarged Edition (Switzerland: UNESCO, 1969), pp. 43-60.

scores as compared to their American peers.<sup>8</sup> Studies concerning the formal instruction of reading in the Chinese language in American school settings, however, cannot be found.

A few studies have been conducted utilizing Chinese characters in the reading process. Rozin, Poritsky and Sotsky found that, after a few hours of tutoring in the recognition of Chinese characters, inner-city second-grade students with serious reading disabilities were able to read English sentences represented by Chinese characters.<sup>9</sup>

The Rozin study was replicated by Harrigan, who also recommends that a less phonemic approach to initial reading might be preferable for certain students with reading difficulties.<sup>10</sup> Harrigan further suggests that the reading of ideographic and phonemic languages may involve two different reading processes as indicated by studies by Makita, Kuromaru

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<sup>8</sup>Percival M. Symonds, "The Effect of Attendance at Chinese Language Schools on Ability with the English Language," Journal of Applied Psychology, 8 (1924), pp. 443-23; Maurice Kaufman, "Will Instruction in Reading Spanish Affect Ability in Reading English?", Journal of Reading (April, 1968), p. 521, citing Yi-Ying Ma, unpublished Ed.D. dissertation, U.C. Berkeley, 1945.

<sup>9</sup>Paul Rozin, Susan Poritsky and Raina Sotsky, "American Children with Reading Problems Can Easily Learn to Read English Represented by Chinese Characters," Science, 171 (1971), pp. 1264-7.

<sup>10</sup>John E. Harrigan, "Initial Reading Instruction: Phonemes, Syllables, or Ideographs?", Journal of Learning Disabilities, 9 (February, 1976), pp. 74-80.

and Okada, and Geschwind.<sup>11</sup> Harrigan proposes that ideographic language may be mapped more directly to meaning, while the blending of small units of phonemes in a phonemic language is processed differently.<sup>12</sup> Neither of the above studies focused on Chinese reading instruction as such, but rather were concerned with interpreting factors involved in dyslexia in English-speaking children.

A study by Nelson and Ladan concentrated on the visual factor of Chinese characters in reading.<sup>13</sup> They found that the better readers were more able to discriminate between characters than the minimal readers. From the result of this study, they concluded that the visual factor involved in the recognition of Chinese characters, instead of the lack of phonemic elements in Chinese character reading, might have accounted for Rozin's subjects' ability to read English represented by Chinese characters.<sup>14</sup>

The studies reported above basically dealt with two aspects--visual and mapping processes--of Chinese reading.

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<sup>11</sup>Harrigan, op. cit., citing K. Makita, "The Rarity of Reading Disability in Japanese Children," American Journal of Orthopsychiatry, Vol. 38 (1968), p. 599; S. Kuromaru, and Okada, in Proceedings of the 7th International Congress of Neurology, Vol. 2 (1961), p. 370; N. Geschwind. Science, Vol. 173 (1971), p. 1970.

<sup>12</sup>Ibid., p. 78.

<sup>13</sup>T. M. Nelson and C. J. Ladan, "Chinese Ideograms as Intermediaries to Reading," Journal of Reading Behavior, Vol. 9 (Summer, 1977), pp. 167-74.

<sup>14</sup>Ibid., p. 173.

None of the studies paid attention to the methodology of instruction in authentic Chinese character recognition. Only simple drills were used to teach Chinese characters in these studies. In authentic Chinese instruction, other strategies which take into consideration the different methods of character formation, Chinese radicals and categorization, etc., would have been considered. (See Appendix B for a list of criteria.) Regardless of their lack of authenticity, these three studies on Chinese character instruction point to some possible advantages of Chinese reading instruction in an American school setting. The rudimentary nature of the studies and the non-authentic instructional method utilized in the studies, however, make definitive conclusions about the effects of Chinese reading instruction on reading achievement or visual perception impossible. In order to determine such relationships, a more realistic instructional setting for an investigation needs to be provided.

Since no previous investigation in a realistic setting exists, this study attempted to initiate the investigation by starting with students at the initial reading stage. The investigation attempted to determine the effects of instruction in Chinese character recognition on the English reading readiness skills of Chinese- and non-Chinese-speaking kindergarten students.

### Basis For This Study

When Chinese reading is contrasted with English reading, two distinct features of Chinese reading can be found. One feature is the visual complexity of the orthography; the other is the possibility of a symbol-to-meaning reading process.

For a beginning reader, the visual aspect of reading is most important. E. J. Gibson has observed that "...much emphasized in early school grades, is the learning of discrimination, of representations (pictures and symbols)."<sup>15</sup> Gagne also pointed out the importance of the child's ability to discriminate distinctive features of objects, pictures, and symbols in initial reading instruction.<sup>16</sup>

The recognition of Chinese characters requires an acute ability to discriminate the distinctive features of the symbols used. Discrimination training in character recognition may improve a child's ability to discriminate the features of different symbols (such as English letters).

Eleanor W. Thonis has pointed out the ineffectiveness of visual discrimination training often practiced in kindergarten in which children were asked to make gross

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<sup>15</sup>Robert Gagne, The Conditions of Learning (New York: Holt, Rinehart and Winston, 1977), p. 107, citing E. J. Gibson, Principles of Perceptual Learning and Development (New York: Appleton, 1969).

<sup>16</sup>Robert Gagne, The Conditions of Learning (New York: Holt, Rinehart and Winston, Inc., 1977), pp. 106-108.

discriminations between objects and picture details.<sup>17</sup> She suggested that reading requires a much more demanding ability to discriminate between letter forms and the different arrangements of letters in words. On the other hand, Gagne stated that the introduction of more letters within a short span of time can cause interference in discrimination learning of letter recognition. Instruction in Chinese character recognition may be one solution to this pedagogical problem because it provides a more realistic symbol discrimination training without the disadvantages of introducing more English letters.

Frank Smith has suggested that a child needs to acquire two insights in order to learn to read: (1) that print is meaningful, and (2) that written language is different from speech.<sup>18</sup> The first insight may be acquired more readily if more than one situation (language) of print-meaning relationship is presented to the learner. For acquiring the second insight, Chinese character recognition instruction may prove to be superior to English reading readiness training if one considers the emphasis placed on sound-letter relationship as practical in most kindergarten reading readiness training as compared to the symbol-to-meaning emphasis of Chinese character recognition instruction.

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<sup>17</sup>Eleanor W. Thonis, Teaching Reading to Non-English Speaking (New York: Collier Macmillan International, Inc., 1970), p. 17.

<sup>18</sup>Cummins, pp. 222-51, citing Frank Smith, "Making Sense of Reading and of Reading Instruction," Review of Educational Research, Vol. 47 (1977), pp. 386-395.

### Statement of the Problem

The study attempted to explore the effects of Chinese character recognition instruction on the English reading readiness skills of kindergarten children. An effort was also made to investigate if there is a significant difference between English reading readiness skills of Chinese and non-Chinese-speaking students who have received Chinese character recognition instruction. The study further examined how instruction in Chinese character recognition affects children's performance in various readiness tasks commonly found in most reading readiness tests. Subsequently, the study investigated the relationship between the children's ability to recognize Chinese characters and their English reading readiness.

### Procedures of the Study

Chinese- and non-Chinese-speaking kindergarten experimental and control group students were pretested with The Metropolitan Readiness Tests and The Pre-reading Screening Procedures in September. The experimental Chinese- and non-Chinese-speaking students received 16 sessions of instruction in Chinese character recognition during the subsequent six weeks. A posttest was given to all the students and the data were collected and analyzed.

### Significance of the Study

This study was an initial attempt to investigate the effect of Chinese reading instruction in an American school setting. Since no body of research in this area exists, the study provides baseline data, questions and suggestions for further investigation.

At present, a difference of opinion regarding the desirability of teaching beginning pre-literate Chinese-speaking students Chinese literary skills exists among Chinese bilingual educators. The results of the study provide a more rational basis for discussing their differences. If differences can be resolved, a more concerted effort to develop and improve curriculum and methodology in Chinese reading in bilingual programs may be the result.

The study also dealt with the use of Chinese character recognition instruction as visual discrimination training for non-Chinese-speaking students. The findings of the study can also provide information regarding the pedagogical aspect of visual discrimination training for English reading readiness.

### Questions to be Answered by This Study

- This study intended to seek answers to the following:
- A. The effects of Chinese instruction in relation to instructional methods and language variables.



1. Is there a significant difference in English reading readiness [as measured by The Metropolitan Readiness Tests and Slingerland's Pre-reading Screening Procedures (I-IV, VII)] between kindergarten students who have received instruction in Chinese character recognition and those who have received only English reading readiness instruction?
  2. Is there a significant difference in English reading readiness between Chinese-speaking children and non-Chinese-speaking children who have received instruction in both Chinese character recognition and English reading readiness?
- B. The effects of instruction on the subtests of the readiness tests between instructional method groups.
3. Is there a significant difference in English reading readiness between children who have received Chinese instruction and children who have not, in the following readiness subtests of The Metropolitan Readiness Tests?
    - a. Word meaning
    - b. Listening
    - c. Matching
    - d. Alphabet
    - e. Numbers
    - f. Copying
    - g. Draw-a-man
  4. Is there a significant difference in English reading readiness between children who have received Chinese instruction and children who have not in the following Pre-reading Screening Procedures?
    - a. Screening Procedure I: Visual Stimulus - Visual Perception - Visual Association - Discrimination of Letter Units for Matching
    - b. Screening Procedure II: Visual Stimulus - Visual Perception - Visual Association - Discrimination of Word Units for Matching
    - c. Screening Procedure III: Visual Stimulus - Visual Perception and Memory - Visual Association - Discrimination for Matching from Recall
    - d. Screening Procedure IV: Visual Stimulus - Visual Perception - Kinesthetic Association with Motor Response for Copying from Near Point

- e. Screening Procedure VII (Gillingham): Visual Stimulus - Visual Perception and Memory - Kinesthetic Association with Kinesthetic-Motor Response from Recall

C. The relationship between English reading readiness skills and Chinese character recognition ability

5. Is there a significant correlation between Chinese character recognition ability (as measured by the Chinese Character Recognition Test) and English readiness skills?
  - a. as measured by The Metropolitan Readiness Tests
  - b. as measured by Pre-reading Screening Procedures

#### Delimitations

In order to focus on the investigations as stated, the following areas were not included within the scope of the study:

1. The study does not deal with the effect of socioeconomic status on the acquisition of reading skills.
2. The study does not examine the socio-linguistic factors of language status and attitude toward various languages as manifested in the school setting and the surrounding community.
3. The study does not deal with Chinese reading skills which incorporate the structural characteristics of Chinese sentences into the instruction.
4. The study does not include students from home language backgrounds other than Chinese and English.
5. The study does not include students with identified learning handicaps.

### Limitations

The investigator of the study is aware of the following limitations to the study:

1. The number of kindergarteners in the study was relatively small because of the limited human and financial resources available to the study.
2. School selection was based on their willingness to cooperate, their closeness in distance and the availability of relatively large numbers of Chinese-speaking kindergarteners. However, the schools were located in similar socioeconomic neighborhoods.
3. The Chinese-speaking students in the study were all ethnic Chinese Indo-Chinese refugees who were new immigrants. They might not be representative of the Chinese-speaking students in the United States.
4. Six weeks of instruction might not be sufficient for the purpose of measuring the effects of instruction in Chinese character recognition.
5. The tests selected were deemed to be the best available for the purpose. Cultural bias and the immaturity of the kindergarteners for test-taking are two of the constraints in measuring possible change.

### Definition of Terms

1. Chinese-speaking kindergarten student: A student from a home where Chinese is the primary language

spoken. The student also demonstrates fluency in expressive and receptive Chinese language in the Cantonese dialect.

2. Non-Chinese-speaking kindergarten student: A student from a home where English is the primary language spoken. The student does not have parents or close kin who are Chinese and has not been exposed to spoken Chinese to the extent that a receptive language in Chinese has been developed.

3. Instruction in Chinese character recognition: A system of instruction developed to teach the recognition of 22 Chinese characters. The instructional method will include strategies commonly utilized by Chinese educators for Chinese character recognition. (See Appendix B for criteria list.)

4. English reading readiness: A set of teachable pre-reading behaviors which is adequate for meeting the demands of appropriate English reading instruction. [Farr, Roger and Nancy Rosen, Teaching a Child to Read (New York: Harcourt, Brace and Jovanovich, Inc., 1970), p. 91; and Durkin, Delores, Teaching Them to Read (Boston: Allyn & Bacon, Inc., 1978), pp. 149-161; also citing Arthur I. Gates, et al., "Reading Readiness," Teacher College Record, XXXVII (May, 1936), pp. 679-685; and David P. Ausubel, "Viewpoints from Related Disciplines: Human Growth and Development," Teacher College Record, LX (February, 1959), 245-254.] For this study the pre-reading behaviors are

limited to those that have been identified for measurement in The Metropolitan Readiness Test and selected subtests of The Slingerland Pre-reading Screening Procedures.

### Summary

Presently research data concerning the effects of authentic Chinese reading instruction in a bilingual education setting in the United States is lacking. Research studies to provide such baseline data for Chinese bilingual programs are much needed. This study was an initial attempt to investigate the effects of Chinese reading instruction in an American school setting.

The study attempted to explore the effects of Chinese character recognition instruction on the English reading readiness skills of Chinese-speaking and non-Chinese-speaking kindergarten students. Chinese and non-Chinese kindergarten control and experimental group students were pretested with two reading readiness instruments. The experimental students received Chinese character recognition instruction in the subsequent six weeks. At the end of the experimental period, posttests were conducted. A Chinese character recognition test was also given to the experimental students. The collected data were analyzed to determine the effects of the Chinese character instruction on the students' English reading readiness skills.

As an initial study in the area of Chinese reading instruction in the U.S. school setting, it hopefully would

provide (1) information for discussions regarding the concerns of introducing initial reading in Chinese in bilingual programs, and (2) suggestions for further investigations. It might also provide information regarding the pedagogical aspects of visual discrimination training for all kindergarten students.

## Chapter 2

### REVIEW OF RELATED LITERATURE

This study was an attempt to investigate the effects of instruction in Chinese character recognition skill on the English reading readiness skills of both Chinese- and non-Chinese-speaking kindergarten students. Thus, literature review related to four areas was conducted:

- (1) The area of reading in two languages was reviewed, since the study sought answers to the effects of teaching reading readiness skills in a child's first language (Chinese) on his or her second language (English) reading readiness skills.
- (2) The area of the effects of visual discrimination training on students' reading readiness was also part of the review, since the study also involved using Chinese characters as meaningful visual symbols in instructing the recognition of Chinese characters to both Chinese- and non-Chinese-speaking kindergarteners.
- (3) The area of the relationship of the various readiness skills to reading achievement in subsequent grades has also been reviewed in relation to the various components of readiness skills which were included in the testing instruments used to measure the effects of the experimental instruction.
- (4) Studies related to the nature of the reading process in an ideographic language were also reviewed, since the study

investigated the possible transfer of reading skills between an ideographic and an alphabetic language.

### Reading in Two Languages

Generally, studies in reading in two languages focus on two major areas: (1) effects on reading achievement of the order of language used to initiate reading instruction; and (2) transferability of reading skills from one language to the other. Although a body of studies in the area is available, the quality varied considerably. Many of the available studies were essentially program evaluations which also have varying degrees of control in their evaluation designs. The objectives of the evaluations also vary from study to study. As a result, findings in the effects of the different orders of presentation of language for reading instruction is far from conclusive.<sup>1</sup>

The studies on reading in two languages have investigated three possible orders of language used in initial reading instruction. One approach is to introduce a child to reading in his or her first language (L1) and introduce reading in the second language (L2) at a later time (L1-->L2). Within this approach, two types of planning are possible. The subtractive plan initiates reading in the first language and later switches into reading in the second

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<sup>1</sup>Mary Lombardo, Research Studies on the Approaches of Beginning Reading for Bilingual Students, U.S., Educational Resource Information Center, ERIC Document ED 189 827, 1979.



language without continuing literacy instruction in the first language. The additive plan introduces reading in the first language and adds reading in the second language later. Literacy development in this case is continued. The second approach is to initiate reading in both the first and second languages simultaneously (L1 + L2). The third approach is to introduce reading in the second language (L2). Under this approach, two plans are possible. One is to add reading in the first language later (L2--→ L2 + L1). The other is to develop proficiency in the second language only (L2--→ L2 - L1).

Studies of the L1--→ L2  
Approach

This approach, which introduces reading in the child's first language and later introduces reading in the second language was endorsed by the UNESCO Conference on the use of the vernacular in education.<sup>2</sup> This approach is currently endorsed in the U.S. by advocates of bilingual education.

The most frequently cited research study on this approach is the Modiano Study.<sup>3</sup> The study involved two groups of Indian students from kindergarten to third grade

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<sup>2</sup>Patricia Lee Engle, The Use of Vernacular in Education (Arlington, Virginia: Center for Applied Linguistics, 1973).

<sup>3</sup>Nancy Modiano, "National or Mother Language in Beginning Reading, A Comparative Study," Research in Teaching English, 1 (1968), pp. 32-43.

in Mexico. One group was taught reading from the beginning in the national language (Spanish). The other group received their initial reading instruction in their native language and subsequently transferred to Spanish reading. The native language group was found to be able to read Spanish with greater comprehension.

Other studies with positive results. Eleven other studies using the L1--- L2 approach supported the positive effects of this approach. The student population of the studies are as follows: (1) Indian students in the primary grades in Mexico,<sup>4</sup> (2) Indian first- and second-grade students in Peru,<sup>5</sup> (3) Indian first- to third-grade students in Mexico,<sup>6</sup> (4) first-grade Spanish-speaking students in San Antonio, Texas,<sup>7</sup> (5) intermediate-grade Mexican-American

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<sup>4</sup>A. Vasquez-Barrera, The Tarascan Project in Mexico. The Use of the Vernacular Language in Education. UNESCO Monographs on Fundamental Education, VIII (Paris: UNESCO, 1953), pp. 77-86.

<sup>5</sup>C. B. Ratto, "Rural Education Campaign Among the Tribes of the Peruvian Jungle," Fundamental and Adult Education, 7 (1955), pp. 55-57.

<sup>6</sup>Mary Lombardo, loc. cit., citing A. Castro de La Fuente, "La alfabetizacion en lenguas indigenas y los promotores culturales. A William Cameron Townsend. (Mexico: Instituto linguistico de Verano, 1961.)

<sup>7</sup>R. D. Arnold, San Antonio Language Research Project Findings, Austin, Texas. R & D Center for Teacher Education, Texas University (ERIC Document ED 022 528, 1968).

students in San Antonio,<sup>8</sup> (6) Indian first- and second-graders in Peru,<sup>9</sup> (7) Hispanic second-grade students in New York City,<sup>10</sup> (8) Mexican-American first graders in San Antonio, Texas,<sup>11</sup> (9) Indian primary-grade students in Peru,<sup>12</sup> (10) first- and second-grade French-speaking students from Maine,<sup>13</sup> (11) Navajo Indian students at Rockpoint, Arizona.<sup>14</sup> At least two of the studies reviewed

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<sup>8</sup>Mary Lombardo, loc. cit., citing T. E. Taylor, A Comparative Study of the Effects of Oral-Aural Language Training on Gains in English Language for Fourth and Fifth Grade Disadvantaged Mexican-American Children (Doctoral dissertation, University of Texas at Austin, 1969).

<sup>9</sup>M. R. Wise, "Utilizing Languages of Minority Groups in a Bilingual Experiment in the Amazonian Jungle of Peru," Community Development Journal, 4 (1969), pp. 117-122

<sup>10</sup>A. Erlich, Bilingual Teaching and Beginning School Success, U.S., Educational Resource Information Center, ERIC Document 077 279, 1971).

<sup>11</sup>V. P. John and V. M. Horner, Basic Studies in Reading, ed. H. Livin and J. P. Williams (New York: Basic Books, 1970), pp. 246-262.

<sup>12</sup>Donald Burns, "Bilingual Education in the Andes of Peru," Language Problems of Developing Nations, ed. Fishman and others (New York: Wiley, 1968), pp. 403-413.

<sup>13</sup>Lombardo, loc. cit., citing N. C. Dube and G. Herbert, St. John Valley Bilingual Education Project: Five-Year Evaluation Report 1970-1975 (prepared for the U.S. Department of Health, Education and Welfare, 1975).

<sup>14</sup>P. Rosier and M. Farella, "Bilingual Education at Rock Point: Some Early Results," TESOL Quarterly, 10, No. 4 (1976), pp. 379-388.

followed the transitional subtractive plan by the third year.

Studies with inconclusive results. Findings in two studies in the L1-->L2 approach were inconclusive. One involved primary students from the Highlands of South Vietman.<sup>15</sup> The other study was that of Mexican-American first graders in Corpus Christi, Texas.<sup>16</sup>

Studies with equal results. Three other studies found near equal performance between students of the L1-->L2 group and its control which followed the L2 approach. One was a study of Cuban and English-speaking middle-class students in Dade County, Florida, from grades 1 - 12 in a bilingual/bicultural program which followed a model of 50 percent instruction in Spanish and 50 percent instruction in English for both Spanish- and English-speaking students.<sup>17</sup> Another involved Mexican-American first and second graders

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<sup>15</sup>Lombardo, loc. cit., citing S. Gudschinsky, "Mother-tongue Literacy and Second Language Learning," Bilingualism in Early Childhood, ed. W. F. Mackey and T. Andersson (Rowley, Mass.: Newberry House, 1977).

<sup>16</sup>R. L. Hillerich and F. H. Thorn, "Ermos Experiment in Reading for Mexican-American Students," U.S., Educational Resource Information Center, ERIC Document ED 035 506, 1969).

<sup>17</sup>Lombardo, loc. cit., citing R. G. Inclan, "An Updated Report on Bilingual Schooling in Dade County, Including Results on a Recent Evaluation" (paper presented at the Conference on Child Languages, Chicago, November, 1971).

in San Antonio, Texas.<sup>18</sup> At the end of the first and second grades, both the experimental and the control groups performed equally. In a study of Tagalog-speaking Filipino primary students in the Phillipines, the experimental group was instructed using the L1--- L2 approach for two years before transferring to English in the third grade. The control group was instructed in English from the first grade.

In the first two years, the experimental group was superior in all measures of school performance. By the third year, the experimental group still performed better, but not significantly.<sup>19</sup>

All the foregoing studies involved the teaching of reading in two alphabetic-phonemic languages which utilize the same alphabet system. No study using this approach was found on two languages which utilize different orthographic systems (such as between an ideographic orthography and an alphabetic-phonemic orthography as in the case of Chinese and English).

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<sup>18</sup>G. C. Pryor, "Evaluation of the Bilingual Project of Harlandale Independent School District, San Antonio, Texas, in the First and Second Grades of Four Elementary Schools during the 1967-1968 School Year," U.S., Educational Resource Information Center, ERIC Document ED 026 158, (1968).

<sup>19</sup>P. T. Orata, "The Florida Experiment Through the Vernacular," The Use of Vernacular Language in Education. Monographs on Fundamental Education, VIII (Paris, UNESCO, 1953), pp. 123-131.

Studies of the Simultaneous  
Approach (L1 + L2)

In this approach, students begin reading instruction in both their first language (L1) and their second language (L2) simultaneously.

Studies with positive results. Two of the studies found the L1 + L2 approach was more successful than the L2 only approach. One involved students from Afrikaans homes in South Africa in an Afrikaans and English bilingual situation.<sup>20</sup> In this study the intelligence of the students was controlled for. Malherbe found that there were definite handicaps for students in the second-language-only program in the early grades, but this disadvantage gradually lessened toward the sixth grade. Another interesting finding of the study was that both students from the above-average intelligence group and the below-average intelligence group did better in the L1 + L2 approach than in the L2 only approach. The greatest gain in the second language was made by the lower intelligence group using the L1 + L2 approach. Very few other similar studies have controlled for intelligence.

In another study using L1 + L2 with first- and second-grade Mexican-American and English-speaking students,

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<sup>20</sup>Christina Bratt Paulston, Implications of Language Learning Theory for Language Planning: Concerns in Bilingual Education (Arlington, VA: Center for Applied Linguistics, 1974), p. 21, citing E. G. Malherbe, The Bilingual School. A Study of Bilingualism in South Africa (London: Longman, Green and Co., 1946).

in Webb, Texas, the experimental group also performed better.<sup>21</sup> Yet another study of Spanish students in K - 2 in Compton, California, found that the experimental students did better in first language reading and English oral skills.<sup>22</sup>

Studies with equal results. A study of Spanish-speaking students from K - 3 in Sacramento, California, found equal performance in the second language between the control and the experimental groups.<sup>23</sup> Similar results were found in studies conducted by Valencia in Pecos as well as those by Grant in New Mexico.<sup>24</sup>

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<sup>21</sup>Lombardo, loc. cit., citing B. G. Trevino, "An Analysis of the Effectiveness of a Bilingual Program in the Teaching of Math in Primary Grades" (Doctoral dissertation, University of Texas, 1968).

<sup>22</sup>F. M. Goodman and C. Stern, Bilingual Program Evaluation Report, ESEA Title VII, 1970-71 (Compton, California: Compton City Schools), U.S., Educational Resource Information Center, ERIC Document ED 054 672).

<sup>23</sup>K. E. Hartwig, Early Childhood Bilingual Education, Final Evaluation 1970-1971 (Sacramento, California: Sacramento City Unified School District ESEA Title VII Project, 1971).

<sup>24</sup>Paulston, loc. cit., p. 18, citing Atilano Valencia, "Bilingual, Bicultural Education: An Effective Learning Scheme for First Grade Spanish-speaking, English-speaking and American Indian children in New Mexico: A Report of Statistical Findings and Recommendations for the Grant Bilingual Project" (Albuquerque, NM: Southwest Cooperative Education Laboratory, 1970); and "The Relative Effects of Early Spanish Language Instruction on Spanish and English Linguistic Development: An Evaluation Report of the Pecos Language Arts Program for the Western States Small School Projects" (Albuquerque, NM: Southwest Cooperative Education Laboratory, 1970).

Inconclusive studies. Two other studies were inconclusive in their findings. One was with German-speaking children in a bilingual German/English setting in Berlin.<sup>25</sup> Mackey found the academic achievement was not retarded by the approach, but teaching was at a much slower pace. An initial evaluation of Chinese- and non-Chinese-speaking students in San Francisco found that the Chinese students in the program performed better in second language reading than the control, but the results did not provide conclusive findings.<sup>26</sup> A study of Mexican-American and English-speaking students in Grades 1 - 3 in Redwood City was also inconclusive.<sup>27</sup>

Studies with negative results. Two other studies found the L1 + L2 approach to be less successful. Both of the studies compared the L1 + L2 group to the respective monolingual students in school settings where their native language was the first language of reading instruction. One example was a study of Italian-speaking students in a bilingual setting in Boston.<sup>28</sup> The other study involved

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<sup>25</sup>Lombardo, loc. cit., citing W. F. Mackey, Bilingual Education in a Binational School (Rowley, Mass.: Newberry House, 1972).

<sup>26</sup>Thomas F. Whalen and Barbara Jew, Title VII Chinese Bilingual Program, Annual Evaluation Report, August 1971.

<sup>27</sup>Paulston, loc. cit., p. 24, citing Andrew Cohen, A Sociolinguistic Approach to Bilingual Education (Rowley, Mass.: Newberry House, 1975).

<sup>28</sup>Lombardo, loc. cit.



students in Persian/English bilingual schools in Iran. Cowan and Sarmad observed that in bilingual schools, Persians did not receive the same kind of attention as English, which might have accounted for the lower Persian reading scores.<sup>29</sup> The investigators hypothesized that the lower reading scores might also be attributed to the vast difference in orthographic and syntactic structure between English and Persian. Because of these distinct differences, students might have developed two distinct strategies for reading the two languages. The effect of this parallel reading strategy might have affected students' performance in either language.<sup>30</sup>

### Conclusion

The group of studies of the L1 + L2 approach yielded mixed or inconclusive results. Only two involved L1 and L2 of different writing systems. While the evaluation of the Chinese/English study in San Francisco showed some positive results, the nature of the evaluation would not allow for definitive conclusions. The L1 + L2 study which involved Persian and English also raised questions of the possibility that transfer of reading skills between two different systems of alphabetic-phonemic languages which also have very different syntactic structures might not occur as

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<sup>29</sup>J. Ronayne Cowan and Zohreh Sarmad, "Reading Performance of Bilingual Children According to Type of School and Home Language," Language Learning, 26 (December, 1976), pp. 353-76.

<sup>30</sup>Ibid.

readily as between languages of the same alphabetic system, such as English, Spanish and French.

Contrary to the findings of the Persian study, two studies in which students received instruction in both Chinese and English reading in two separate school settings found that students' second language (English) reading scores were comparable to their English-speaking peers. Symonds' study of Hawaiian Chinese students in Chinese language schools and Yi-Ying Ma's study of students in San Francisco's Chinese-language school both indicated that student performance in English reading and language skills suffered no adverse effects.<sup>31</sup> Student skills in Chinese reading were not assessed in either study. However, attendance at Chinese language school is voluntary. Additional instructional time in a separate school setting is also involved. It is doubtful whether a Chinese language school in addition to English language public school setting is comparable to a Chinese bilingual L1 + L2 situation.

Results of the Persian L1 + L2 study indicated that transfer of reading skills might not occur as readily between languages with different orthographies. The two Chinese language school studies were not necessarily comparable to a L1 + L2 bilingual setting. The study of the San Francisco Chinese bilingual program indicated positive results, but the findings were not conclusive. Additional studies of the

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<sup>31</sup>Symonds, op. cit.

L1 + L2 approach to Chinese/English reading need to be conducted to investigate the transferability of reading skills between languages with very different orthographies.

Studies of the L2  
Approach to Reading

In the second language reading approach, students begin their reading instruction in the second language. The approach is commonly known as "total immersion." James Cummins has differentiated two kinds of programs under the L2 approach: (1) Immersion and (2) Submersion.<sup>32</sup> Cummins defined Immersion programs as those in which students of the dominant language and cultural group elected to learn a second language by being instructed in all subjects in a second language. Literacy in the first language of the student is to be introduced later. Basically, this is an additive plan in which proficiency in both L1 and L2 is the ultimate goal (L2-->L2 + L1). A Submersion program as defined by Cummins is one in which a minority language-speaking student is submersed in an all-second-language program designed for the native speakers of that second language in mixed attendance with the native speakers in a school setting where the second language is the dominant and prestigious language. The example of this approach is the schooling experience of non-English-speaking students in the

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<sup>32</sup>James Cummins, "Linguistic Interdependence and the Educational Development of Bilingual Children," Review of Educational Research, 49 (Spring, 1979), pp. 222-6.

U.S. before bilingual education was available. The submer-  
sion program is also one of subtractive planning which has  
as an ultimate goal the development of proficiency in the L2  
language only in a school setting (L2--- L2 - L1).<sup>33</sup>

Studies which found the L2 Immersion successful were  
the Lambert Study in Canada,<sup>34</sup> the Davis Study in the  
Phillipines,<sup>35</sup> the MacNamara Study in Ireland,<sup>36</sup> and the  
Cohen Study in Culver City.<sup>37</sup> Transfer of reading skills  
was observed when first-language reading was introduced  
later.

Perhaps the most frequently cited and carefully  
designed study of the language switch experiment was the St.  
Lambert experiment conducted by Lambert and others.<sup>38</sup> The  
study involved middle-class English-speaking students who  
received the first two years of their schooling completely  
in French in a curriculum designed for native French

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<sup>33</sup>Cummins, loc. cit.

<sup>34</sup>Wallace E. Lambert and G. Richard Tucker, Bilin-  
gual Education of Children (Rowley, Mass.: Newberry House,  
1972).

<sup>35</sup>Lombardo, loc. cit., citing F. B. Davis,  
Phillipine Language-Teaching Experiments (Quezon City,  
Phillipines: Aleman-Phoenix, 1967).

<sup>36</sup>Paulston, loc. cit., p. 17, citing J. MacNamara,  
Bilingualism and Primary Education (Edinburgh: Edinburgh  
University Press, 1966).

<sup>37</sup>Paulston, loc. cit., p. 19, citing Andrew Cohen,  
V. Fier, and M. Flores, "The Culver City Spanish Immersion  
Program - End of Year #1 and Year #2" (Los Angeles: Depart-  
ment of English, UCLA, 1973).

<sup>38</sup>Lambert, loc. cit.

speakers. English language arts were introduced in subsequent years. After five years of instruction, the achievement of the experimental group was compared to the traditional English-speaking curriculum control group. The experimental group was found to be equal to the control in their ability to read, write and speak English. Much higher proficiency in French was also achieved by the experimental group as compared to the control, which received instruction in French as a second language. Transfer of reading skills from French to English was also indicated. A similar program using English-speaking students from a lower socioeconomic background in Toronto was less successful.<sup>39</sup>

The lack of success of Submersion-type programs for minority languages students is well documented in the U.S. from a historical perspective.<sup>40</sup>

### Conclusion

The issue of effective approaches to teaching reading in two languages is far from settled. It is increasingly clear that the issue of the introduction of literacy in the first or the second language is not a purely linguistic issue, since results are contradictory in terms of the merits of L1-->L2, L1 + L2 or L2 only approaches. The social

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<sup>39</sup>H. C. Barik and M. Swain, "English French Bilingual Education in the Early Grades: The Elgin Study," Modern Language Journal, 58 (1974), 392-403.

<sup>40</sup>Lombardo, loc. cit., citing Herschel T. Manuel, "The Education of Mexican American and Spanish-speaking Children in Texas," Education and the Mexican American (New York: Arno Press, 1974).

linguistic factors of language status of the languages involved in the school setting as it relates to the first language and second language of the student seems to affect the success of the approach used.<sup>41</sup> The factors of training and competencies of teachers and the quality of the curriculum material available in a particular language are the other factors.<sup>42</sup> Social economic background difference could be another.<sup>43</sup> The cultural, linguistic and motivational differences between language groups could be another.<sup>44</sup>

For programs which involve languages that do not use the Roman alphabet or a phonemic orthography such as Chinese, the question of whether initial literacy should be taught in the first language (Chinese) and whether a transfer of reading skills occurs between an ideographic and a phonemic orthography become even more difficult to answer because of the lack of available research studies. The controversy on the desirability of teaching initial reading in

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<sup>41</sup>Lambert, loc. cit.

<sup>42</sup>Paulston, loc. cit., p. 26.

<sup>43</sup>Paulston, citing Andrew Cohen, A Sociolinguistic Approach to Bilingual Education (Rowley, Mass.: Newberry Press, 1975).

<sup>44</sup>Cummins, loc. cit.

Chinese in bilingual programs is far from settled.<sup>45</sup> Much research in this area is necessary to answer the questions of (1) the effects of reading instruction in two languages which utilize vastly different orthography, and (2) the transferability of initial reading skills between such orthographies.

The Nature of the Reading Process in  
an Ideography Language

A hand search of literature covering 1940-1980 in the Educational Index, Resources in Education, Current Journals in Education and Dissertation Abstracts, and a computer search in ERIC, Psychological Abstracts, Dissertation Abstracts and Language Learning Behavior Abstracts found no reference to studies directly related to the topic of the present study. The computer search, even with a broadened related search, yielded less than ten usable references, many of which had already been located during the hand search. Because of the lack of a body of research directly related to the study, a more general review of

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<sup>45</sup>Conversation with Dan Holt, Bilingual Consultant, California State Department of Education, Office of Bilingual/Bicultural Education, who was responsible for coordinating the efforts for writing a handbook for Cantonese/Chinese bilingual programs, in which he confirmed the differences of opinion in the field which the investigator was aware of as President of the California Association of Chinese Bilingual Educators; the final draft of A Handbook for Developing Bilingual Education Opportunities for Cantonese-speaking Students (pp. 56-59) also reflected that difference in opinion. (The investigator read the first draft as content reviewer for the Handbook.)

related areas was conducted. The review included those that directly relate to the Chinese writing system, the reading process in an ideographic orthography which bears functional relationship to the present study. Three major areas of reviews on the topic are included: (1) Processes and characteristics of Chinese reading as they relate to English reading, (2) Reading processes specific to the Chinese orthography, and (3) Reading processes of the Chinese written symbols in other Asian languages.

Processes and Characteristics  
of Chinese Reading as they  
Relate to English Reading

Three studies were found in which Chinese characters were utilized in the reading process of non-Chinese-speaking American school children. In all three studies, Chinese characters were used as visual symbols to represent meaning in English. There were no attempts to utilize actual Chinese language in any of the studies.

The most often cited of the studies was conducted with inner-city second-grade black students with severe reading difficulties by Rozin, Poritsky and Sotsky.<sup>46</sup> In this study, eight students were tutored in both English reading (letter-sound relationship and blending) and 30 Chinese characters representing their English meanings. It was found that students who have problems reading single consonant-vowel-consonant trigrams and rhyming words learned

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<sup>46</sup>Rozin and others, loc. cit.



the Chinese characters quickly and were able to comprehend sentences that were composed by using the 30 Chinese characters. The tutoring in English produced very little results. Rozin attributed these results to (1) motivation created by the novel approach using Chinese characters, (2) mapping of Chinese characters into speech at the level of words, and (3) the highly abstract nature of the phonemic unit used in initial reading instruction in an alphabetic orthography such as English. Rozin also suggested the possibility that Chinese characters might be easier to discriminate visually than whole English words.

In a similar study Harrigan replicated the Rozin study with seven white rural Maine first graders with reading difficulties. Similar results were obtained. Harrigan also attributed the result to the abstract nature of the phonemic approach to initial reading in English.<sup>47</sup> He further proposed that an ideographic language might map more directly to meaning, while the blending of small units of phonemes in an alphabetic-phonemic language might be processed differently.

A study by Nelson and Ladan used second-grade children who were "poor" or "better" readers to test their ability to discriminate Chinese characters that had been graded by complexity levels.<sup>48</sup> The study found that the

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<sup>47</sup>Harrigan, loc. cit.

<sup>48</sup>Nelson and Ladan, loc. cit.

better readers performed better than poor readers in their ability to discriminate Chinese characters. From the results of the study, Nelson and Ladan concluded that the visual factor involved in the recognition of Chinese characters instead of the lack of phonemic elements in Chinese character reading might have accounted for Rozin's subjects' ability to read sentences represented by Chinese characters more successfully than English.

The three foregoing studies basically dealt with two aspects--the visual and the mapping process--of Chinese reading. None of the studies had a design based on the methodology of instruction in authentic Chinese character recognition. However, they do point to some possible advantages of Chinese reading instruction in an American school setting. The rudimentary nature of these studies and the non-authentic instructional method utilized make definitive conclusions about the effects of Chinese character instruction on reading achievement or visual perception impossible. Furthermore, the subjects of these studies also were made up of mainly students who have already experienced failure in reading as an activity. The question of motivation and past failure experiences also complicated the interpretation of results of Chinese character instruction. In order to determine such relationships, a more realistic instructional setting with students without previous experiences of reading failure need to be provided in an investigation of the topic.

Reading Processes Specific  
to the Chinese Orthography

Both Rozin and Harrigan, in discussing their studies, have suggested that Chinese writing might map more directly into meaning. Geschwind, Kuromaru and Makita<sup>49</sup> have also suggested the possibility of different processing of ideographic and alphabetic orthographies. The studies to be reviewed deal with this area. All these studies used subjects who were proficient in Chinese reading.

The notion that the reading of alphabetic and ideographic writing may involve different processes was supported by recent findings in clinical studies of acquired reading disorder of adults in Japan. Japanese writing is unique in its orthography in that it combines the usage of two types of written symbols--kana and kanji. Kana symbols are phonetic symbols for syllables. Kanji symbols are ideographic symbols borrowed from Chinese characters. Geschwind, Kuromaru and Sasanuma have reported that the ability of Japanese aphasic patients to use the two types of symbols may be selectively impaired in different types of aphasic

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<sup>49</sup>Harrigan, loc. cit., p. 79, citing Geschwind, "Dyslexia," Science (1971), pp. 173, 190; Kuromaru and others, loc. cit.; Makita, loc. cit.

disorder involving different locations of the brain.<sup>50</sup>

Broca aphasia usually impairs the patient's ability to read Kana, while Gogi aphasia, which involves a different part of the brain, usually impairs the patient's ability to read Kanji. The implication is that information processing in reading might be different with different orthographies. Rozin and others have suggested that this might be so because of the lack of phonetic information in the written symbols, Chinese characters might not need decoding to sound for word identification as do alphabetic languages to identify words.

Tzeng and others<sup>51,52</sup> conducted a study to investigate if the critical differences between the ideographic and the alphabetic orthographies are in the absence or presence of phonetic recoding during reading. Two experiments were conducted using Chinese graduate students who were fluent readers of Chinese. The first experiment involved presenting single characters that have similar vowels, consonants, or similar consonants and vowels for

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<sup>50</sup>Ovid J. L. Tzeng, Daisy Hung and William S. Y. Wong, "Speech Decoding in Reading Chinese Characters," Experimental Psychology Human Learning and Memory, 3, No. 6 (November 1977), pp. 631-42, citing Geschwind, "Dyslexia," Science (1971), pp. 173, 190; S. Kuromaru and others, Proceedings of the 7th International Congress of Neurology (Rome: Suita Grafica Romana, 1961); and S. Sasanuma, "Impairment of Written Language in Japanese Aphasics: Kana versus Kanji Processing," Journal of Chinese Linguistics, 2 (1974), 141-158.

<sup>51</sup>Ibid.

<sup>52</sup>Ibid.

recall. Findings showed more interference as a result of phonemic similarity. This result is similar to those found in similar studies with alphabetic writing. Based on the findings, Tzeng and others rejected the thesis that the phonetic element is bypassed in the visual information processing of Chinese characters.

Since it could be argued that a phonetic recoding strategy is employed only in single character processing, and that a different strategy might be used in normal reading, Tzeng and others conducted a second experiment to test the processing of meaningful sentences. Normal and anomalous sentences which were phonemically similar and dissimilar were used. Subjects were asked to judge if the sentences read were anomalous or normal. A different scanning strategy used by the subjects was observed when the test sentences were phonemically similar or dissimilar. Tzeng et al. concluded that the phonetic recoding does occur in reading of Chinese writing. However, it should be pointed out that the second experiment was weak in its conceptualization. It assumed that when judging the abnormality or normality of sentences, the subject would employ the same strategies as reading "normal" sentences for comprehension.

The general conclusion that may be drawn from the study is that, regardless of orthography, a phonetic working memory is a component of the general processing of linguistic information and that differences in reading processes which could be attributed to orthographic differences probably occur before the working memory stage.

A similar study was conducted by Mae Chu-Chang and Donald J. Loritz with Chinese bilingual high school students using Spanish bilingual students as a comparison group.<sup>53</sup> The study investigated the mode of short-term memory storage of written material by Chinese speakers. The objective of the study was to investigate how Chinese speakers encode ideographic writing in short-term memory and how the same subjects who are learning English as a second language encode alphabetic writing in short-term memory. In testing the subjects for recall of the Chinese word recognition list and the English word recognition list, phonetic, semantic and visual distractor lists were used. These lists provided characters that were phonetically, semantically and visually similar to the respective test lists. The results showed that for the Chinese speakers recalling Chinese characters, significantly more errors were made with the phonetically similar list; but in reading English, the same subjects made more errors on the visual list.

Chu-Chang et al. concluded that proficient Chinese readers in processing Chinese words probably followed the same universal process of all proficient readers in that the encoding in short-term memory is phonological. They also concluded that the significantly higher number of errors made on the visual list in English reading for the Chinese

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<sup>53</sup>Mae Chu-Chang and Donald J. Loritz, "Phonological Encoding of Chinese Ideographs in Short-term Memory," Language Learning, 27, No. 2 (Dec., 1977), 341-52.

speakers may be due to the use of a more visual strategy of shape-to-meaning association which the subjects learned at an early stage of learning to read in Chinese. When they were encountering learning to read in a second language, the early strategy was employed. It was found that the Spanish-speaking bilingual subjects also made more errors on the visually similar list in English. From the results, the investigators suggested the possibility of a two-stage reading process for learning to read. In Stage I, the learner utilizes a predominantly visual strategy. In Stage II, a more phonological strategy is used. In learning to read in Chinese, an even more visual strategy of shape-meaning association might have been employed. This is supported by a study on children learning to read in Chinese in which more visual types of recognition errors were made initially.<sup>54</sup> The findings in the two foregoing studies indicated that, in teaching initial reading, an approach which helps improve the learner's visual strategies may facilitate his or her success in learning to read.

Both the Chu-Chang and Loritz study and the Tzeng et al. studies indicated the use of phonological representation in short-term memory in proficient readers regardless of orthography. Neither rules out the possibility that a different initial process for the reading of an ideographic

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<sup>54</sup>Mae Chu-Chang, loc. cit., p. 50, citing Van Yen Yin and Zian Chi Tsen in "The Special Aspects of Memorizing Chinese Characters in Elementary School Children," Acta Psychologica Sinica, 3 (1962), pp. 219-230.

orthography may occur. An earlier similar study by Erickson, Mattingly et al. also demonstrated that even in reading Kanji (Chinese characters), which does not have an overt phonetic structure, phonetic short-term storage still occurs.<sup>55</sup> Erickson further claimed that phonetic short-term storage is probably necessary to any primary linguistic activity.

The foregoing studies pointed to the high probability that phonological strategies are universally applied by proficient readers in any language. This does not preclude that initial difference in information processing of different types of orthography could also occur.

Two studies by Tsao et al. studied Stroop Interference of Chinese bilingual subjects to investigate the possibility of hemispheric differences in the information processing of ideographic and alphabetic writing. The investigator used a typical procedure in demonstrating Stroop Interference. Color names printed in incongruent colors were presented to the subjects. For instance, the word "green" would be printed in red ink. Subjects are asked to name the colors of the ink and to ignore the printed color names. This incongruency between colors and color names usually results in markedly slower responses in naming colors among fluent readers.

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<sup>55</sup>Donna Erickson, Ignatius G. Mattingly, and Michael T. Turvey, "Phonetic Activity in Reading: An Experiment with Kanji," Haskins Laboratories Status Report on Speech Research, 33 (1973), pp. 137-156.



In the first study, Tsao et al.<sup>56</sup> compared the responses of English- and Chinese-speaking subjects to this procedure. The color names for the English and Chinese subjects were presented in English and Chinese writing for the two groups, respectively. Naming of the color patches and black printed color names were used as control for each group. The Chinese subject demonstrated a larger interference than the English subjects. Bilinguality as an explanation for the larger interference with the Chinese subjects was ruled out, since a recalculation of available data on Stroop Interference of bilinguals of other languages showed less interference than their monolingual controls.

Tsao et al. also pointed out that other studies have assigned the direct accessing of meaning from a pattern configuration as well as accessing of information about color as the function of the right brain hemisphere.<sup>57</sup> A recent report by Hatta also found that Kanji enjoyed a right hemispheric advantage in visual recognition.<sup>58</sup> Thus they speculated that the larger interference for the Chinese subjects

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<sup>56</sup>Irving Brederman and Yao-Chung Tsao, "On Processing Chinese Ideographs and English Words: Some Implications from Stroop-test Results," Cognitive Psychology, 11 (1979), 125-132.

<sup>57</sup>Ibid., citing J. Davidoff, "Hemispheric Sensitivity Difference in the Perception of Color," Quarterly Journal of Experimental Psychology, 28 (1976), 387-394.

<sup>58</sup>Ibid., citing T. Hatta, "Recognition of Japanese Kanji in the Left and Right Visual Fields," Neuropsychologia, 15 (1977), 685-688.

could be the result of Chinese character color name and the naming of the color competing for the same perceptual capacities in the same brain hemisphere. They also speculated that there might be basic differences in the obligatory processing of Chinese and English written symbols. Whereas a reader of English might not be able to refrain from applying an abstract rule system to the words, a Chinese reader might not be able to refrain from a configurational processing of the Chinese characters.

To further investigate possible hemispheric differences in information processing of alphabetic and ideographic writing, Tsao et al. did another study to measure Stroop Interference of Chinese subjects in their right and left vision fields. An earlier study by Tsao et al. found that Stroop Interference for English speakers is greater in the right vision field than the left.<sup>59</sup> They also reasoned that a reverse result would be obtained with Chinese subjects if the speculation of color naming and ideographic process competing for perceptual capacities in the right hemisphere were accurate. Results of the study showed that there were significantly more interferences when the stimuli were presented in the left visual field than the right when reaction time was used as the measure.<sup>60</sup> The same effect

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<sup>59</sup>Yao-Chung Tsao, Timothy Feustel and Chris Soseos, "Stroop Interference in the Left and Right Visual Fields," Brain and Language, 8 (1979), 367-371.

<sup>60</sup>Yao-Chung Tsao, Ming-Jung Wu and Timothy Feustel, "Stroop Interference: Hemispheric Difference in Chinese Speakers," Brain and Language (in press).

measured by error scores was only marginally significant. Tsao et al. concluded that this study and the previous two studies taken together suggested that there are differences between the way Chinese and English writings are processed.

### Conclusion

The Chu-Chang, Tzeng and Tsao studies taken together may suggest that within the reading process (one form of information processing) for proficient readers, both the universal aspects of the reading processing and the language specific aspects of the reading process may be operating. In the case of English reading (alphabetic) as compared to Chinese reading (ideographic), language specific and therefore different processes might be operating at one stage, but the universal aspects of reading may be operating at another stage in both orthographies.

In a study of the dependency relation between oral language and reading in bilingual children, Mae Chu-Chang investigated the reading process of fourth- and fifth-grade Cantonese-speaking Chinese bilingual students.<sup>61</sup> Since modern Chinese writing is based on the vocabulary and sentence structure of the Mandarin dialect, Cantonese-speaking Chinese students in reading Chinese would face two kinds of vocabulary and sentence structures. One kind would be congruent with the oral language of the Cantonese dialect. The

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<sup>61</sup>Mae Chu-Chang, The Dependency Relation Between Oral Language and Reading in Bilingual Children (Doctoral dissertation, Boston University, 1979), pp. 70-72.

other kind would be incongruent (Mandarin vocabulary and structure which are not shared by the Cantonese dialect). As a result, in reading Chinese, the Cantonese child would be reading both in a language he (she) speaks--Cantonese, and in a second language--Mandarin.

The concern of this study was the mapping process from perceptual representation in short-term memory storage to the oral language storage. Chu-Chang maintained that if reading is dependent on an existing oral repertoire, then a Cantonese child will find it more difficult to recognize a written word that is incongruent with his (her) spoken dialect. The results of the study showed that congruent vocabulary and structures (in a passage) were indeed easier to read. But the hypothesis that in reading incongruent words or passages more time would be required since a translation process from the Mandarin structure to oral Cantonese structure would be required was not supported by the results. Chu-Chang concluded that the study demonstrated the fallacy of the notion that a language can map directly from the visual image to meaning. However, Chu-Chang seems to ignore another interpretation of her results. The study did not support a translation process into the reader's oral language dialect when the Cantonese reader reads incongruent passages or words. An alternate interpretation may be that a direct mapping from visual image to meaning occurs, at least in reading characters and structures that are not congruent with the oral language. In a study previously mentioned, Chu-Chang has found that Chinese bilingual students

in learning to read English (as a second language) utilized a much more visual strategy. A more visual-to-meaning strategy for orally incongruent Chinese words and structures will be consistent with this finding. The mapping process of Chinese writing still requires further investigation.

Processing of Chinese  
Written Symbols in  
Other Language Systems

Chinese characters are used in an integrated manner in at least two other Asian language systems, namely Japanese and Korean. Although the meaning and pronunciation of the characters--Kanji--in these languages might have changed over the years, the ideographic nature of Kanji remained. The following studies explored Chinese characters within the Japanese and Korean writing systems. Both of these systems utilize a set of phonetic symbols intermingled with Kanji in their writing.

The difficulty in learning to read in Chinese which many Western researchers have assumed is probably vastly exaggerated. Both Makita and Leong have pointed out and challenged the notion that the burden of memorizing Kanji is much greater than words in an alphabetic writing system.<sup>62</sup> One notion was that a vast number of characters have to be rote-memorized by a person in order to become functionally

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<sup>62</sup>Kiyoshi Makita, "Reading Disability and the Writing System," New Horizon in Reading, ed. John E. Merritt (Newark, Delaware: IRA Inc., 1976), pp. 252-3; C. K. Leong, "Is Literacy Acquisition Easier in Some Languages Than Others?" Visible Language, 7 (Spring, 1973), pp. 145-156.

literate (3,000 minimum for Chinese, 1,850 minimum for Japanese), whereas in an alphabetic language only the letters need to be learned. Makita pointed out that knowing the letter and sound in an alphabetic language only certainly does not allow a person to achieve literacy. Both Makita and Leong maintained that unlike the random impression of character formation understood by Western researchers, Kanji are formulated in a systematic way. The radicals (components or units within a character) often give hints to the meaning category of the characters. Many Chinese characters are made up of two component radicals; one gives the meaning clue (much like prefixes, suffixes and roots), while the other gives pronunciation clues. There is also a small number of characters which are derived from pictographs.

Some examples of the different ways by which Chinese characters are formed is given below. 一, 二, 三 are "one", "two" and "three" respectively. 日 is "sun" which is simplified from the pictograph ☉. 月 is "moon" from 月. 明, which is made up of 日 and 月 means "bright". 女 means "female". 媽, which means "mother", takes the sound from 馬 (ma) but indicates the meaning category of "female" with the radical 女.

妹 means "younger sister". It takes the sound from (mui), but indicates the meaning category "female" with 女.

何, 荷, 河 all take the sound from 可 (haw).

何 with the radical 亻 indicates a human; the character means "who". 荷 with the 艹 radical indicates a plant;

the character means "lotus". 荷 with the 艹 radical indicates water; the character means "river".

There are quite a number of homonyms in Chinese, the difference of which are only discriminated by tonal differences in speaking or no differences at all. When two literate persons converse and are unable to determine which similar-sounding character has been referred to either because of unclear meaning or dialectal differences, they often clarify by writing out the character in the air, referring to the meaning radical part of the character if the words have the same sound radicals such as 何, 荷, 河 mentioned previously (i.e., haw with the water radical, not the plant radical) or calling out the component stroke part of the character. (Example: 黄 and 王 are both pronounced wong. When oral clarification has to be made, one would say 王 with the three horizontal strokes or 黄 with the 艹 "plant" radical.)

Each character, unlike what is understood by Western researchers, is not memorized by random strokes by a literate person. Many of the same components reappear in different formations in different characters. Regardless of the number of strokes or component units, simple characters and complicated characters both occupy the same fixed-sized square space. Characters which are complex in stroke and radical formation may be more difficult to write, but because of the fixed space occupied, the more complex configurations might be even easier to recognize than the simpler ones.

Characters as used in Chinese are not only fixed in length and size. Each fixed square space is always one syllable. These characteristics make pronunciation and recognition less complicated.

Makita, in an earlier writing, has reported on the rarity of reading disorders in Japanese children.<sup>63</sup> He maintained that Japanese writing with the consistent syllable symbols of Kana and the possibility of a different perceptual process of Kanji (more direct symbol-to-meaning relationship without the phonetic element) might have caused less cognitive confusion for children learning to read than the alphabetic system.<sup>64</sup>

Two other studies lent support to the notion of exaggerated difficulty in learning Kanji. In a study by Steinberg and Yamada, they investigated the relative difficulty in learning Japanese "Kanji" and "Kana" in 3- and 4-year-old children to test the claim held by many educators and laymen in Japan that "Kanji" is much more complicated to learn than "Kana." Because of this commonly-held notion, children in schools are taught in "Kana" before they learn "Kanji."<sup>65</sup> The 3 - 4 year olds were selected because

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<sup>63</sup>Kiyoshi Makita, "The Rarity of Reading Disability in Japanese Children," American Journal of Orthopsychiatry, 38 (July, 1968), 597-614.

<sup>64</sup>Ibid.

<sup>65</sup>Danny D. Steinberg and Jun Yamada, "Are Whole Word Kanji Easier to Learn than Syllable Kana?" Reading Research Quarterly, 14, No. 1 (1978-79), pp. 88-99.



children would have learned some "Kana" by 5. The other reason for the age group was to investigate if 3 - 4 year olds have the ability to learn "Kanji." Forty-two children, 14 girls and 28 boys, were in the experiment. The subjects were given two "Kanji" and two "Kana" to learn. The difference in the number of "Kana" and "Kanji" learned was significant at the .01 level with much higher mean score for learning "Kanji." The relations of the number of strokes in "Kanji" and scores achieved were insignificant. Children also indicated that the Kanji presented was more "meaningful." "Kanji" scored higher than "Kana" in meaningfulness. This is consistent with Fukazawa,<sup>66</sup> who found that meaning and not perceptual complexity mainly determine the acquisition of "Kanji" in school children. These are also consistent with Sakamoto's finding that Kanji reading was not difficult as claimed for pre-school students.<sup>67</sup>

Related to the findings above was the study on the effect of script on memory between Kanji and the Korean alphabet in Korean script.<sup>68</sup> Soji Park and Tannis Arbuckle used 26 Koreans who were educated in Korea to conduct their

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<sup>66</sup> Steinberg and others, p. 97, citing Shuusuke Fukazawa, "Kanji to dokuji gakushu--Sono Kyooiku Shinrigaku Kenkyuu" (Learning to read Kanji--educational psychological aspects.) Tokyo: Gakutoosha, 1976.

<sup>67</sup> Takahiko Sakamoto, "Preschool Reading in Japan," Reading Teacher, 29 (Dec. 1975), 240-244.

<sup>68</sup> Soji Park and Tannis Arbuckle, "Ideograms Versus Alphabets: Effects of Script on Memory in 'Biscriptual' Korean Subjects," Experimental Psychology: Human Learning and Memory, 3, No. 6 (Nov., 1977), pp. 631-42.

experiment. Subjects were tested individually with a tachistoscope to find out if a subject recalled whether a symbol (either alphabetic or ideographic) had been presented previously. Results showed that ideographs which had been presented previously were recognized and recalled more often than the alphabetic symbols. The study lends support to the possibility that processing of ideographic script and alphabetic script are different and that there are certain qualities of the ideographic script which make it distinct and memorable.

A study on the perception of Chinese characters conducted by Yu-Kuang Chu also tends to support the possibility that the design of Chinese characters lends itself to an ease of perception.<sup>69</sup> One hundred characters presented in upright (correct), upside-down, or horizontal left- or right-side-up position were presented electronically to college students who know no Chinese. The mean score for identifying the correct position (which is one chance in four) was 60.71.

Studies just reviewed tend to challenge the notion that (1) Chinese characters are difficult to learn to read, especially for beginning students, and (2) Chinese characters because of their visual complexity, are burdensome to the memory in reading, as compared to an alphabetic-phonemic system.

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<sup>69</sup>Yu-Kuang Chu, "Perception of Chinese Characters: An Experimental Study," Journal of Chinese Language Teaching Association, 9 (May, 1974), 57-65.

Visual Perceptual Training in Relation  
to Reading Readiness and  
Reading Achievement

One of the most controversial areas of English reading readiness involves the learning of visual perceptual skills. A large number of studies have found a high correlation between visual perceptual skills and reading success. Yet a logical subsequent step to such findings, training students in visual perceptual skills, has, at best, produced mixed results on subsequent measurements of reading achievement.

Visual Perceptual Skills as  
a Predictor of Reading  
Achievement

The visual perceptual skills often included in various measurements are those which involved (1) the visual matching of forms, objects or letters of the alphabet, (2) the copying of letters and geometric forms, (3) the recognition of forms (such as figure-ground discrimination), and (4) visual memory (matching or copying of previously presented letters or letter-like designs or forms).

Goins found that tests which involved visual perception of geometric figures or pictures have relatively high correlation with reading achievement in the first grade.<sup>70</sup>

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<sup>70</sup>Jean Turner Goins, "Visual/Perceptual Ability and Early Reading Progress," Supplementary Educational Monographs, No. 87 (Chicago: University of Chicago Press, 1958), pp. 116-128.

In a study to determine the relative importance of reading readiness, intelligence and visual perceptual skills, Bryan also found that visual perception appears to have the higher correlation with first-grade reading success than the other two factors.<sup>71</sup> He concluded that visual perception as measured by the Frostig Developmental Test of Visual Perception could be used as a predictor of reading achievement. In order to obtain more specific information, Thomas Barret investigated the relative contribution of seven types of visual discrimination skills to the prediction of first-grade reading achievement.<sup>72</sup> The three visual discrimination tasks which contributed the most to the prediction of reading achievement were letter and number recognition, copying of patterns and visual matching of words. These findings are consistent with those found by Goins. Barret, however, was careful to caution that the study failed to establish a cause and effect relationship between the visual tasks and reading success.

A study of the contribution of various factors in predicting reading achievement in Canada also found that letter recognition and other visual skills are more related

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<sup>71</sup>Quentin R. Bryan, "Relative Importance of Intelligence and Visual Perception in Predicting Reading Achievement," California Journal of Educational Research, XV, No. 1 (January, 1965), 44-48.

<sup>72</sup>Thomas C. Barret, "Visual Discrimination Tasks as Predictors of First Grade Reading Achievement," The Reading Teacher, 18 (1965), 276-82.

to reading achievement.<sup>73</sup> More recently, a study comparing two methods of instruction in kindergarten found that letter recognition skills were the best predictors of initial reading success.<sup>74</sup> A more test-specific study found that, among all the subtests of The Metropolitan Readiness Tests, the alphabet and number subtests were the best predictors of first-grade reading achievement.<sup>75</sup> Bond and Dykstra, however, found that most of the visual perceptual tests were not significantly different from each other in that most involved the visual skills in discriminating alphabetic, geometric, digital or pictorial symbols.<sup>76</sup> They also found that while visual perceptual tests were good predictors of first-grade reading achievement, its ability to predict decreases as grade levels increase.

After reviewing the findings of research in reading readiness, Walter H. MacGinite concluded that the tasks which were the best predictors of reading tended to be those

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<sup>73</sup>Evanechko and others, "An Investigation of the Reading Readiness Domain," Research in the Teaching of English, 7 (1973), pp. 61-78.

<sup>74</sup>Margaret Ann Richek, "Readiness Skills that Predict Initial Word Learning Using 2 Different Methods of Instruction," Reading Research Quarterly, 13, No. 2 (1977-80), pp. 200-222.

<sup>75</sup>Ann W. Engin, "The Relative Importance of the Subtests of the Metropolitan Readiness Test in the Prediction of First Grade Reading and Arithmetic Achievement," Journal of Psychology, 88, No. 2 (November, 1974), pp. 289-98.

<sup>76</sup>G. L. Bond and R. Dykstra, "The Cooperative Research Program in First Grade Reading Instruction," Reading Research Quarterly, 12 (1967), pp. 5-142.

that were most similar to the act of reading itself.<sup>77</sup> This is consistent with the findings that, in comparing the different tasks of visual discrimination as predictors of reading achievement, the task of discriminating letters and words are more related to the criterion than that of geometric forms.

### The Effects of Visual Perceptual Training

Studies which investigated the relationship between visual perceptual skills and reading achievement were generally consistent in finding high correlation between visual skills and reading achievement. The findings on the effects of training programs in visual perceptual skills on reading achievement have been at best contradictory. In a review of the research on this topic, George Spache found that one possible reason for such variation in results might be the differences in actual training that were labelled as visual perceptual training.<sup>78</sup> According to Spache, the training programs can be generally categorized by the emphasis in training: (1) Visual discrimination of letter forms and words, (2) Visual motor-type training, (3) Hand-eye

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<sup>77</sup>Walter H. MacGinitie, "Evaluating Readiness for Learning to Read: A Critical Review and Evaluation of Research," Reading Research Quarterly, 4 (Spring, 1979), pp. 396-410.

<sup>78</sup>George Spache, "The Outcomes of Visual Perceptual Training," New Horizons in Reading, Fifth IRA World Congress in Reading, Vienna, Austria, 1974 Proceeding, ed. John E. Merritt (Newark, Delaware: IRA, Inc., 1976), pp. 449-455.

coordination, (4) Visual tracking, and (5) Geometric form perception and reproduction. Out of the 28 programs reviewed, 15 produced gains in perceptual tests by retest, 7 did not. However, when the training was related to its effect on readiness, only one was found to be positive, 9 were not. Fourteen of the programs which attempted to investigate the effects of training on reading were all negative in results. However, another 11 studies, emphasizing visual motor training were successful in improving readiness or reading achievement. Seven studies emphasizing visual discrimination of forms, letters and words were successful in improving reading achievement. Eleven studies cited as well designed produced five positive, five negative and one inconclusive results. The studies utilizing middle-class children generally resulted in negative findings, while those involving lower socioeconomic background children or lower achievers were more positive. However, no identification of these studies was provided by Spache.<sup>79</sup>

The studies available for review were of varied quality and student population. Although a few of the studies showed positive results, a preponderance of the studies showed no significant differences as a result of training on reading achievement or readiness. Among those which found positive results were studies by Simpson,<sup>80</sup>

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<sup>79</sup>Spache, loc. cit.

<sup>80</sup>Dorothy M. Simpson; "Perceptual Readiness and Beginning Reading" (Doctoral dissertation, Purdue University, 1960).

Rutherford,<sup>81</sup> Faustman<sup>82</sup> and Alley.<sup>83</sup> Those studies which found no significant difference as a result of training were reported by Rosen,<sup>84</sup> Arciszewski,<sup>85</sup> Keim,<sup>86</sup> Falik,<sup>87</sup>

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<sup>81</sup>William L. Rutherford, "The Effects of Perceptual-Motor Training on the Performance of Kindergarten Pupils on Metropolitan Readiness Tests" (Doctoral dissertation, North Texas State University, 1964).

<sup>82</sup>Marian N. Faustman, "Some Effects of Perception Training on First Grade Success in Reading" (Doctoral dissertation, University of California, Berkeley, 1966).

<sup>83</sup>Gordon Alley, "Reading Readiness and the Frostig Training Program," Exceptional Children, XXXV (September, 1968), pp. 68-69.

<sup>84</sup>Carl L. Rosen, "An Experimental Study of Visual Perceptual Training and Reading Achievement in First Grade," Perceptual and Motor Skills, 22 (1966), pp. 979-986.

<sup>85</sup>Raymond A. Arciszewski, "The Effects of Visual Perception Training on the Perception Ability and Reading Achievement of First Grade Students" (Doctoral dissertation, Rutgers University, New Brunswick, New Jersey, 1968).

<sup>86</sup>Richard P. Keim, "Visual-Motor Training, Readiness and Intelligence of Kindergarten Children" (Doctoral dissertation, Temple University, 1968).

<sup>87</sup>Louise M. Falik, "The Effects of Special Perceptual-Motor Training in Kindergarten on Reading Readiness and on Second Grade Reading Performance," Journal of Learning Disabilities, II (August, 1969), 395-402.



Hedges,<sup>88</sup> Hammill,<sup>89</sup> Armbruster,<sup>90</sup> Buckland,<sup>91</sup> Johnson,<sup>92</sup>  
Brecht,<sup>93</sup> Martin<sup>94</sup> and Seaton.<sup>95</sup>

### Conclusion

As a whole, the correlational studies reviewed revealed a highly positive relationship between visual-perception skills and reading achievement. Yet a cause and effect relationship between these visual skills and the reading success cannot be established through studies of the effects of training which were targeted specifically at

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<sup>88</sup>William D. Hedges and B. Veralee, "The Effects of a Perceptual-Motor Program on the Achievement of First Grade Children," Educational Leadership, 1972.

<sup>89</sup>D. Hammill, "Training Visual Perceptual Processes," Journal of Learning Disabilities, 5 (1972), 552-559.

<sup>90</sup>Rudolph A. Armbruster, "Perceptual Motor, Gross Motor and Sensory Motor Skills Training: The Effect Upon School Readiness and Self-Concept Development of Kindergarten Children" (Doctoral dissertation, Wayne State University, 1972).

<sup>91</sup>Pearl Buckland and Bruce Balow, "Effect of Visual Perceptual Training on Reading Achievement," Exceptional Children, 39, No. 4 (January, 1973), 299-364.

<sup>92</sup>Bonnie Lee Johnson, "The Effect of Three Visual Perceptual Programs on the Readiness of Kindergarten Children" (Doctoral dissertation, Texas A & M University, 1973).

<sup>93</sup>Richard David Brecht, "The Effects of Visual Tracking Training in Kindergarten Reading Readiness Scores" (Doctoral dissertation, University of Missouri, 1973).

<sup>94</sup>James C. Martin, "Effects of Visual Perceptual Training on Visual Perceptual Skills and Reading Achievement," Perceptual and Motor Skill, 37 (1973), p. 564.

<sup>95</sup>Hal W. Seaton, "The Effects of a Visual Perceptual Training Program on Reading Achievement," Journal of Reading Behavior, 9, No. 2 (Summer, 1977), 188-192.

certain aspects of visual perceptual skills. It may be that while the absence of adequate visual perceptual skills may hinder a child's ability to succeed in reading, further training of students with adequate skills may not result in additional gains. Such an interpretation would explain studies which found positive results using a population with identified visual-perceptual deficiencies. It would also explain the lack of success with studies which utilize subjects with adequate visual perceptual skills. Another possible explanation would be that when the skills trained are too narrow and specific in a study, training gains would not be likely except in that specific criterion. Thus, if the training used in a study is not closely related to the act or the purpose of reading itself, it would likely not result in positive effects on reading or readiness skills.

The Relationship Between Letter  
Recognition and Reading  
Achievement

Studies in visual perceptual skills and their relationship to reading achievement have revealed that those visual perceptual skills and training that are closely related to the discrimination of letters and words are more successful as training tasks and more highly correlated to reading achievement. One of the reading readiness skills that is often found in most reading readiness tests is letter recognition. As a task, letter recognition actually means the ability to identify a letter symbol with a letter

name. Although often mentioned as a visual skill, letter recognition requires additional skills beyond those necessary for visual discrimination of those that are the same and those that are different.

Frank Smith distinguished the identification of letters into two aspects.<sup>96</sup> The first aspect is the discrimination of various configurations as different or functionally equivalent. (This aspect of letter recognition or identification is similar to tasks involved in visual discrimination.) The second aspect, according to Smith, is the establishment and allocation of category names to the configurations.

Findings from studies on the relationship between letter recognition and reading achievement have consistently shown that knowledge of letter name is highly predictive of reading success. The studies included those of Monroe,<sup>97</sup> Durrell,<sup>98</sup> Silvaroli,<sup>99</sup> Bond and Dykstra<sup>100</sup> and Jansky and

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<sup>96</sup>Frank Smith, Understanding Reading - A Psycholinguistic Analysis of Reading and Learning to Read (New York: Holt, Rinehart and Winston, Inc., 1971), pp. 114-5.

<sup>97</sup>Marion Monroe, "Reading Aptitude Tests for the Prediction of Success and Failure in Beginning Reading," Education, 156 (Sept. 1935), pp. 7-14.

<sup>98</sup>Donald Durrell, "Success in First Grade Reading," ed. Donald D. Durrell, Journal of Education, 140, No. 3 (Feb., 1958), pp. 2-49.

<sup>99</sup>N. J. Silvaroli, "Factors in Predicting Children's Success in First Grade Reading," Reading and Inquiry, Proceedings of International Reading Association, 10 (1965), pp. 296-298.

<sup>100</sup>Bond and Dykstra, loc. cit.

DeHirsch,<sup>101</sup> Evanechko,<sup>102</sup> and Dermott.<sup>103</sup>

In Donald Durrell's monograph on success in first-grade reading, six studies of a population of 2,000 first graders in Massachusetts were conducted to investigate various aspects of first-grade reading.<sup>104</sup> Olson's study found that tests which measured the knowledge of letter name (naming letters, identifying letters named and writing letters when named) provided the best predictor of February test achievement in reading.<sup>105</sup> It was also found that in the first four months, the children were able to learn letter names rapidly (from a mean of 12 in September to 24 in February). Gavel found that the same letter knowledge tests in the previous study taken in September were also the best predictors of June reading achievement.<sup>106</sup> Linehan conducted a study with 300 experimental and control students at

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<sup>101</sup>S. J. Samuels, "The Effect of Letter-Name Knowledge on Learning to Read," American Educational Research Journal, 9, No. 1 (January, 1972), 65-74, citing K. DeHirsch and others in Predicting Reading Failure: A Preliminary Study (New York: Harper and Row, 1966).

<sup>102</sup>Evanechko and others, loc. cit.

<sup>103</sup>Ralph A. Dermott, "Two Dimensions of Field Dependence - Independence: How Theory and Nine Other Variables Interrelate and Predict Specific Reading Skills at the End of First Grade" (Doctoral dissertation, 1977).

<sup>104</sup>Durrell, loc. cit.

<sup>105</sup>Arther V. Olson, "Growth in Word Perception Abilities as it Relates to Success in Beginning Reading," Success in First Grade Reading, ed. Donald D. Durrell, pp. 25-36.

<sup>106</sup>Sylvia R. Gavel, "June Reading Achievement of First-Grade Children," Success in First Grade Reading, pp. 37-43.

the beginning of first grade.<sup>107</sup> The study found that the experimental group which followed a systematic presentation of letter knowledge and phonetic development with an incidental program of word recognition was significantly higher in June reading achievement than the control which received systematic presentation of word recognition with an incidental program of letter and phonic development. The above findings indicated that early instruction in letter knowledge may be beneficial to reading achievement.

The foregoing studies on the relationship and effects of letter recognition on reading achievement seemed to indicate that alphabet recognition is probably related to initial reading success and that instruction in alphabet recognition during the initial stages of learning to read would contribute to subsequent success in reading.

S. J. Samuels, however, pointed out that while a large number of correlational studies have shown a high correlation between letter knowledge and subsequent reading success, studies that did not show superior results could also be found.<sup>108</sup> Ohnmacht had found that training students in both letter and sound was superior to training in letter

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<sup>107</sup>Eleanor B. Linehan, "Early Instruction in Letter-Names and Sounds as Related to Success in Beginning Reading," Success in First Grade Reading, pp. 44-48.

<sup>108</sup>S. J. Samuels, "The Effect of Letter-Name Knowledge on Learning to Read," American Educational Research Journal, 9, No. 1 (January, 1972), 65-74.

name alone.<sup>109</sup> Johnson also found early classroom training in letter name failed to produce superior reading achievement at the end of the school year.<sup>110</sup> Samuels attempted to investigate the effects of letter name knowledge on learning to read words through a laboratory-controlled situation in which a training transfer model was used.<sup>111</sup> He trained the experimental subjects by teaching them experimental symbols which were assigned letter names (names such as "m", "e", "a"). Data were collected on the transfer of trained skills by presenting the experimental group with "words" made with the same experimental symbols for pronunciation. The control group was given the transfer task first and a training task subsequently. Significant transfers for the experimental group did not result. Samuels thus concluded that letter-name knowledge does not facilitate learning to read words made up of the same letters.

One obvious fault of the research design in the study was the assigning of the real letter names to the experimental symbols. Since the subjects were students midway through first grade, most of them would probably have letter name knowledge of most of the letters in the

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<sup>109</sup>S. J. Samuels citing D. D. Ohnmacht, "The Effect of Letter-Knowledge on Achievement in Reading in the First Grade" (paper presented at AERA, Los Angeles, 1969).

<sup>110</sup>S. J. Samuels, citing R. J. Johnson, "The Effect of Training in Letter Name on Success in Beginning Reading for Children of Differing Abilities" (Doctoral dissertation, University of Minnesota, 1969).

<sup>111</sup>Ibid.

alphabet. The experimental group who received a short period of training in the names of the experimental symbols which were given the same names as the names of real letters may more likely experience an interference from the letter names that they already knew. A subsequent partial replication of this study by Chisholm and Knafle<sup>112</sup> found opposite results. The study found letter name knowledge highly predictive of reading achievement.

The studies reviewed, taken as a whole, seemed to lead to the conclusion that letter knowledge could be used as a predictor of reading achievement and that letter recognition is probably essential to the learning of reading in an alphabetic language. This is consistent with Olson's finding that low reading achievement (sight word recognition) of students is associated with a low level of letter knowledge.<sup>113</sup> However, the teaching of letter name alone may not always "cause" the child to learn to read successfully.

#### The Present Study

The main concerns of the present study address the effects of training in initial reading skills of reading readiness in an ideographic language and its effect on the initial reading skills of an alphabetic language. Current views of reading readiness tend to consider readiness skills

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<sup>112</sup>Diane Chisholm and June D. Knafle, "Letter Name as a Prerequisite to Learning to Read" (paper presented at AERA, Washington, D.C., 1965) (ERIC ED 102 536)

<sup>113</sup>Olson, loc. cit.

as a part of the continuum in the initial stages of learning to read.<sup>114</sup>

Studies on reading in two languages have indicated that transfer of skills does take place from one language to another. However, the transfer of skills was observed mainly in languages which shared the same alphabetic writing system. Studies dealing with the transfer of skill between different types of writing systems are not available; one study (Persian/English) of reading of two different alphabetic systems revealed negative results. Thus the transferability of skills between an alphabetic-phonemic and an ideographic language may not be assumed from findings about the transfer of skills between alphabetic-phonemic languages.

Studies on the reading process in Chinese appear to indicate that even in reading an ideographic orthography, the universal reading process of dependency on an oral language repertoire still operates. However, there is also evidence that the processing of the ideographic orthography at certain stages may be different from that of an alphabetic language.

At a more practical, school-related level, studies have indicated certain advantages of Chinese character instruction even in an American school setting. Other studies have indicated that the learning of Chinese characters is not as difficult as many have claimed, even for very young

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<sup>114</sup>Delores Durken, Teaching Them to Read (Boston: Allyn & Bacon, Inc., 1978), pp. 149-161.



children. Other studies revealed that certain features may make Chinese characters more distinctive for recognition and recall. Most of the studies in the area have indicated that a certain visual quality does exist in ideographic symbols which may bring about a processing which is different from alphabetic symbols.

Studies on visual perceptual skills have found high correlation of such skills with reading achievement; the training in these skills, however, only brought about mixed results. An initial study into the effects of instruction in the initial reading skills of an ideographic language on the initial reading skills of an alphabetic language can combine the concerns raised by many of the studies reviewed.

As an initial study on the effects of reading in an ideographic language and an alphabetic-phonemic language, the present study investigated these effects at the very beginning of reading instruction. Because of the special visual quality of the Chinese characters, an opportunity to utilize them as one form of visual perceptual training is available, especially when non-Chinese kindergarten students are involved. However, by using kindergarten students, it has avoided the complicating factors encountered in the Rozin study in which the subjects had previous experiences of reading failure. The beginning kindergarten children have not had the opportunity to fail or be exposed to reading as an activity or become bored with alphabetic reading. Therefore, the "novel" approach of using Chinese characters is no

more "novel" to them than instruction in the English alphabet.

Reading readiness studies have also found that training that is most like the act of reading is more likely to have an effect on reading achievement. Chinese character recognition instruction, being an actual form of beginning reading activity, should fulfill that requirement adequately, especially if one views the universal aspect of reading as one of meaning seeking.

The present study utilized a quasi-experimental design of experimental and control groups to investigate the effects of Chinese character recognition instruction on the English reading readiness of Chinese- and non-Chinese-speaking kindergarten students. Subsequent to pretesting in English readiness skills, experimental instruction was conducted within a regular classroom setting with the experimental group. The control group received additional English readiness activities during the same time period. Post-tests were given to all students following the instructional period. Data were analyzed using the Analysis of Covariance and the Pearson Product Moment Correlation Analysis.

Findings of the present study may provide information related to the present literature review in the following areas:

1. The transferability of initial reading skills from an ideographic language to an alphabetic language.
2. The effects of training in the recognition of Chinese characters on initial English reading skills.

3. The relative effectiveness of regular English reading readiness training and instruction in Chinese characters on the improvement of English reading readiness skills.

4. The degree to which beginning kindergarten students can learn Chinese characters.

## Chapter 3

### RESEARCH DESIGN

The present study attempted to investigate the effects of Chinese character instruction on the English reading readiness skills of Chinese- and non-Chinese-speaking kindergarten students. It was concluded that the most appropriate method for answering the questions of the study was through experimental instruction within actual classroom settings with the target populations. The description of the research design, methodology, experimental procedures, instrumentation and data collection has been given in subsequent sections.

#### Population and Sampling

Two different populations of students were included in the study, namely the Chinese- and non-Chinese-speaking. The students came from three separate school sites. Separate sampling procedures were necessary for the two different populations. A detailed description of the populations, schools and sampling procedures follows.

#### Population

The population for the study consisted of monolingual Chinese-speaking and monolingual English-speaking beginning kindergarten children. A total of 38 subjects were

originally involved, 19 in the experimental group and 19 in the control group. A total of 34 of the students completed the experiment.

Table 1  
Number of Students who Started and Completed the Experiment

Language	Start (N=38)		Complete (N=34)	
	Exper.	Control	Exper.	Control
Chinese speaking	9	9	6	9
Non-Chinese speaking	<u>10</u>	<u>10</u>	<u>10</u>	<u>9</u>
Total	19	19	16	18

Chinese-speaking population. The Chinese-speaking kindergarten students were all new immigrant Indo-Chinese refugees who were ethnic Chinese from Vietnam. The age range of the children was from 4 years 10 months to 5 years 10 months, with one child who was 6 years 5 months. In the experimental group five boys and four girls were originally selected. In the control group there were four boys and five girls. During pre-testing, two of the boys in the experimental group would not cooperate, even in individual testing situations. Both were suspected by the classroom teacher of having possible learning handicaps. The two were not included in the experiment. One student (a girl) transferred out of the school after the third week of instruction.

The total experimental Chinese-speaking population who completed the experiment was six (three boys and three girls). All students in the control group completed the experiment.

Non-Chinese-speaking population. The non-Chinese-speaking population was monolingual English-speaking kindergarten students from the same classroom in a school located in a low socioeconomic neighborhood. The age range of the children was from 4 years 10 months to 5 years 10 months with one child who was 6 years 1 month. In the experimental group there were three boys and seven girls. In the control group there were originally five boys and five girls. One girl in the control group transferred out of the school shortly after pre-testing. All students in the experimental group completed the experiment.

#### Sampling Procedures

The number of Chinese-speaking kindergarten students at any school site in the area where the study was conducted had traditionally been relatively small. The Chinese-speaking population, although relatively large in the area, had not been concentrated within one school attendance area. There was also uncertainty as to the eventual enrollment of these students before the beginning of the school year since kindergarten entrance was the first formal enrollment into the schools. For the above reasons, it was decided that different sampling procedures might be necessary for the Chinese- and non-Chinese-speaking populations. It was

anticipated that the sampling procedure used for the non-Chinese-speaking population could satisfy the conditions of an experimental design of control group. The Chinese-speaking population sampling procedure would likely not satisfy the same conditions because of a variety of constraints which will be described later.

Sampling procedure for the non-Chinese-speaking group. Twenty-five students of monolingual English-speaking background were identified by the cooperating kindergarten teacher. Their monolingual language background was confirmed by the school language survey forms. Twenty of the students were randomly selected for the study. Ten each of the selected group were randomly assigned to the control and experimental groups.

Non-Chinese-speaking population. The school from which the population was selected was experiencing an influx of Indo-Chinese ethnic Chinese students during the previous school year. The prospect was good that a sufficient number of Chinese-speaking kindergarteners would be enrolled in the following school year. In addition, the school and the kindergarten teacher were willing to incorporate the experimental instruction into the kindergarten curriculum for either Chinese- or non-Chinese-speaking students so that formal and time-consuming arrangements to conduct an experiment would not need to be made with the school district. For these reasons, the school was contacted tentatively for

providing at least the non-Chinese-speaking experimental and control populations.

Sampling procedure for the Chinese-speaking group.

The sampling procedure for the Chinese population did not meet the same conditions as the non-Chinese-speaking population. The experimental and control groups were selected and assigned simply because the schools involved were willing to cooperate.

Chinese-speaking population. Due to the influx of Indo-Chinese students to the school mentioned above, nine Chinese-speaking kindergarteners were enrolled in the same kindergarten. It was originally planned that the nine students would serve as the Chinese-speaking experimental group. A control group would then be selected from a number of school sites if necessary. (The concentration of experimental students in both language populations at the same site was highly desirable from a practical standpoint, since limited financial and human resources were available for the study.) In addition, such an arrangement would allow for more comparable instruction in the other areas of the kindergarten curriculum for the English experimental and control groups, as well as the Chinese experimental group.

However, because of the overloading of students in this kindergarten created by the new influx, the district decided to transfer all the Chinese-speaking kindergarten students to a nearby school just as the arrangement with the



school and teacher to conduct the study was finalized. Subsequent cooperation to conduct the study was obtained from the new school site. A similar overloading resulted in the transfer of Indo-Chinese students to another nearby school. This school provided the control population with nine Chinese-speaking kindergarten students from two morning kindergarten classrooms. Because of the lack of school data on these children, careful matching of the experimental and control populations could not be achieved. However, the students from both groups were recent immigrants from Vietnam who were ethnic Chinese. The two groups were from similar socioeconomic backgrounds according to the school's community liaison worker in the two schools. Data on parent background of the new ethnic Chinese immigrants collected in two initial field research studies on the population by the investigator and graduate bilingual education students at the nearby state university indicated that both the control and experimental populations came from low socioeconomic backgrounds. Most of the population came from rural areas of North Vietnam. The parents were mostly monolingual Chinese (Cantonese) speaking. Their education level was low. Most of the parents were not literate in Chinese. Their previous occupations were mainly in fishing and farming.

The schools. The three schools were located in a metropolitan area of 700,000 population. All three schools involved were within an eight-mile radius of each other in similar low socioeconomic neighborhoods. All the schools

received ESEA Title I funds. They all received students from large low-rent apartment complexes which housed families with children.

The kindergarten teachers involved with the population in the study all have had over 10 years of experience. The two classroom teachers who had Chinese-speaking students were assisted by instructional aides who were Chinese-speaking. The classroom teacher who instructed the non-Chinese-speaking population of the study was assisted by a student teacher.

### Research Methodology

The study attempted to answer questions regarding the effects of Chinese instruction on student performance in English reading readiness skills. A quasi-experimental control group design was selected to control for (1) positive gains made through English reading readiness instruction by the classroom teacher, and (2) positive gains through maturation. Both are most important since gains in reading readiness skills measured by tests are likely to be made by beginning kindergarten children within a time period of two months simply because of their growth in skills in handling classroom situations such as testing and the use of paper and pencil, their maturation and the instruction in English reading readiness provided in the kindergarten curriculum.

Pretests and posttests were also used in anticipation that for the Chinese group random selection and

assignment from the same classroom setting might not be possible. Also, the size of the total population of the study was small, which increased the chances of non-equivalent experimental and control groups regardless of sampling procedures. By collecting both pretest and posttest scores, the pretest performance of the student could be used as the covariate to control for initial differences.

The independent variables of the study were languages (Chinese- and non-Chinese-speaking) and instructional methods (instruction and control). The dependent variables were posttest scores on reading readiness as measured by the total and subtest scores of The Metropolitan Readiness Tests and Slingerland's Pre-reading Screening Procedures (I-IV, VII).

#### Experimental Procedure

The following procedure was used in conducting the experiment. The procedure of the experiment has been described basically in chronological order. A description of the testing condition and classroom condition has been provided in subsequent sections.

1. Students selected for the study were pretested with The Metropolitan Readiness Tests, Form A, and Slingerland's Pre-reading Screening Procedures (I-IV, VII).

Testing began on the fifth week of the fall semester. It was completed within three weeks.

2. Students in the two experimental groups received instruction in Chinese character recognition three days a week (Tuesdays, Wednesdays and Thursdays) for a period of

six weeks. The non-Chinese-speaking group was instructed at 9:30 a.m. and the Chinese-speaking group at 10:30 a.m. All together, 16 sessions of 30-minutes' duration were completed. At the end of the period, 22 Chinese characters were taught and reviewed.

3. The students in both the experimental and control groups were posttested with The Metropolitan Readiness Tests, Form B, and Slingerland's Pre-reading Screening Procedures (I-IV, VII), beginning the first week of December. Most testing was completed within two weeks to avoid testing students during the week before Christmas vacation. A few students who were absent during different sections of various testing completed those subtests during the third week of December or the second week following the vacation.

4. The Chinese Character Recognition Test was also given to all the students in the experimental group at the end of the instructional period.

#### Experimental Treatment and Control Conditions

The student population in the study was from four different classrooms. A description of classroom instructional conditions for both the experimental and control groups has been provided in the following paragraphs.

#### The Chinese-speaking Experimental Group

The group received instruction in Chinese character recognition given in the Chinese language within the regular

classroom during a time period when other students were outdoors or in other small group activities. The person who provided the Chinese character instruction remained for another 30 minutes following the Chinese instruction to assist the classroom teacher in activities with the Chinese-speaking students or other students as directed by the cooperating classroom teacher. The purpose of this arrangement was to provide the impression to the children that the instruction provided by the Chinese instructor was just a part of regular classroom activity. During the rest of the kindergarten day the Chinese-speaking students followed the same instructional curriculum in the kindergarten classroom with the assistance of a Chinese-speaking instructional aide.

#### The Chinese-speaking Control Group

The group of students were from two separate classrooms in another school. The students received instruction (not in Chinese characters) and assistance given in the Chinese language in both half-hour pull-out programs and within classroom regular instruction.

#### The non-Chinese-speaking Experimental and Control Groups

The experimental group received Chinese character instruction given in English (with Chinese meanings of the characters represented by their English counterparts). The same instructor for the Chinese-speaking experimental group instructed this group. All the instructions were the same

for both the Chinese and English experimental groups with the exception of the language used. The same lesson was used at 9:30 a.m. for the non-Chinese-speaking group and at 10:30 a.m. for the Chinese-speaking group on the same day.

In the non-Chinese-speaking experimental instruction situation, all materials related to the Chinese instruction were collected and removed from the classroom after each session to insure that there would be no contamination of results, since the control group was also composed of students in the same classroom.

Instruction for the experimental group was given at a time when the English-speaking control group and other students in the classroom were divided into two separate groups equal in size to the experimental group for small-group instructional activity. The two other groups received instruction from the classroom teacher and a student teacher. Activities for the control group during this time period consisted of additional kindergarten activities related to the development of English reading readiness skills. Activities have included puzzle reconstruction, writing and tracing of letters of the alphabet and worksheets on visual discrimination of sameness and differences in pictures of objects, etc.

The Chinese instructor also worked in classroom activities with all the students as assigned by the classroom teacher during the 30 minutes prior to the Chinese instruction. The purpose of this arrangement was also to

provide the impression to the children that the instruction given by the Chinese instructor was just part of the regular classroom activity provided by one of the instructional staff of that classroom. (Another instructional aide came to the classroom to assist the teacher with a few of the Spanish-speaking children part of the time.) These arrangements seemed to be successful. During the sessions observed by the investigator in both the Chinese and non-Chinese-speaking experimental groups, the children followed the Chinese instructor to the activity area in a matter-of-fact manner. For the rest of the instructional time, both the control and experimental groups followed the same kindergarten instructional program provided.

#### Chinese Character Recognition Instructional Packet

An instruction packet with all the materials necessary for the instruction of 30 Chinese characters was originally developed by the investigator. The characters were to be introduced and taught in 22 sessions within approximately eight weeks. In the study, only 22 of the characters were taught because of time constraints.

#### Content of the Instructional Packet

The instructional packet included the following materials:

1. Lesson plans with objectives and procedures of each lesson written in detail.

2. Picture cue cards and large character cards needed to introduce the meaning of each of the characters.

3. Manipulative materials and other supplemental materials which reinforced the recognition of characters.

4. Worksheets for tracing and copying of characters for each lesson.

Selection and Presentation  
of Characters in the  
Packet

Characters with less numbers of strokes, less complex stroke formation and visual complexity were generally introduced earlier than those of increased difficulty. However, characters that were selected because of meaning category similarities or visual similarities were also presented closely together. (See Criteria List for the Selection of Characters and Sample Plans from the Packet in the Appendix.)

The following list of 22 out of 30 characters in the Packet were taught in the study. The characters shown are arranged in the order of presentation. The characters that were introduced together in the same session are placed here within brackets.

[一	二	三]	人	[大	小]
one	two	three	person	big	little
[上	下]	山	天	水	口
up	down	hill	sky	water	mouth
[日	月]	早	星	有	
sun	moon	morning	star	to have	
[木	林]	果	[男	女]	
wood	forest	fruit	man	woman	



## Instrumentation and Data Collection

The instruments used in the study included a Chinese Character Recognition Instructional Packet, a Chinese Character Recognition Test, The Metropolitan Readiness Tests and Slingerland's Pre-reading Screening Procedures. Each of the instruments used has been described in subsequent sections.

### The Design and Intent of the Packet

The packet was designed with the least possible input and information from other visual perception and readiness training programs and packets. The investigator avoided reading into the literature and research related to the area prior to the completion of the development of this Instructional Packet, the experimental instruction and the collection of posttest data of the study.

If the Instructional Packet contained elements that could be found in other developed readiness training programs, they were purely coincidental to the extent that authentic Chinese character recognition methodology also contained the same elements.

The Packet was not designed to be unusually creative, innovative or interesting as compared to Chinese character instruction which could be developed by an adequately trained teacher who was also familiar with authentic Chinese instructional methodology. The intent was to provide

a set of instructions which closely resembled those that could be available in a Chinese bilingual program that was adequately staffed. Such experimental instruction in a realistic classroom setting hopefully would yield realistic data regarding the effects of instruction investigated by the study.

#### Validation of the Packet

A checklist for the evaluation of the Packet was developed as a list of questions. This was used by a panel to rate the Instructional Packet regarding the validity of its contents and the authenticity of its methodology. The panel of evaluators included a university Chinese language instructor, an English-speaking kindergarten teacher who has team-taught in a Chinese bilingual setting, a Chinese bilingual preschool teacher with a graduate degree in bilingual education, a Chinese bilingual classroom teacher and a bilingual instructional aide. Each rater rated the Packet according to the checklist questions which allowed for three categories of ratings: (1) Yes, (2) No, (3) Revision. If revision was suggested, the rater would indicate the page number of the instructional plans and circle on the plan the portion requiring revision, with optional comments and suggestions.

The investigator discussed with each rater items checked "No" or "Revision" and the general impression of the total Packet. Most suggestions given were methodological and procedural improvement in nature. Revisions were made

in those portions. A few revisions on the selection and sequencing of characters were requested. Each was discussed with the rater. Characters and methodology which were requested for revision by more than one rater were revised to the satisfaction of the raters involved.

On the whole, the lessons planned and characters selected seemed to reach the consensus of the Chinese bilingual raters as appropriate and authentic. Most revisions were minor. (See letter and Evaluation Checklist in the Appendix.)

#### Field-testing of the Packet

Because of the limited number of students available during summer vacation for testing the Packet, only three children were used in the selected field test of the first three lessons. The children were pre-literate Chinese bilingual children between the ages of 5 and 8. The result did not indicate a need for revision. However, because of the differences between the field-test group and the anticipated experimental children, the investigator was prepared to make changes on an ongoing basis during the experiment if necessary. The investigator's experience in teaching kindergarten children, teaching the Chinese language and developing curriculum and instructional plans for instructional aides in the past provided some assurance that the packet designed would be generally appropriate. This was confirmed during the actual experimental instruction.

### Use of the Packet

The lessons were conducted in English for the non-Chinese-speaking group and in the Cantonese dialect of Chinese for the Chinese-speaking group. The Chinese pronunciation of each of the characters was not introduced to the non-Chinese-speaking students. Instead, each Chinese character was introduced as "the Chinese name for \_\_\_\_\_." In each case an English equivalent of the Chinese character was used. For the Chinese-speaking students, each character was introduced with its authentic Cantonese pronunciation.

The original packet included 30 characters to be presented in approximately 22 sessions of 20-minute duration in eight weeks. A combination of unavoidable conditions shortened the instructional period to six weeks of 16 sessions of 30-minute duration. (The unavoidable conditions included (1) the delay in the arrangements with cooperating schools due to school district's decision for interschool Indo-Chinese student transfers because of class size overload; (2) the time limitation set by the cooperating teachers to complete all experiments and testing before Christmas vacation to accommodate their own districtwide standardized testing schedules in mid-January; (3) the unforeseen delay of instruction due to extra time needed to complete testing; and (4) occasional illness of the instructor and unforeseen change in school schedule.)

The Chinese Character  
Recognition Test

The test consisted of the 22 characters taught during the experiment. The meaning of each character was illustrated by a picture. Three characters followed the illustration as multiple-choice answers to be selected and marked by the students.

During the administration of the test the tester orally named the English equivalent (for the non-Chinese-speaking group) or gave the Cantonese pronunciation of the character (for the Chinese-speaking group) for each of the pictures in the test. The students marked one of the three characters as the answer following the oral cue for each picture.

To insure that all students marked their own real choice, two different test forms were used for children sitting next to or across from each other. The testing items and the order in which each item appeared were identical in the two forms. The three characters used in each multiple-choice item were also identical. Only the order in which the three characters appeared in each item were different between form A and form B. (See Appendix for sample forms.)

The above precaution, however, did not prove to be necessary during the actual testing. All the children seemed very sure of their own choices. They all marked their answers quickly and on their own. The high percentage

of correct answers achieved by most of the students indicated a high level of mastery and retention of the characters taught. This was reflected in the self-assuredness exhibited during testing.

The investigator recognized that the reliability of the test had not been previously established. The lack of appropriate subjects for such testing prior to the experiment was beyond the control of the study.

### The Metropolitan Readiness Tests

The Metropolitan Readiness Tests were originally selected because they were commonly used for testing in schools and because the reviews and references from the Mental Measurements Yearbook indicated that the test was well-constructed and widely used as the testing instrument in a variety of Master's and Doctoral studies.

Originally it was planned that, if possible, the posttesting of the experiment would coincide with the mid-year school testing which utilized the same instrument. However, it was found that the school had adopted the newer edition of the test. Upon examination, it was found that the new edition contained subtests in auditory memory and rhyming which would further handicap the measurement of performance of non-English-speaking students. In addition, the copying test (of letter and geometric shapes) was eliminated from the new edition. This subtest was an important measurement of the effects of the experiment in the study. It was

decided that the 1964 edition was a more appropriate test for the study.

Validity and reliability of the test. Reviews of the 1964 edition of the test by Robert Dykstra and Harry Singer both indicated that the test was well constructed and should prove to be a useful tool as a readiness test in either kindergarten or first grade.<sup>1</sup> The information on its reliability and validity, however, was based on student testing at the end of kindergarten or the beginning of first grade. The test manual, on the other hand, indicated that the test could be used throughout the kindergarten year. Total test reliability was .90. The correlation between The Metropolitan Readiness Tests and the Murphy-Durrell Reading Readiness Analysis was .80. Singer also indicated that the scoring instrument of the Copy subtest had been improved from the previous edition. The split half reliability of the total test when the Copy Test was included was between .79 to .85. The test, however, had low alternate form reliability in the subtests, whereas the alternate form reliability of the total test was .91.

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<sup>1</sup>Robert Dykstra and Harry Singer, The Seventh Mental Measurement Yearbook. Edited by Oscar Krisen Buros (Highland Park, New Jersey: The Gryphon Press, 1972), pp. 1175-1177.

Buros' information on the test also indicated that up to 1972, 110 references to the test could be found.<sup>2</sup> Upon examination of the references, it was found that a large number of them were from research studies, particularly those from Master's and Doctoral studies related to readiness and prediction of reading achievement.

Pre-reading Screening  
Procedures by Beth  
Slingerland

This instrument was designed to detect specific language disabilities related to reading for students at the end of kindergarten or the beginning of first grade. The instrument was selected for the study because it contained subtests that would allow more extensive measurement of skills related to performance in visual matching, copying and recall of visual stimulus than those found in The Metropolitan Readiness Tests.

Since these elements appeared to measure the above areas more specifically for possible change in student performances as a result of instruction in Chinese character recognition, it was decided that a combination of data from this test and The Metropolitan Tests might provide more definitive and comprehensive information for the study.

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<sup>2</sup>The Seventh Mental Measurement Yearbook. Edited by Oscar Krisen Buros (Highland Park, New Jersey: The Gryphon Press, 1972), p. 1174.



Validity and reliability of the instrument. The review of the 1968 edition of the instrument by Coleen B. Jamison and Roy A. Kress indicated that the instrument itself had considerable merits. However, no information on its reliability or validity was available.<sup>3</sup> The reviewers agreed with the test manual that the test should not be used to interpret student performance by itself. When used with The Metropolitan Readiness Tests and Pinter-Cunningham Primary Test, it would provide a more comprehensive and definitive conclusion. For the purpose of this study the Pinter-Cunningham Test was not used.

A new edition of the instrument has been developed since the previous review. As a result, the former edition was no longer available. However, upon examining the new edition, the subtests selected for use for the study remained essentially unchanged. Two persons with expertise in testing and measurement and the assessment of reading difficulties were consulted regarding the instrument. Both concurred that the Pre-reading Screening Procedures document was an adequate instrument for the purpose of the study.

Administration of the  
Metropolitan Readiness  
Tests and Pre-reading  
Screening Procedures

Because of the differences in English language proficiency within the sample population, two different sets

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<sup>3</sup>Coleen B. Jamison and Roy A. Kress, The Seventh Mental Measurement Yearbook. Edited by Oscar Krisen Buros (Highland Park, NJ: The Gryphon Press, 1972), pp. 1140-42.

of procedures for the administration of the tests were followed.

The non-Chinese-speaking control and experimental groups. For these students the directions in English as given by the test manuals were followed.

The Chinese-speaking control and experimental groups. The directions for the two tests were given in Chinese, while the contents related to the English language were given in English (Metropolitan Subtests 1 and 2). The content in the Numbers subtest was given bilingually so that student performance could be measured whether the origin of the concepts and skills acquisition was from home in Chinese or from school in English.

The tests directions translation. The investigator translated all the directions that were orally given to the students from the test manuals into Chinese in written form. Without having been exposed to the original English manuals, the tester translated orally all the Chinese directions back into English. Then the investigator and the tester examined the English directions to determine if they were comparable to the original. Revisions were made in the Chinese directions which resulted in rather different English back translation. During the process, the actual oral language to be used based on the written Chinese translation was also determined. (Chinese written structure and oral Cantonese structure are not always the same.)

Testing condition. The pretest was administered to small groups of students (4 - 5) in sessions which lasted approximately 20 minutes. All testing was conducted by the same person who was previously trained by the investigator of the study. The few students who were disruptive in small groups were tested in smaller groups or individually. All students were tested in an area away from the regular classroom. The amount of time allowed for the content of the tests as stipulated in the manuals was strictly adhered to. However, the time needed to administer the tests other than the test content far exceeded the estimated time as given by the test manuals because of existing conditions in the schools and the maturity level of the students. (See Figures 1 and 2 for the testing schedule.)

The posttest was administered to slightly larger groups (6 - 8) by the same person with the investigator as the assistant to shorten administration time. A small portion of the posttest was administered by the investigator with the assistance of another trained person when the original tester was absent because of an emergency.

Testing for the different schools followed the same order in both pretest and posttest to insure that the time period between pretest and posttest was approximately the same for all students.

Figure 1  
Pretest Schedule

Test Sessions	English Exper. and Control (4 groups)	Chinese Exper. (2 groups)	Chinese Control (2 groups)
Metro. 1	Day 1 Week 1	Day 1 Week 1	Day 7 Week 2
Metro. 2, 3	Day 2 Week 1	Day 2 Week 1	Day 8 Week 2
Metro. 4, Draw-A-Man	Day 3 Week 1	Day 3 Week 1	Day 9 Week 2
Metro. 5	Day 4 Week 1	Day 4 Week 1	Day 10 Week 3
Metro. 6, Sling. 1, 2	Day 5 Week 2	Day 5 Week 2	Day 11 Week 3
Sling. 3, 4, 7	Day 6 Week 2	Day 6 Week 2	Day 12 Week 3

Figure 2  
Posttest Schedule

Test Sessions	English Exper. and Control (3 groups)	Chinese Exper. (1 group)	Chinese Control (2 groups)
Metro. 1	Day 1 Week 1	Day 2 Week 1	Day 6 Week 2
Metro. 2, 3	Day 1 Week 1	Day 2 Week 1	Day 6 Week 2
Metro. 4, Draw-A-Man	Day 2 Week 1	Day 3 Week 2	Day 7 Week 3
Metro. 5	Day 3 Week 2	Day 3 Week 2	Day 7 Week 3
Metro. 6, Sling. 1, 2	Day 4 Week 2	Day 5 Week 2	Day 8 Week 3
Sling. 3, 4, 7	Day 4 Week 2	Day 6 Week 2	Day 8 Week 3

Scoring of tests. All scoring strictly followed the directions given in the test manuals. A graduate assistant with course work in testing and measurement scored all the objective tests with the keys. The scores were then double-checked by the investigator to insure accuracy.

Metropolitan Test 6 (Copying) and Slingerland Procedures IV and VII require two raters. The assistant and the investigator read the rating directions and discussed the rating to arrive at a consensus. Then the assistant folded all test booklets to cover the names of the students. The booklets were scrambled so that control and experimental students' booklets would not stay in intact groupings. The assistant and the investigator each rated half of the booklets and scored them. Then the booklets were exchanged and rated the second time. Booklets in which the two raters had differences in rating were separated and rated together one more time to reach consensus on the test score.

The Draw-A-Man Test of The Metropolitan Tests is not a part of the total test score. A simplified rating scale was suggested by the test manual. This only provides a letter ranking. Since this test is taken from the Goodenough Draw-A-Man Test, it was decided that the standard scores from Children's Drawings as Measures of Intellectual Maturity, A Revision and Extension of the Goodenough Draw-A-Man by Dale

B. Harris would be used instead.<sup>4</sup> Scoring of this test requires a trained scorer. It was provided by Dr. William Merz, Professor, Department of Behavioral Sciences in Education at California State University, Sacramento.

#### Training and Qualification of the Chinese Instructor/ Tester

The instructor/tester was a graduate student in counseling and rehabilitation. She received her B.A. in Child Development. She had previous experience working with young children and a certificate to work with handicapped children from Canada. She is bilingual/biliterate in Cantonese (Chinese) and English.

#### Training for Testing

The instructor/tester was trained to do the testing through the discussion of the test manual and demonstration by the investigator during the first three testing sessions. Subsequent monitoring showed that the procedures were carefully adhered to.

#### Training for Instruction

Detailed lesson plans and all instructional materials were provided by the investigator. The first three lessons were discussed before instruction began. If the instructor

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<sup>4</sup>Dale B. Harris, Children's Drawings as Measures of Intellectual Maturity, A Revision and Extension of the Good-enough Draw-A-Man Test (New York: Harcourt, Brace & World, Inc., 1963).

encountered difficulties in following a lesson plan, she was to report to the investigator and discuss adjustment. The initial instructional sessions were carefully monitored to insure that instructional procedures were clearly understood and followed. Subsequent monitoring was done at least once each week. The observation during monitoring on the interest and attitude of the experimental group students toward the instructor and the evaluation by the classroom teachers all confirmed that the instructor conducted the sessions satisfactorily.

### Hypotheses and Statistical Analyses

The hypotheses of the study and statistical analyses used to test the hypotheses are described in this section. The list of hypotheses, rationale for the statistical procedures chosen and the statistical procedure used for each hypothesis are described separately.

#### Hypotheses of the Study

- A. The effects of Chinese instruction in relation to instructional methods and language variables.
  1. There is no significant difference in English reading readiness [as measured by The Metropolitan Readiness Tests and Slingerland's Pre-reading Screening Procedures (I-IV, VII)] between kindergarten students who have received instruction in Chinese character recognition and those who have received only English reading readiness instruction.
  2. There is no significant difference in English reading readiness between Chinese-speaking children and non-Chinese-speaking children who have received instruction in both Chinese character recognition and English reading readiness.

- B. The effects of instruction on the subtests of the readiness tests between instructional method groups.
3. There is no significant difference in English reading readiness between children who have received Chinese instruction and children who have not in the following readiness subtests of The Metropolitan Readiness Tests.
 

a. Word meaning	e. Numbers
b. Listening	f. Copying
c. Matching	g. Draw-A-Man
d. Alphabet	
  4. There is no significant difference in English reading readiness between children who have received Chinese instruction and children who have not in the following Pre-reading Screening Procedures.
    - a. Screening Procedure I: Visual Stimulus - Visual Perception - Visual Association - Discrimination of Letter Units for Matching
    - b. Screening Procedure II: Visual Stimulus - Visual Perception - Visual Association - Discrimination of Word Units for Matching
    - c. Screening Procedure III: Visual Stimulus - Visual Perception and Memory - Visual Association - Discrimination for Matching from Recall
    - d. Screening Procedure IV: Visual Stimulus - Visual Perception - Kinesthetic Association with Motor Response for Copying from Near Point
    - e. Screening Procedure VII (Gillingham): Visual Stimulus - Visual Perception and Memory - Kinesthetic Association with Kinesthetic-Motor Response from Recall
- C. The relationship between English reading readiness and Chinese character recognition ability and English reading readiness
5. There is no significant correlation between Chinese character recognition ability (as measured by the Chinese Character Recognition Test) and English reading readiness skills



- a. as measured by The Metropolitan Readiness Tests
- b. as measured by Pre-reading Screening Procedures.

Rationale for the  
Statistical Procedures  
Chosen

Three statistical procedures were used to test the hypotheses of the study. They were the Analysis of Covariance, the Analysis of Variance, and the Pearson Product Moment Correlation. The significance level for all of the hypotheses was set at 0.05.

The Analysis of Covariance. To determine if the effects of instruction were significant, this procedure was chosen so that possible initial differences of the experimental and control groups of the two languages were controlled. The statistical significance of the adjusted post-test mean of the groups could then be determined.

The Analysis of Variance. Since the total population was small and the sampling procedure of the Chinese group could not meet the condition of random selection and assignment, the conditions for the Analysis of Covariance might not have been met. For this reason all hypotheses which showed statistically significant results were tested with an additional Analysis of Variance of the gain score means to provide additional information for the analysis of data.

The Pearson Product Moment Correlation. All the scores of the readiness tests and the Chinese Character Recognition Test were continuous scores. To test the strength of the relationship between Chinese character recognition ability and English reading readiness skills, the Product Moment Correlation was chosen since it is subject to a smaller standard error.

Statistical Procedures for  
Hypotheses 1 - 5

Test for Hypothesis 1:

To determine the effects of Chinese instruction in relation to instructional method and language variables, a two-way analysis of covariance (instructional method x language) was used to analyze data collected. The pretest score of The Metropolitan Readiness Tests and the Pre-reading Screening Tests were used as the covariate. Analysis of main effects and interactions provided the answers.

Test for Hypothesis 2:

To determine the effects of instruction in relation to the language variable of the experimental group, a one-way Analysis of Covariance was used to provide the answer.

Test for Hypotheses 3 and 4:

To determine the effects of instruction on the various subtests, a one-way Analysis of Covariance

of instructional method was used for each subtest to provide answers.

#### Test for Hypothesis 5:

To determine the strength of the relationship between Chinese character recognition ability and English reading readiness skills, Pearson Product Moment Correlation Analysis was used to provide answers.

#### Additional Tests:

For subparts of Hypotheses 3 and 4 that showed statistically significant results, Analysis of Variance of the gain scores between instructional method groups was also used to give additional information.

### Summary

Thirty-four kindergarten students made up the sample population of Chinese- and non-Chinese-speaking experimental and control groups of the study. A quasi-experimental control group design was used to determine the effects of instruction in Chinese character recognition on the English reading readiness of Chinese- and non-Chinese-speaking kindergarten students.

All students were pretested with The Metropolitan Readiness Tests and Slingerland's Pre-reading Screening Procedures. Sixteen sessions of 30-minute duration of the experimental instruction were given to the experimental groups

over a period of six weeks. Twenty-two Chinese characters were taught. A Chinese Character Recognition Test was administered to the students to determine the mastery and retention of the characters taught. All students were also posttested and the data collected.

A Chinese Character Recognition Instructional Packet and a Chinese Character Recognition Test were developed by the investigator for the experimental instruction. The testing directions of appropriate sections of The Metropolitan and the Slingerland Tests were translated into Chinese for administration to the Chinese-speaking students. A bilingual tester/instructor was trained to carry out the experimental instruction and to administer the tests.

The collected data were analyzed. The Analysis of Covariance, the Analysis of Variance and the Pearson Product Moment Correlation were used to test the different hypotheses of the study.

## Chapter 4

### DATA ANALYSIS

The Statistical Package for the Social Sciences (SPSS) was used in analyzing the collected data from the study. The data are stored on the Burroughs B6700 computer housed at the University of the Pacific. The ANCOVA subprogram was used to analyze data for questions related to the effects of treatment on English reading readiness skills. The Pearson Correlation subprogram was used to analyze data to answer the question on the relationship of Chinese character recognition ability and English reading readiness skills.

Results from the statistical analyses are presented with the questions asked in the study. The questions are grouped into three major categories and presented under three separate headings. Tables related to questions under each heading follow the discussions of the questions in the section. (For the additional table of comparative test scores of Chinese- and non-Chinese-speaking students on the Chinese Character Recognition Test not included in the questions of the study, see page 176 in the Appendix.)

The Effects of Chinese Instruction in  
Relation to Instructional Methods  
and Languages Variables

The Analysis of Covariance was used to analyze the posttest total test scores on the Metropolitan Readiness Tests and the Slingerland Pre-reading Screening Procedures (I-IV, VII). The pretest scores on the two tests were used as respective covariates to adjust for initial differences in the population. Results of the significance testing and the pattern of relationship between the mean scores of the Instructional Method Groups (Treatment and Control) and the language groups (Chinese and non-Chinese-speaking) are presented in Tables 2-7.

1. Is there a significant difference in English reading readiness [as measured by the Metropolitan Readiness Tests and Slingerland's Pre-reading Screening Procedures (I-IV, VII)] between kindergarten students who have received instruction in Chinese character recognition and those who have received only English reading readiness instruction?

a. The Metropolitan Readiness Test: The main effects of treatment were not statistically significant ( $F = 0.390, p > .05$ ). (See Table 2.) The two-way interaction was also not significant ( $F = 0.271, p > .05$ ). The results of these analyses do not support that instruction has an effect on the English reading readiness skills of kindergarten students as measured by the total test scores of the Metropolitan Readiness Test. Further, they do not

Table 2

Two-way Analysis of Covariance of the Metropolitan  
 Readiness Tests Posttest Total Scores of the  
 Instructional Method Groups X Language  
 Groups with Pretest Scores as  
 Covariate

Source	SS	DF	MS	F	Significance Level
Main effects	112.205	2	56.102	0.639	0.535
Group	25.483	1	25.483	0.290	0.594
Language	89.998	1	89.998	1.024	0.320
Group X Lang.	23.812	1	23.812	0.271	0.609
Residual	2548.003	29	87.862		

Grand Mean = 40.82		Adjusted for Covariate	
<u>Group</u>	<u>N</u>	<u>Mean</u>	<u>Deviation</u>
Treatment	16	39.82	-1.00
Control	18	41.71	0.89
Language			
Chinese	15	38.93	-1.89
Non-Chinese	19	42.31	1.49

\*P &lt; .05

\*\*P &lt; .01

Table 3

Two-way Analysis of Covariance of the Slingerland  
Pre-reading Screening Procedures Posttest  
Total Test Scores of Instructional  
Methods Group X Language Groups  
with Pretest Scores as  
Covariate

Source	SS	DF	MS	F	Significance Level
Main effects	362.244	2	181.122	6.361	0.005
Group	133.395	1	133.395	4.685	0.039*
Language	191.854	1	191.854	6.738	0.015*
Group X Lang.	0.485	1	0.485	0.017	0.897
Residual	825.708	29	28.473		

Grand Mean = 18.28		Adjusted for Covariate	
<u>Group</u>	<u>N</u>	<u>Mean</u>	<u>Deviation</u>
Treatment	16	20.51	2.13
Control	18	16.48	-1.90
Language			
Chinese	15	15.65	-2.73
Non-Chinese	19	20.53	2.15

\*P &lt; .05

\*\*P &lt; .01



support that there is a differentiated effect for the instructional method groups (treatment and control) between the students of the two language groups (Chinese and non-Chinese-speaking).

b. The Slingerland Pre-reading Screening Procedures: The main effects of the Slingerland total scores was statistically significant ( $F = 4.685$ ,  $p < .05$ ). The Multiple Classification Analysis indicated that the treatment group had an adjusted mean score of 20.51 and the control group was 16.48 (see Table 3). The results of the two analyses support that there is a positive effect of Chinese character instruction on the English reading readiness skills as measured by the Slingerland total scores.

The differences in the effects of instruction on the Metropolitan scores and the Slingerland scores can be explained by the differences in the skills measured by the two tests. The Metropolitan scores are a composite score measuring skills in word meaning, listening, visual matching, number recognition and concepts, alphabet recognition and copying of patterns. The Slingerland score is a composite score measuring skills in visual matching, visual memory and copying of patterns. It may be that Chinese character instruction has a positive effect only on the English reading readiness skills which

are closely related to skills taught in the Chinese character instruction. Since visual discrimination and copying skills were integral parts of the instructional activities for Chinese character recognition, it is likely that the treatment group would improve in skills in these areas.

Another possible interpretation for the statistically significant main effects of the Slingerland test would be that the treatment group was higher in readiness skills initially, which might indicate higher capacity to make larger gains that were not adjusted for by the ANCOVA.

This interpretation is not supported by further comparison of the pretest and posttest scores of the two tests (see Table 4). ANOVA of the Metropolitan pretest scores of the treatment and control groups showed that the main effects were statistically significant ( $F = 6.052, p < .05$ ). The mean scores of the treatment group (36.4375) were higher than that of the control group (24.7778). Yet the Analysis of Covariance in the Metropolitan posttest score showed that neither the main effects of treatment nor the Interaction of Language X Instructional Method were statistically significant. The treatment group adjusted mean of 39.82 was lower than the control mean of 41.71. (See Table 2.) The Pretest ANOVA and Posttest ANCOVA of the Slingerland

Table 4

Analysis of Variance of Pretest Total Score of the  
Metropolitan and the Slingerland Procedures  
Between Instructional Method Groups

Source	SS	DF	MS	F	Significance Level
Metropolitan Pretest					
Between groups	1151.569	1	1151.569	6.053	0.0195*
Within groups	6089.049	32	190.283		
Slingerland Pretest					
Between groups	20.864	1	20.864	0.411	0.5262
Within groups	1626.194	32	50.819		
<u>Group</u>	<u>N</u>	<u>Mean</u>	<u>Standard Deviation</u>		
Metropolitan Pretest					
Treatment	16	36.4375	11.0452		
Control	18	24.7778	15.8283		
Slingerland Pretest					
Treatment	16	12.1250	6.6320		
Control	18	10.5556	7.5390		

\*P &lt; .05

\*\*P &lt; .01

scores, however, indicated a different pattern (see Table 4). Unlike the Metropolitan tests, the ANOVA of the Slingerland pretest scores showed that the main effects for the treatment and control groups were not statistically significant ( $F = 0.411$ ,  $p > .05$ ). However, similar to the Metropolitan test, the Slingerland pretest mean score of the treatment group (12.1250) was also higher than the control (10.5556). The results of the Analysis of Covariance on the Slingerland posttest score in Table 3, however, showed that the mean effects were statistically significant ( $F = 4.685$ ,  $p < .05$ ), with the treatment group achieving an adjusted mean score of 20.51 to the control's 16.48.

This inconsistency between the pretest-posttest results of the two tests would tend to negate the interpretation that the higher posttest mean on the Slingerland of the treatment group was due largely to initial superior skills which might indicate a greater capacity for gains not adjusted for by the Analysis of Covariance. Otherwise, the results of the Metropolitan posttest ANCOVA should at least show a higher adjusted mean for the treatment group. An additional ANOVA on the Slingerland gain scores (posttest - pretest) also showed that the main effects were again statistically significant ( $F = 4.815$ ,  $p < .05$ ), with the treatment group mean gain of 9.1875 and control of 4.889. (See Table 5.)

Table 5

Analysis of Variance of Slingerland Total Test Gain  
Scores Between Instructional Method Groups

Source	SS	DF	MS	F	Significance Level
Between groups	156.520	1	156.520	4.815	0.0356
Within groups	1047.215	32	32.507		

<u>Group</u>	<u>N</u>	<u>Mean</u>	<u>Standard Deviation</u>
Treatment	16	9.1875	5.5283
Control	18	4.8889	5.8500

\*P &lt; .05

\*\*P &lt; .01

The above results of the analyses of the data would seem to support that Chinese character instruction has a positive effect on the improvement of skills which are closely related to those skills which are taught during character instruction.

The analyses of data regarding the subtest scores will answer subsequent questions about the effects of instruction on different areas of reading readiness skills in the Metropolitan tests.

2. Is there a significant difference in English reading readiness between Chinese-speaking children and non-Chinese-speaking children who have received instruction in both Chinese character recognition and English reading readiness?

a. Metropolitan Readiness Test: The ANCOVA of the main effects of treatment on the language group on the Metropolitan scores was not statistically significant. The result of the analysis does not support a differentiated effect of treatment on the two language groups. (See Table 6.) Another interpretation could be that the statistically insignificant main effects are largely the result of the increased possibility of not reaching statistical significance with a small population ( $N = 16$ ). Given a larger population, differentiated effects of instruction on the two language groups might have been supported by the results.

Table 6

Analysis of Covariance of the Posttest Total Test  
Scores of the Metropolitan and Slingerland Test  
Between the Chinese and Non-Chinese Speaking  
Treatment

Source	SS	DF	MS	F	Significance Level
Metropolitan					
Main effects	1.462	1	1.462	0.018	0.894
Language	1.463	1	1.462	0.018	0.894
Residual	1033.698	13	79.515		
Slingerland					
Main effects	170.228	1	170.228	11.357	0.005**
Language	170.228	1	170.228	11.357	0.005**
Residual	194.850	13	14.988		
Adjusted for Covariate					
<u>Group</u>	<u>N</u>		<u>Mean</u>		<u>Deviation</u>
Metropolitan (Grand Mean = 44.31)					
Chinese	6		44.76		0.45
Non-Chinese	10		44.64		-0.27
Slingerland (Grand Mean = 21.69)					
Chinese	6		17.13		-4.56
Non-Chinese	10		24.43		2.74

\*P &lt; .05

\*\*P &lt; .01

b. The Slingerland Pre-reading Screening Procedures: The ANCOVA of the main effects was statistically significant. The multiple classification analysis showed that the Chinese-speaking treatment students had an adjusted mean score of 15.82 to the non-Chinese-speaking treatment group mean of 20.40. The results of the analysis can be interpreted as supporting a greater positive effect of treatment for the non-Chinese-speaking group. However, further comparison of the ANCOVA of both the Metropolitan and Slingerland posttest total scores and subtest scores between language groups (both treatment and control) revealed that the pattern of all the mean scores between the two language groups are almost identical to those between the Chinese and non-Chinese treatment groups. (See Table 7.) These comparisons would tend to negate the interpretation that there is a differentiated positive result of treatment between language groups. An alternate interpretation is that the significant mean effects of language can be explained as a part of the consistent pattern of differences in scores between language groups, regardless of instructional methods (treatment and control). Given the parallel results between the language groups and language treatment groups in the Metropolitan post-test (Table 7), this interpretation can also be applied consistently to



Table 7

Comparison of the Grand Mean Deviation and Significance Level of the  
Analysis of Covariance of Posttest Total and Subtest Scores  
of the Metropolitan and Slingerland Tests of the  
Language Groups and Language Treatment Group

	Adjusted Deviation					
	Language Group (N = 34)			Treatment Group (N = 16)		
	Chinese (N=15)	Non-Chinese (N=19)	Sig. Level	Chinese (N= 6)	Non-Chinese (N=10)	Sig. Level
<u>Slingerland Post-test</u>						
Proc. I	3.81	5.15	0.032*	4.26	6.05	0.036*
Proc. II	2.82	4.42	0.022*	2.25	4.86	0.003*
Proc. III	3.65	5.06	0.011*	4.01	5.40	0.119
Proc. IV	2.36	3.22	0.149	3.06	4.16	0.234
Proc. VII	2.68	2.93	0.692	3.29	4.12	0.433
Total	17.65	20.53	0.015*	17.13	24.43	0.005**
<u>Metropolitan Post-test</u>						
a. Word	6.21	6.94	0.287	6.11	6.73	0.503
b. Listen	6.71	7.12	0.036*	5.35	6.88	0.147
c. Match	8.19	8.59	0.686	7.93	9.05	0.445
d. Alphabet	7.88	9.04	0.364	10.48	11.01	0.774
e. Numbers	7.00	8.47	0.120	7.73	8.66	0.536
f. Copy	3.79	2.95	0.282	4.89	4.36	0.638
Total	38.97	42.28	0.317	44.76	44.04	0.874

\*P &lt; .05

\*\*P &lt; .01

the previous question on the effects of treatment on the language treatment groups in the Metropolitan tests.

The Effects of Instruction on the  
Subtests of the Readiness Tests  
between Instructional  
Method Groups

Analysis of Covariance was used to analyze the post-test subtest scores in the Metropolitan and the Slingerland tests. The respective pretest subtest scores were used as the covariates to adjust for initial differences in skills in the population. Results of the significance testing and the pattern of relationship between the treatment and control groups are presented in Tables 8-11.

3. Is there a significant difference in English reading readiness between children who have received Chinese instruction and children who have not in the following readiness subtests of the Metropolitan Readiness Tests? (See Table 8.)

- |                 |               |
|-----------------|---------------|
| a. Word meaning | e. Numbers    |
| b. Listening    | f. Copying    |
| c. Matching     | g. Draw-a-man |
| d. Alphabet     |               |

a. Word meaning subtest: ANCOVA of the main effects of instruction on the word meaning subtest was not statistically significant ( $F = 0.375$ ,  $p > .05$ ). The results of the analysis do not

support that instruction in Chinese characters has an effect on a student's knowledge of English word meaning.

b. Listening subtest: The main effects for this subtest were not statistically significant ( $F = 1.710$ ,  $p > .05$ ). An effect of treatment on the student's listening skills is not supported.

c. Matching subtest: The main effects for this subtest are not statistically significant ( $F = 0.022$ ,  $p > .05$ ). An effect of treatment on a student's skill in visual matching is not supported.

d. Alphabet subtest: The main effects for this subtest were statistically significant ( $F = 5.255$ ,  $p < .05$ ). The results of the multiple classification analysis showed that the treatment group received an adjusted mean score of 9.96 and the control of 7.25. The results of the analyses support a positive effect of treatment on student's skill in alphabet recognition.

A further comparison of the adjusted and unadjusted mean scores for subtests a, b, c, and d showed that the pretest scores of the treatment group were higher in all four subtests. While subtests a, b and c ANCOVA main effects were all consistently not statistically significant, the main effects of the Alphabet subtest were. This departure from the consistent patterns of the three previous subtests in the Alphabet subtest again

tends to negate the interpretation that initial superior skills and capacity for gains might account largely for the subsequent greater gains in the treatment group. An examination of the post-test mean score for the Alphabet subtest showed that there was a difference of 4.31 between the treatment and control unadjusted mean and a difference of 2.71 for the adjusted mean (Table 8). The total possible score for this subtest is 16, but the highest score achieved in the study was 15. An advantage of close to three letters out of 15 for the treatment group that was achieved over a relatively short period of instruction further supports that it is highly probable Chinese character instruction has a positive effect on a student's improvement in Alphabet recognition skills.

A subsequent ANOVA of gain scores (post-test - pretest) of the Alphabet subtest (Table 9) showed that the main effects of treatment were not significant ( $F = 4.065$ ,  $p = .0522$ ). However, since  $p = .0522$  just barely failed to achieve statistical significance and since the more sensitive ANOVA of the posttest score with pretest scores as the covariate showed  $F = 5.255$  and  $p = .029 < .05$ , the positive effect of instruction on students' alphabet recognition skill can still be supported.

e. Numbers subtest: The main effects of treatment were not statistically significant. An effect

Table 8  
 Analysis of Covariance of Metropolitan Posttest  
 Subtest Scores of Instructional Method  
 Groups with Pretest Scores as  
 Covariates

Source	SS	DF	MS	F	Signifi- cance of F
Main effects					
3a. Word Meaning	1.355	1	1.355	0.375	0.545
3b. Listening	6.042	1	6.042	1.710	0.201
3c. Matching	0.144	1	0.144	0.022	0.884
3d. Alphabet	58.902	1	58.902	5.255	0.029*
3e. Numbers	9.564	1	9.564	1.352	0.254
3f. Copying	33.736	1	33.736	8.519	0.006**
3g. Draw-A-Man	22.011	1	22.011	0.040	0.842

Group	N	Mean	Devia- tion	Adj. Covariates Mean	Deviat.
3a. Word Meaning	(Grand Mean = 6.62)				
Treatment	16	6.50	-0.12	6.40	-0.22
Control	18	6.72	0.10	6.82	0.20
3b. Listening	(Grand Mean = 6.50)				
Treatment	16	6.31	-0.19	6.03	-0.47
Control	18	6.67	0.17	6.92	0.42
3c. Matching	(Grand Mean = 8.41)				
Treatment	16	8.62	0.21	8.48	0.07
Control	18	8.22	-0.19	8.35	-0.06
3d. Alphabet	(Grand Mean = 8.53)				
Treatment	16	10.81	2.28	9.96	1.43
Control	18	6.50	-2.03	7.25	-1.28
3e. Numbers	(Grand Mean = 7.82)				
Treatment	16	8.31	0.49	7.21	-0.61
Control	18	7.39	-0.43	8.37	0.55
3f. Copying	(Grand Mean = 3.32)				
Treatment	16	4.46	1.24	4.38	1.06
Control	18	2.22	-1.10	2.38	-0.94
3g. Draw-A-Man	(Grand Mean = 68.91)				
Treatment	16	75.31	6.40	69.82	0.91
Control	18	63.72	-5.69	68.10	-0.81

Draw-A-Man score is not part of the total test score as instructed by the test manual. Present scoring used standard scores from the test manual of Children's Drawings as Measures of Intellectual Maturity, a Revision and Extension of the Goodenough Draw-A-Man Test, by Dale B. Harris, Harcourt, Brace & World, Inc., New York, 1963.

\*P &lt; .05

\*\*P &lt; .01

Table 9

Analysis of Variance of Metropolitan Alphabet  
Subtest Gain Scores of Instructional  
Method Groups

Source	SS	DF	MS	F	Significance of F
Between groups	46.668	1	46.668	4.065	0.0522
Within groups	367.361	32	11.480		

<u>Group</u>	<u>N</u>	<u>Mean</u>	<u>Standard Deviation</u>
Treatment	16	4.6250	2.8954
Control	18	2.2778	3.7699

\*P &lt; .05

\*\*P &lt; .01

of instruction on a student's performance in number recognition and concepts is not supported.

f. Copying subtest: The main effects of treatment showed that it was statistically significant ( $F = 8.519, p < .05$ ). The multiple classification analysis showed that the treatment group adjusted mean score was 4.38 as compared to the control score of 2.38. The results of the analyses support a positive effect of treatment on a student's skills in copying patterns including letters, numbers and geometric patterns. An additional ANOVA on the Copying subtest gain score (Table 10) also showed that the main effect was statistically significant ( $F = 8.602, p = .0062 < .05$ ). The mean gain for the treatment group was 2.3125, compared to the control of 0.3333. The results further supported the positive effects of instruction on copying skills.

g. Draw-a-man subtest: The main effects of treatment were not statistically significant. The results do not support that there is an effect of instruction on a student's skills for the Draw-a-man test.

The results of the analysis of the various subtests of the Metropolitan Test support the positive effects of instruction on alphabet recognition and copying skills. The effects of instruction on English vocabulary, listening, number and visual matching skills are not supported. With the exception of the matching subtest, the positive effects

Table 10

Analysis of Variance of Metropolitan Copying Subtest  
Gain Scores of Instructional Method Groups

Source	SS	DF	MS	F	Significance of F
Between groups	33.180	1	33.180	8.602	0.0062**
Within groups	123.438	32	3.857		

<u>Group</u>	<u>N</u>	<u>Mean</u>	<u>Standard Deviation</u>
Treatment	16	2.3125	1.9568
Control	18	0.3338	1.9704

\*P &lt; .05

\*\*P &lt; .01



of instruction on copying and alphabet recognition appear to be consistent with findings as discussed in Question 1; that is, the positive effects of instruction tend to be found in skill areas related to skills that are taught in Chinese character recognition instruction.

4. Is there a significant difference in English reading readiness between children who have received Chinese instruction and children who have not in the following Pre-reading Screening Procedures? (Table 11)

a. Screening Procedure I: Visual Stimulus - Visual Perception - Visual Association - Discrimination of Letter Units for Matching: The main effects of treatment were not statistically significant. Results of the analyses do not support that treatment has an effect on a student's skills as measured in this procedure.

However, since the main effects of the visual matching subtest in the Metropolitan test which involved similar tasks was also not statistically significant, an alternate interpretation could be that the additional English reading readiness activities the control students received during the time the treatment group was receiving Chinese instruction have comparable effects on the visual matching improvement as those used in the Chinese instruction.

Table 11

Analysis of Covariance of Slingerland Posttest  
Subtest Scores of Instructional Method  
Groups with Pretest Scores as  
Covariates

Source	SS	DF	MS	F	Significance of F
Main effects					
4a. Proc. I	5.778	1	5.778	2.007	0.167
4b. Proc. II	0.108	1	0.108	0.031	0.862
4c. Proc. III	4.473	1	4.473	2.060	0.162
4d. Proc. IV	14.710	1	14.710	5.553	0.025*
4e. Proc. VII	23.324	1	23.324	7.078	0.013*

Group	N	Unadj. Covariates		Adj. Covariates	
		Mean	Deviat.	Mean	Deviat.
4a. Proc. I	(Grand	Mean = 4.56)			
Treatment	16	5.38	0.82	5.02	0.46
Control	18	3.83	-0.73	4.14	-0.41
4b. Proc. II	(Grand	Mean = 3.71)			
Treatment	16	3.88	0.17	3.77	0.06
Control	18	3.56	-0.15	3.67	-0.05
4c. Proc. III	(Grand	Mean = 4.44)			
Treatment	16	4.87	0.43	4.83	0.39
Control	18	4.05	-0.39	4.09	-0.35
4d. Proc. IV	(Grand	Mean = 2.85)			
Treatment	16	3.75	0.90	3.62	0.71
Control	18	2.05	-0.80	2.22	-0.63
4e. Proc. VII	(Grand	Mean = 2.82)			
Treatment	16	3.81	0.99	3.71	0.89
Control	18	1.94	-0.88	2.03	-0.79

\*P &lt; .05

\*\*P &lt; .01

b. Screening Procedure II: Visual Stimulus - Visual Perception - Visual Association - Discrimination for Word Units for Matching: The main effects of treatment were not statistically significant. The results of the analysis do not support that treatment has an effect on students' skills in visual discrimination of word units for matching. Since this procedure is also similar to the Matching subtest of the Metropolitan test, the alternate interpretation described in Procedure I can also apply here.

c. Screening Procedure III: Visual Stimulus - Visual Perception and Memory - Visual Association - Discrimination for Matching from Recall: The main effects of treatment were not statistically significant. The results of the analysis do not support that treatment has an effect on students' skills in discrimination for matching from recall. The comparable effects of regular kindergarten instruction suggested as an alternate interpretation in Procedure I can also apply to Procedure III.

d. Screening Procedure IV: Visual Stimulus - Visual Perception - Kinesthetic Association with Motor Response for Copying from Near Point: The main effects of treatment were statistically significant ( $F = 5.553, p < .05$ ). Multiple classification analysis showed that the treatment group had an

adjusted mean score of 3.62 to the control's 2.22. The results of the analyses support that treatment has a positive effect on students' skills in copying from a near point. This finding is consistent with the result of the Metropolitan copying subtest which is similar to this procedure.

e. Screening Procedure VII (Gillingham):

Visual Stimulus - Visual Perception and Memory - Kinesthetic Association with Kinesthetic Response from Recall:

The main effects of treatment were statistically significant. The multiple classification analysis showed that the treatment group had an adjusted mean score of 3.71 as compared to the control of 2.03. The results of the analyses support that treatment has a positive effect on the students' skills in copying from memory.

It should be noted that although Procedures I-III main effects were not statistically significant, all three mean scores were consistently higher for the treatment group. The main effects of the total scores were statistically significant as discussed in Question 2. Again, the findings in Question 4 are consistent with findings in the previous three questions; that is, Chinese instruction has a positive effect on English reading readiness skill areas that are related to those found in Chinese character recognition instruction. Also, it is likely that certain skills such as visual matching are affected to a comparable degree by

regular English reading readiness instruction. Further examination of the relationships between Chinese character recognition skills with various English reading readiness skills in Question 5 will more clearly indicate the strength of relationship between certain English reading readiness skills and character recognition skills.

The Relationship Between English Reading  
Readiness and Chinese Character  
Recognition Ability

The Pearson Product Moment Correlation was used to analyze the relationship between the Chinese character recognition test scores and the posttest scores of the total test and subtest of the Metropolitan and the Slingerland tests. SPSS subprogram Pearson Correlation was used to compute the coefficients and their statistical significance. Computed data are in Table 12.

5. Is there a significant correlation between Chinese character recognition ability [as measured by the Chinese Character Recognition Test] and English reading readiness skills?

- a. as measured by The Metropolitan Readiness Tests;
- b. as measured by Slingerland's Pre-reading Screening Procedures.

a. Metropolitan Readiness Tests. The results of the correlation analysis showed statistically significant correlations between the Chinese Character Recognition Test score and (1) the total score

Table 12

Pearson Correlation Analysis of the Chinese  
Character Recognition Test Score with  
Metropolitan and Slingerland Tests  
Posttest Total and Subtest

Variable Pairs	Coeffi- cient	N	P	Significance Level
Chinese Characters				
with Metropolitan Tests				
a. Word Meaning	0.4343	16	0.046	0.092
b. Listening	0.3220	16	0.112	0.224
c. Matching	0.1406	16	0.302	0.604
d. Alphabet	0.6863	16	0.002	0.004**
e. Numbers	0.3569	16	0.087	0.174
f. Copying	0.4624	16	0.036	0.072
g. Draw-A-Man	0.6385	16	0.004	0.008**
h. Total	0.5518	16	0.013	0.026*
with Slingerland Procedures				
a. Procedure I	0.0190	16	0.472	0.944
b. Procedure II	0.2222	16	0.204	0.408
c. Procedure III	0.3611	16	0.085	0.170
d. Procedure IV	0.2945	16	0.134	0.268
d. Procedure VII	0.4983	16	0.025	0.050*
f. Total	0.4152	16	0.055	0.11

\*P &lt; .05

\*\*P &lt; .01

( $r = 0.5518$ ,  $p = 0.026 < .05$ ), (2) the Alphabet Recognition Subtest Score ( $r = 0.6863$ ,  $p = 0.004 < .01$ ), and (3) the Draw-A-Man Subtest score ( $r = 0.6383$ ,  $p = 0.008 < .01$ ). The results of the analyses support a positive relationship between the skills measured in the above tests and Chinese character recognition ability. Results also revealed a relatively strong relationship with the Copying subtest ( $r = 0.4624$ ,  $p = 0.072 > .05$ ), even though the coefficient did not reach statistical significance. The relatively small population ( $N = 16$ ) could have increased the difficulty in reaching statistical significance. The results of the analyses support a strong and positive relationship between Chinese character recognition ability and English reading readiness skills as measured by the Metropolitan Tests with very strong relationship, particularly with the alphabet recognition skills and skills in Draw-A-Man, and a relatively strong relationship with pattern copying skills. Although a strong positive relationship between Chinese character ability and all the other skills in the Metropolitan Test is not supported, the results can support that Chinese character recognition ability is positively related to all the readiness skills in the Metropolitan Tests.

b. The Slingerland Pre-reading Screening Procedures: The correlation analysis showed that the correlation between Chinese character recognition scores and the total Slingerland scores was not statistically significant ( $r = 0.4152$ ,  $p = 0.11 > .05$ ). The correlation with Procedure VII (Gillingham) [Visual Perception and Memory - Kinesthetic Association with Kinesthetic Motor Response from Recall] was statistically significant ( $r = 0.4983$ ,  $p = 0.05 = .05$ ). Results of the analyses do not support a strong relationship between Chinese character recognition ability and reading readiness skills measured by the Slingerland total score. A strong relationship between Chinese character recognition ability and copying from memory (Procedure VII) is supported. Results support a positive relationship between Chinese character recognition ability and all the readiness skills measured in the Slingerland Procedures. A strong relationship with skills in copying from memory is also supported.

#### Summary

The analyses of data collected for the study supported statistically significant positive effects of Chinese character instruction, particularly on students' skills in alphabet recognition and copying patterns from near point and from memory.



A differentiated positive effect of instruction on the non-Chinese-speaking treatment students in visual matching were statistically supported. However, the consistently parallel pattern of differentiated posttest mean between language groups regardless of treatment gave support to the interpretation that the difference in posttest mean between language treatment groups was largely the effect of language group differences, rather than differentiated treatment effects. The correlation analyses support a positive relationship between Chinese character recognition ability and all English reading readiness skills measured in the study. Statistically significant relationship is supported between Chinese character recognition ability and skills in alphabet recognition, copying from memory and Draw-A-Man (a measure of intellectual maturity). A statistically significant relationship between character recognition abilities and skills measured in The Metropolitan Readiness Tests is also supported.

## Chapter 5

### DISCUSSION, CONCLUSIONS AND RECOMMENDATIONS

The study utilized a quasi-experimental control group design to determine the effects of Chinese character recognition instruction on the English reading readiness of Chinese- and non-Chinese-speaking kindergarten students. Thirty-four Chinese- and non-Chinese-speaking kindergarten students were involved in the study. All students were pre-tested in September, 1980 with The Metropolitan Readiness Tests and Slingerland's Pre-reading Screening Procedures (I-IV, VII).

The Chinese- and non-Chinese-speaking experimental students were instructed through a Chinese Character Recognition Instructional Packet developed by the investigator for the study. All instruction took place within regular classroom settings during school hours. Sixteen instructional sessions of 30-minute duration were conducted during a six-week period. Twenty-two Chinese characters were taught. The students were subsequently tested with the Chinese Character Recognition Test developed by the investigator. All students (experimental and control groups) were posttested in December of the same year.

Collected data were analyzed using the Statistical Package for the Social Sciences. The data were stored on the Burroughs B6700 computer housed at the University of the Pacific. The ANOVA Subprogram and the Pearson Correlation Subprogram were used to answer the questions of the study. Results of the analyses follow.

### Findings of the Study

The findings of the study are described in two separate sections. The first section deals with the statistically significant results which support the positive effects of instruction on various English reading readiness skills. The second section deals with the statistically significant correlation between Chinese character recognition ability and various English reading readiness skills.

#### Findings that Support the Positive Effects of Instruction

An analysis of the data collected showed that effects of instruction can be supported for alphabet recognition and pattern copying skills as measured by The Metropolitan Readiness Tests for both the Chinese- and non-Chinese-speaking experimental group students. Positive effects were also noted for the overall visual perceptual skills as measured by the total scores of the Pre-reading Screening Procedures and, in particular, skills in copying from near point and copying from memory.

Although statistical analysis can support a differentiated positive effect of treatment for the Chinese- and non-Chinese-speaking students, the consistent pattern of similarities of these differences in all test results between the two language groups, treatment or control, tends to negate the possibility of differentiated treatment effects and support the interpretation of a language effect instead. That is, the greater positive effects of instruction on the non-Chinese-speaking students were more likely due to an overall consistent pattern of higher scores for the non-Chinese-speaking group (both experimental and control) as compared to the Chinese-speaking group (experimental and control). Although the non-Chinese-speaking experimental group also scored higher in the Chinese Character Recognition Test, no statistically significant difference in performance between the language groups was found.

Findings that Support  
Statistically Significant  
Relationship Between  
Chinese Character Recognition and Various English  
Reading Readiness Skills

A statistically significant relationship between the scores of the Chinese Character Recognition Test and the Total Metropolitan Tests, Alphabet subtest, and the Draw-A-Man test was also found. No support for a statistically significant relationship between the Chinese Character Recognition Test and the Slingerland Procedures could be established except for the Copying from Memory subtest.

### Conclusions from the Findings

From the analysis of the data collected, it was concluded that, given the situation in which students received either instruction in additional English reading readiness or instruction in Chinese character recognition, the group receiving Chinese instruction was not negatively affected by the instruction in their improvement in English reading readiness skills. Further, it is possible that Chinese character instruction is more effective than regular kindergarten English reading readiness activities in improving certain readiness skills such as letter recognition and pattern copying. Correlational analysis also revealed the possibility that skills necessary for Chinese character recognition are positively related to skills in English reading readiness. In particular, the ability to recognize Chinese characters is strongly related to English reading readiness skills such as the ability to identify or recognize the alphabet, the ability to copy patterns from memory as well as intellectual maturity as indicated in the Draw-A-Man test.

In relating the findings which indicated the positive effects of instruction in letter recognition and copying from memory and positive relationship between Chinese character recognition ability and the same English reading readiness skills, it seems plausible that a cause and effect relationship between Chinese instruction and achievement in

readiness skills of letter recognition and copying from memory does exist.

### General Instructional Findings

The findings of the study in the effects of instruction in Chinese character recognition on English reading readiness is consistent with studies on the effects of visual perceptual training on reading achievement in that positive effects are usually found in skills that are closely related to those skills that are trained.

In the instruction in Chinese character recognition, the discrimination of the similarities and differences between characters was one of the strategies taught. This was accomplished by comparing the similar and dissimilar parts, or radicals, of different characters. In addition, tracing and copying of Chinese characters are two of the activities that are consistently used to assist students in observing and noticing differences in the characters. This also reinforces their recognition of the characters. Each of the characters is also introduced as "the name for \_\_\_\_\_", which is followed by activities that help students recognize the configuration of each of the characters, as well as attaching a name to the configuration.

The investigator also concluded that with the extensive activities in observing visual design and copying such designs (characters), the instruction in Chinese had a positive effect on English reading readiness skills that involve

copying or copying from memory. Furthermore, the activities which help students recognize the configuration of a character and attach a name to the configuration can also have an effect on the students' ability to identify a configuration such as a letter of an alphabet and attach an appropriate name to the configuration. Therefore, the statistically significant results in these subtests are basically consistent with other studies of the effects of visual perceptual training.

During the experimental period, unstructured observation of the behavior of the experimental group also revealed interesting student behaviors. On more than one visit to the English-speaking experimental classroom, the investigator entered the classroom at a time when the kindergarten teacher was teaching the writing of certain letters of the alphabet. The investigator observed a few of the experimental group students (sitting in mixed groups with control students) tracing the letters in the air and whispering the 'stroke' formation and 'stroke' position of the letters to themselves in the same manner they had been taught in Chinese instruction. The classroom teacher was observed showing a different strategy at the time.

During the posttest, both the investigator and the tester observed experimental group students first tracing a design to be copied before copying these designs in copying subtests. It seems possible that the positive effects of Chinese character instruction in the area of copying for the

experimental group may be the result of the students' ability to transfer the utilization of a set of strategies learned in the context of Chinese character recognition to a different set of tasks which require similar skills.

In relation to the positive effects of instruction on alphabet recognition, the instructor of the Chinese recognition sessions has also noticed that, following the teaching of a few characters, she found that some of the Chinese experimental students exhibited an interest in the letters of the alphabet. This was evidenced by their looking at and tracing those letters found in the classroom and asking questions about their names. It is reasonable to speculate that the children were perceiving the two activities (recognition of character and recognition of letters) as similar types of activities.

This was further supported by the activities of the English students in the copying of characters during Chinese instruction sessions. Students who completed the character copying worksheets early could also be found writing strings of English letters on the border and blank spaces of Chinese worksheets. One interpretation of such behavior could be that the kindergarten students perceive the activity of copying characters and copying letters as related or similar.

### General Conclusions

The investigator concluded that the skills that are related to initial reading in an ideographic language are transferable to an alphabetic language in areas which involve



visual motor skills such as copying, letter identification skills that require both configuration discrimination and allocation of a category name to a configuration.

Findings of the study tend to uphold the common sense notion held by many Chinese bilingual educators that the skills that are developed during the instruction of Chinese character recognition can be transferred to similar skills in English reading readiness such as copying and identifying a configuration with its name.

It can be further concluded that, since skills that are necessary to recognize Chinese are correlated with English readiness skills as measured by The Metropolitan Tests, the skills necessary for initial reading in an ideographic language might be similar to those necessary for an alphabetic language. Since positive effects of instruction in the ideographic symbols have been found in specific areas, these readiness skills trained in the ideographic language are transferable to the alphabetic language.

In addition, since studies have found that the ability to recognize letters and the ability to copy patterns were both highly predictive of reading achievement in the first grade, the transferrability of skills from Chinese character recognition to these skill areas would imply that instruction in initial Chinese reading skills may be very beneficial to students' initial English reading performance.

In the limited situation set by the experiment, the control group also received English readiness instruction

during the same instructional time period. It is possible that for certain visual perceptual and visual motor skills, as well as letter identification skills, the instructional method used in Chinese character recognition is more effective for the improvement of these skills than the traditional English readiness instructional activities used for the development of these skills in the kindergarten curriculum. Such a conclusion is not unreasonable when one considers the studies which have shown the Chinese characters to be more easily memorized or easier to learn than phonic symbols.

Given the studies which indicate a more configuration to meaning process for learning to read in Chinese character reading and the Chu-Chang<sup>1</sup> study which supported the possibility that reading might be a two-stage process and that the initial learning of reading is more visual than phonological, it might be possible that the more visual to meaning approach to initial reading utilized in Chinese character recognition is more effective than the sound to meaning approach of initial English reading for young children who are developing initial skills for reading.

Another aspect of the study which is worth noticing is the large number of Chinese characters the children were able to learn within the short period of experimental

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<sup>1</sup>Mau Chu-Chang and Donald J. Loritz, "Phonological Encoding of Chinese Ideographs in Short-term Memory," Language Learning, 27, No. 2 (Dec., 1977), 347.

instruction. When the children's performance level in Chinese is compared to their performance in learning letters by the end of the experimental period, the high performance level in Chinese is evident. (Alphabet recognition as measured by The Metropolitan Readiness Tests posttest showed the control group mean of 6 letters and experimental group mean of 10. Chinese Character Recognition Test results showed an experimental group mean of 19 characters out of 22.)

Given an environment where the exposure to the English alphabet is readily available to all the kindergarten students and the lack of exposure to Chinese characters except during instruction, such levels of performance in Chinese by the kindergarten students appear to be consistent with the Steinberg<sup>2</sup> study which indicated that Kanji (or Chinese character) which is more meaningful is easier to learn than Kana (Japanese phonetic symbols) for young children. This is also consistent with the Fukuzawa study<sup>3</sup> which concluded that it is meaningfulness, not configurational simplicity or complexity, that determines the ease of learning of Chinese characters.

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<sup>2</sup>Danny D. Steinberg and Jun Yamada, "Are Whole Word Kanji Easier to Learn than Syllable Kana?" Reading Research Quarterly, 14, No. 1 (1978-79), 88-99.

<sup>3</sup>Steinberg and others, citing Shunsuke, Fukuzawa, "Kanji to dokuji gakushu--sono kyooiku shinrigaka ken kyuu (Learning to read Kanji--educational psychological aspects). Tokyo: Gakutoosha.

### Applications in the Classroom

Based upon the findings of the study, certain recommendations for classroom application of the study can be made. The recommendations will be divided by classroom settings.

#### Bilingual Classrooms

Based on the study, certain initial reading skills in Chinese can be transferred to English reading. There is also a possibility that some of these visual perceptual skills are more effectively taught through Chinese character instruction than the traditional visual perceptual activities used in most kindergarten classrooms.

Chinese-speaking students. For Chinese-speaking limited-English-proficient kindergarten students, initial Chinese reading activities such as the recognition of individual meaningful Chinese characters, using authentic methodology, can serve as initial reading activity for learning to read in Chinese, as well as in English. Since the results of the study did not indicate a positive effect in the Listening and Numbers subtests in The Metropolitan Test, it is recommended that aural/oral English language development and bilingual instruction in numbers recognition and concept will be used to improve skills in those areas.

Although results of the study did not indicate a significant difference in visual matching skills between the

experimental and control groups, a consistently higher score was achieved by the experimental group. It is therefore reasonable to conclude that Chinese instruction is at least comparable for developing those skills. In classroom application, if a child is receiving Chinese character instruction, additional English reading readiness activities in visual perceptual and visual motor skills to compensate for time expended in Chinese instruction is likely to be redundant and largely unnecessary.

English-fluent, non-Chinese-speaking students. For the fluent English-speaking kindergarten students in a Chinese bilingual classroom or a school with a Chinese bilingual kindergarten program, the same initial Chinese instruction can also replace additional English reading readiness skills instruction. This has two advantages. First, by this variation in instruction, the student will have more varied activities for the development of visual perceptual skills than working on repeated visual discrimination worksheets as practiced in many classrooms. Secondly, within a mixed group with Chinese-speaking students, a limited Chinese vocabulary for these characters can also be developed as an initial step in learning another language. Therefore, unlike other visual perceptual training which is mainly a means to an end, the teaching of Chinese characters can serve in addition as an enrichment activity.

Unlike the experimental condition in the study, a regular classroom can place characters with pictures in the

classroom as well. If the English sight word is placed side-by-side with the Chinese characters, the transfer of skills from identifying Chinese characters to the English word is very likely for both Chinese and English fluent children. In addition, unlike languages which utilize the same alphabetic system, such as French and English, Spanish and English, the chances that children will become confused as to which sight word represents words in which language is not likely to happen.

#### All Kindergarten Classrooms

The using of Chinese characters as visual perceptual training is not as difficult to accomplish as many might anticipate. Since the characters need not be tied directly to their Chinese pronunciation as implemented in the study, a set of prepared material for Chinese character recognition can be used by any English-speaking teacher with a few hours of training. A volunteer who can write Chinese can also assist in the instruction.

A more general implication from this study for the kindergarten class is that meaningful symbols are quickly and enthusiastically learned by children who do not have preconceived ideas of what is visually complicated to learn. In a kindergarten classroom, it may be more appropriate to teach the identification of meaningful sight words to children and accomplish the teaching of separate letter recognition and letter copying tasks by teaching them as

component parts of the total configuration of a meaningful sight word similar to the teaching of strokes or radical units in Chinese character recognition instruction. Such activities would enhance children's understanding of the primary purpose of reading as one of meaning-seeking through written symbols. Such activity might be more congruent with young children's tendency for a more visual to meaning approach at this age level as found by Conrad's study.<sup>4</sup>

#### Recommendations and Suggestions for Further Research

The present study should be considered as one of heuristic value in the area of transfer of reading skills between an ideographic and an alphabetic language. Further research is necessary in the following areas.

1. The population of this study is small. A larger sample study may indicate if the effects of Chinese character instruction found in this study is generalizable to kindergarten students from different social economic backgrounds and academic and cognitive development.

2. The Chinese population in this study was limited to a small number. It also included only ethnic Chinese refugees with very little experience in the U.S. environment. A study with a larger population of Chinese students from a variety of backgrounds with similar design will give further

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<sup>4</sup>Mae Chu-Chang and Donald Loritz, citing R. Conrad, "The Chronology of the Development of Covert Speech in Children," Developmental Psychology, 5 (398-405).

indication of the generalizability of the results of this study.

3. Although not tested in the study, the positive effect of Chinese instruction on letter identification may be extended to the area of sight word identification or recognition in first grade reading, since the basic components of the configuration identification process are similar. A study to determine the effects of Chinese instruction on sight word recognition will further extend the knowledge of transfer of skills between an ideographic and an alphabetic language.

4. Further studies on the effects of Chinese instruction on English reading skills beyond kindergarten may give clearer indications of the transferability of skills at different levels of learning to read.

5. Experimental students in the study have been observed to transfer strategies learned in Chinese instruction to other similar situations. A planned structured observational study of these behaviors can be conducted in a similar study so that more objective data of such transfers of strategy can be collected.

6. Although in the Chinese Character Recognition Test the English-speaking group achieved a higher mean score than the Chinese group, both the instructor and the investigator concurred that in copying the characters on the Chinese worksheets, the Chinese-speaking children tended to copy with more accuracy in character formation. A more



controlled study to examine the accuracy of this impression could be conducted to collect data which would further the knowledge of the effect of written symbols in a young child's environment on his/her initial ability to reproduce such written symbols.

### Summary

The present study found that the instruction in Chinese character recognition skills had positive effects on two very important English reading readiness skills-- letter recognition and pattern copying. In view of the previous studies that have shown the importance of these skills to reading achievement, the findings of this study may be important to those who are concerned with the transferability of reading skills between Chinese and English and to those who implement Chinese bilingual education programs.

The implications of meaningfulness vs. visual simplicity or complexity in written symbols presented for learning by young students may also be important to those who are concerned with the learning of initial reading skills in young children. However, this study is limited by the size and the nature of the population and the length of time of the experiment. It is hoped that the findings will at least stimulate discussions, dialogues and further research into the area of initial reading instruction in relation to the written symbols taught.

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APPENDIX A

Dear Evaluators:

I appreciate your willingness to cooperate in the evaluation of this instructional packet. You are requested to examine the instructional packet and fill out your evaluation and suggestions independently. A subsequent meeting of the whole panel will be scheduled so that I may benefit from your opinions and suggestions as a group.

Since the panel members are selected because of your varying expertise, some portion of the evaluation might not be applicable to you. You may mark those portions N/A. However, you are urged to give suggestions and opinions in as many portions as possible.

The evaluation checklist provided space for evaluating the packet as a whole and for indicating specific lessons for revisions. For more detailed comments regarding specific parts of the packet, you are requested to mark and comment on the packet.

Again, I would like to thank you for your cooperation in this effort.

Sincerely,

Victoria Jew

VJ:nr

APPENDIX B

## Evaluation Checklist for Chinese Character Recognition Instructional Packet

## A. Content Considerations:

1. Are the characters selected appropriate for kindergarten instruction? Yes ( ) No ( )  
 Lessons are requiring revision \_\_\_\_\_ (Example: Lessons 1, 5, 18)

## Suggested Areas of Considerations

- a. Do characters selected represent concrete concepts? Yes ( ) No ( ) Revision \_\_\_\_\_  
 b. Do these characters represent concepts kindergarten children are most likely to be familiar with in their environment? Yes ( ) No ( ) Revision \_\_\_\_\_  
 c. Do these characters represent concepts which are relevant to the kindergarten curriculum? Yes ( ) No ( ) Revision \_\_\_\_\_  
 d. Other considerations? \_\_\_\_\_ Yes ( ) No ( ) Revision \_\_\_\_\_

## B. Kindergarten Pedagogical Considerations:

1. Are the objectives appropriate for the age group? Yes ( ) No ( )  
 Lessons requiring revision \_\_\_\_\_  
 2. Are the instructional procedures appropriate for the age group? Yes ( ) No ( )  
 Lessons requiring revision \_\_\_\_\_  
 3. Are the student activities appropriate for the age group? Yes ( ) No ( )  
 Lessons requiring revision \_\_\_\_\_  
 4. Are the sequence of objectives, instructional procedures and student activities for the packet as a whole appropriate? Yes ( ) No ( )  
 Lessons requiring revision \_\_\_\_\_  
 5. Other considerations? \_\_\_\_\_ Yes ( ) No ( )  
 Lessons requiring revision \_\_\_\_\_

## C. Chinese Character Pedagogical Considerations:

1. Does the packet reflect a sequential presentation of characters of increasing visual complexity? Yes ( ) No ( )  
 Lessons requiring revision \_\_\_\_\_  
 2. Does the packet allow for the recognition of basic radicals or visual components beyond stroke order and formation? Yes ( ) No ( )  
 Lessons requiring revision \_\_\_\_\_  
 3. Are the characters selected appropriate for kindergarten children in terms of visual complexity? Yes ( ) No ( )  
 Lessons requiring revision \_\_\_\_\_  
 4. Other considerations? \_\_\_\_\_ Yes ( ) No ( )  
 Lessons requiring revision \_\_\_\_\_

-2-

## D. Chinese Character Formation Considerations:

1. Do the characters selected reflect the rules of character formation which are appropriate for presentation to kindergarten students? Yes ( ) No ( ) Revision \_\_\_\_\_  
 Lessons requiring revision \_\_\_\_\_

## Suggested Areas of Considerations

- a. Are pictographic characters included in the characters selected? Yes ( ) No ( ) Revision \_\_\_\_\_  
 b. Are common radicals represented in characters selected? Yes ( ) No ( ) Revision \_\_\_\_\_  
 c. Are there groups of characters which can be categorized under some of the common radicals presented? Yes ( ) No ( ) Revision \_\_\_\_\_  
 d. Do the categorizations reflect the meanings of the common radicals? Yes ( ) No ( ) Revision \_\_\_\_\_  
 e. Do the characters selected allow for contrasting pairs of words that are similar in some parts and different in other parts? Yes ( ) No ( ) Revision \_\_\_\_\_  
 f. Other considerations: \_\_\_\_\_ Yes ( ) No ( ) Revision \_\_\_\_\_

## E. Authenticity of Instructional Methods Considerations:

1. Are the methods and strategies used consistent with those of authentic Chinese instruction? Yes ( ) No ( )  
 Lessons requiring revision \_\_\_\_\_  
 2. Are the methods and strategies used consistent with those used in authentic Chinese instruction for the age group? Yes ( ) No ( )  
 Lessons requiring revision \_\_\_\_\_

## Suggested Areas of Considerations

- a. Are the different strategies used consistent with the various rules of character formation? Yes ( ) No ( ) Revision \_\_\_\_\_  
 b. Are pictures used to reinforce meaning? Yes ( ) No ( ) Revision \_\_\_\_\_  
 c. Are tracing and copying used to reinforce recognition? Yes ( ) No ( ) Revision \_\_\_\_\_  
 d. Are comparison and contrast of characters used to reinforce recognition? Yes ( ) No ( ) Revision \_\_\_\_\_  
 e. Is grid ruled paper used for copying characters? Yes ( ) No ( ) Revision \_\_\_\_\_  
 f. Are basic strokes and stroke order taught as part of the recognition skills? Yes ( ) No ( ) Revision \_\_\_\_\_  
 g. Other considerations: \_\_\_\_\_ Yes ( ) No ( ) Revision \_\_\_\_\_

Criteria List for the Selection of Chinese  
Characters for Recognition Instruction

A. Content Considerations:

1. Do the characters selected represent concrete concepts?
2. Do these characters represent concepts kindergarten children are most likely to be familiar with in their environment?
3. Do these characters represent concepts which are relevant to the kindergarten curriculum?

B. Pedagogical Considerations:

1. Do the characters selected indicate a possibility for a sequential presentation of characters of increasing visual complexity?
2. Do the characters selected allow for recognition of basic radicals or visual components beyond stroke order?
3. Are the characters selected appropriate for kindergarten students in terms of visual complexity?
4. Do the characters selected represent a wide enough range of word parts to allow for the construction of meaning carrying units that are applicable to both Chinese and English?

C. Chinese Character Formation Considerations:

1. Are pictographic characters included in the characters selected?
2. Are common radicals represented in characters selected?
3. Are there groups of characters which can be categorized under some of the common radicals presented?
4. Do the categorizations reflect the meanings of the common radicals?
5. Do the characters selected allow for contrasting pairs of words that are similar in some parts and different in other parts?

Chinese Character Instruction Lesson Plans

Lesson 1

Characters to be introduced: 一 , 二 , 三

Objectives:

1. Children will be able to match the number of objects (1-3) shown with appropriate number of objects.
2. Children will be able to show the appropriate number of objects when shown the characters 一 , 二 , 三 .
3. Children will be able to trace 一 , 二 , 三 and then copy them freehand within the grid space provided.
4. Children will be able to identify the appropriate characters when given the number of objects.

Procedure:

1. Show one crayon and ask children to tell how many. Then 2, 3, etc. Repeat with blocks and triangles, each time repeating the words 1, 2, 3. Show one crayon and ask the children to show you the same number of circles. Repeat with 2 and 3. Repeat with other objects.
2. Show 一 and let children know that this is the Chinese name for "1". Ask the children to provide the same number of crayons. Repeat with 二 , 三 .
3. Write 一 二 三 on a board. Have children trace in the air the same strokes. As you do, say "One stroke across." Repeat for the other characters.
4. Give a short review of 一 , 二 , 三 with objects. Repeat tracing in the air the three characters.
5. Demonstrate writing the characters within grid. Repeat stroke order and formation.
6. Demonstrate tracing and help children with tracing and then freehand copying for each character. Hold

a child's hand to guide if necessary. Point out length comparison and accuracy as children copy. Monitor children for top-to-bottom stroke order and left-to-right stroke formation.

7. Give children character cards. Show objects up to three. Ask children to provide the appropriate characters.



APPENDIX C

Lesson 3

Characters to be introduced: 大 小

## Objectives:

1. Children will be able to compare two objects and correctly identify one as large and the other as small.
2. Children will associate 大 小 as names for "large" and "small".
3. Children will be able to trace and copy the characters with reasonable accuracy in spacing, stroke order and formation.
4. Children will be able to identify 大 or 小 when asked to do so.

## Procedure:

1. Show sets of two objects, one large, one small. Ask children which one is large, which one is small. Use sets of the same objects to provide easier comparison initially. (Be sure the "small" object from previous sets is used later as "large" in other sets to convey the idea of relativity of size.)
2. Ask children how they might show people if an object is large or small using their arms and hands. Suggest two gestures, outstretched arms for large and inward turning hands for small.
3. Show stick figures of the two gestures. Ask children which one suggests "large" or "small".
4. Remind children of the Chinese name of a person from the last session. Show the superimposed picture from the previous lesson.
5. Tell children you are going to show them the Chinese names for large and small. Show the characters on superimposed stick figures. Ask children to guess which one is the name for large and small.
6. Trace the characters on the picture as you ask the children to trace in the air. (Say, "First, one stroke across, next a slide to your left, then a slide to your right." "First one stroke down the

middle, with a little hook, next a short dart on the left, then a short dart on the right."

7. Show sets of large and small objects. Ask children which one is large and which one is small. Have children place the appropriate object next to the superimposed character cards for 大 and 小.
8. Give character cards for 大 小 to each child. Show sets of objects. Compare for large and small. Hold large (small) object and ask children to show the appropriate card.
9. Show superimposed characters again and review briefly as in 8.
10. Trace in the air as in 6.
11. Demonstrate writing of characters on grid cards.
12. Have children trace and copy on worksheet. Monitor for stroke order and formation carefully.

#### Review Session

13. Have cards for 大 小 人 ready. Ask children how they might show "big person" and "small person" with the cards. Work with children with a few examples.
14. Show cards for 一 二 三 大 小 人 in pocket chart. Ask how they can make "one person," "two persons," "big person," "small person," etc. Pull out cards to form the meaning units.
15. Give work sheets to children. Have them underline the correct meaning units. After children have underlined the units correctly, they are to copy the correct answers in the space provided.

(End of Review Session)



Lesson 9


Characters to be introduced:





Objectives:

1. Children will associate 日, 月 with "sun" and "moon."
2. Children will be able to observe similarities and differences between the two characters.
3. Children will be able to copy with reasonable accuracy in spacing and stroke order and formation.

Procedure:

1. Show children two cut-out circles. Tell them these are what you are going to use to show a sun and a moon. Ask them if they know which one is the sun and which one is the moon. Comment on the uncertainty of the answers.
2. Color one orange and one pale yellow. Ask children if they can tell which one is going to be the sun and the moon and why.
3. "Sometimes one of them has a different shape. Do you know which one?" Cut the moon into a crescent shape and say, "Sometimes the moon is shaped like this. Have you seen the moon like this before?"
4. "Now do you know for sure which one is going to be my sun and which one is going to be my moon?"
5. Show the archaic pictograph characters  . Ask children if they can guess which one is the sun and which is the moon.
6. Tell children that you are going to show the Chinese names for "sun" and "moon" and that they look a little like the picture you have just shown them. Show 日, 月. Ask children to guess which one is the "sun" or "moon." As they guess, guide children by commenting on the differences in shape, strokes, etc.
7. Trace characters on large card as children follow by tracing on grid paper. "One stroke down, one stroke across and down. One stroke across inside and one stroke across to close up the sun." (Comment on how

it is a little like  but different, etc.) "One curve stroke down like the crescent moon. One short stroke across then down a long ways with a little hook. Now two short strokes across inside in the middle of the moon."

8. When the children are finished, they are to come up and feel the two cards in two separate touch boxes. One is the name for the sun and one for the moon. They are to feel and whisper to the instructor which is which.
9. When they are finished with the touch boxes, they are to make their feeling cards with beans. (Beans will be used to glue to the characters  ,  already written on circular cards of orange and yellow for the two characters. Monitor and encourage children to glue in the order of stroke formation.)
10. Have children copy  and  on the worksheets.

Lesson 11

Character to be introduced:

Objectives:

1. Children will associate 星 with "star."
2. Children will recognize the similarities and differences between 日, 星, 早.
3. Children will be able to copy 星 with reasonable accuracy in stroke order, formation and spacing.

Procedure:

1. Show the picture of a sun and a moon. Share your experiences with them on the sun and the moon to bring out the point that both of them give light and you can see both of them in the sky.
2. Ask children what other object that they know that they can see in the sky which gives light. Which are the ones which give light at night besides the moon.
3. Show a picture of stars at night.
4. Show pictures of "sun," "morning," "star." Show character cards of 日, 早, 星. Ask children if they can tell you which one goes with which of the three pictures.
5. When the pictures and characters are correctly matched, ask the children to look at 星 to see if they can see some part of the name that they already know. Guide children to notice the 日 radical as similar to 日. Comment on the fact that they both give light.
6. Ask children if they can remember a name that looks like 早. If children do not remember, remind them by showing the picture for 早 (morning).
7. Write 星 in large subgrided card as children trace in the air. Repeat stroke formation, stroke order as they trace.
8. Have children copy on grid paper 日, , .
9. Give children worksheet to draw the two pictures:



人	人	人	人	人
山	山	山	山	山



Lesson 9



日								日
月								月








APPENDIX D



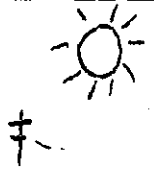

## Chinese Character Recognition Test

## Form A


A.

	大	人	水
	一	二	木
	口	林	山
	女	大	有
	小	水	林
	日	星	人
	二	山	三
	小	大	人

A2

↓	天	上	下
	日	口	山
	月	早	有
	上	天	大
	小	人	大
↑	一	下	上
	日	早	男
	山	水	三

A3.

↓	上	下	大
	早	果	星
	水	男	日
	二	三	天
	林	小	木
	小	男	果
	有	女	月
	大	木	林






## Chinese Character Recognition Test

## Form B






B 1.

	水	大	人
	二	木	一
	山	林	口
	有	大	女
	水	林	小
	人	日	星
	山	三	二
	人	小	大

B<sub>2</sub>.

↓	下	天	上
	山	日	口
	有	月	早
	天	大	上
	大	人	小
↑	下	上	一
	早	男	日
	三	山	水

B3.

↓	上	下	大
	星	早	果
	男	日	水
	三	二	天
	小	木	林
	男	果	小
	月	女	有
	林	木	大

APPENDIX E



Table 13

The Analysis of Variance of the Chinese Character  
Recognition Test Between Chinese- and  
Non-Chinese-Speaking Kindergarten  
Experimental Group Students

Source	SS	DF	MS	F	Significance Level
Language	16.017	1	16.017	1.262	0.280
Residual	177.733	14	12.695		

Grand Mean = 19.13

<u>Group</u>	<u>N</u>	<u>Mean</u>	<u>Deviation</u>
Chinese	6	17.84	-1.29
Non-Chinese	10	19.91	0.78

\*P < .05

\*\*P < .01