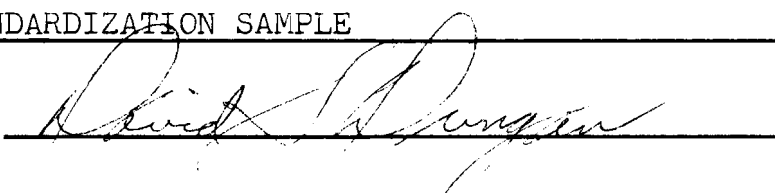


AN ABSTRACT OF THE THESIS OF

Rebeca Urbaneja for the Master of Science  
in Clinical Psychology presented May 1979

Title: A COMPARISON OF THE PERFORMANCE OF MEXICAN-AMERICAN  
CHILDREN ON THE SPANISH TRANSLATION OF THE WISC-R WITH THE  
ORIGINAL WISC-R STANDARDIZATION SAMPLE

Abstract approved: 

The hypothesis of this study was that there is no significant difference between the performance of Mexican-American children, when tested by the WISC-R in Spanish, and that of the population of children in the United States upon which the WISC-R was standardized.

The Spanish adaptation of the Wechsler Intelligence Scale for Children--Revised (WISC-R 1974) under study by The Psychological Corporation, New York, was used as the instrument of measurement.

The sample consisted of eighty-one Mexican-American children of eight, nine, and ten years of age attending school in the cities of Wichita, Garden City, and Goodland, Kansas.

The Verbal Performance and Full Scale IQs of the Mexican-Americans were computed using the WISC-R English

version norms. The Verbal Performance and Full Scale means were computed for the eighty-one Mexican Americans and compared with the standardization sample by a t-test procedure. Significant differences were found in these comparisons.

For comparison of the subtests with the standardization sample a t-test for correlated observations was conducted at each age level. There was no significant difference found between the Mexican-Americans and the standardization sample on Comprehension at all age levels and the Arithmetic subtest at age ten. There was no significant difference on Picture Arrangement at the three age levels.

The conclusions pointed out that the subtests which require a process of social interaction, familiarity with environmental objects, and formal educational background were the ones in which the Mexican-Americans perform with significant difference from the standardization sample.

A COMPARISON OF THE PERFORMANCE OF MEXICAN-AMERICAN CHILDREN  
ON THE SPANISH TRANSLATION OF THE WISC-R WITH THE  
ORIGINAL WISC-R STANDARDIZATION SAMPLE

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A Thesis  
Presented to  
The Department of Psychology  
Emporia State University  
Emporia, Kansas

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In Partial Fulfillment  
of the Requirements for the Degree  
Master of Science

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by  
Rebeca Urbaneja  
May 1979

11/10/78  
11/10/78  
11/10/78

*Del H. Cass*

Approved for the Major Department

*Harold E. Durst*

Approved for the Graduate Council

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## Chapter 1

### INTRODUCTION

The Wechsler Intelligence Scale is one of the most widely used instruments for the evaluation and placement of a child in the school system when that child presents significant deviation on group tests.

Screening is a systematic process of identifying those students who may require additional evaluation to determine if special education services have to be provided in their educational plan.<sup>1</sup> One of the basic considerations in conducting the screening activities in the school system is the English language proficiency of the child.<sup>2</sup>

If an individual evaluation of the child is required after the screening process, the Wechsler Intelligence Scale for Children (WISC) and its revised version (WISC-R) are the individual tests commonly used. These are tests accepted by a majority and remain the instrument of choice for the psychological assessment of children's

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<sup>1</sup>Joseph P. Hannon, "Special Education Regulations and Procedures, Federal and State Regulations," Conference on Special Educational Needs of Multi-Cultural-Multi-Lingual Children, Board of Education, Milwaukee, Wisconsin, 8-9 March 1979, p. 8.

<sup>2</sup>Ibid., p. 15.

intelligence, according to Whitworth.<sup>3</sup> Many studies have been conducted and published questioning the validity of these tests when they are used on non-Anglo children.<sup>4</sup> The WISC and the WISC-R are still in use for the evaluation of Mexican-American children. Not having a better instrument, psychologists have to use either the WISC Spanish version standardized in Puerto Rico or the WISC-R English version, with the help of an interpreter if the psychologist does not speak Spanish. Neither of these procedures can give a valid evaluation of the Mexican-American child's Intelligence Quotient (IQ). Conscious of this fact, the professional tries to get an approximation by using the results obtained on the performance part of the test. The raw scores are converted into IQs through the standardization sample tables in the English version manual. The general observation is that the Mexican-American children perform lower than the Anglo-American children of the same age.

In this study the tests have been given in Spanish, using the Dade County Spanish Adaptation of the WISC-R under study by the Psychological Corporation. The subjects

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<sup>3</sup>Randolph H. Whitworth, "Review of the WISC-R," The Eight Mental Measurement Year Book, ed. Oscar Krisen Buros (Highland Park, New Jersey: Gryphon Press, 1978), Vol. I, pp. 1-713.

<sup>4</sup>Roy D. Goldman and Linda K. Hartig, "The WISC May Not Be a Valid Predictor of School Performance for Primary-Grade Minority Children," American Journal of Mental Deficiency, 80 (May, 1976), 583-87.



involved were a sample of eighty-one Mexican-American children in the State of Kansas. The IQs were computed and compared with the IQs of the standardization sample of the original WISC-R English version.

After presentation of a theoretical formulation, the significance of the study, the specific statement of the problem, the purpose, and the hypotheses have been discussed; the limitations of the study, as well as terms identified as needing further clarification, have been included in this chapter.

#### THEORETICAL FORMULATION

Wechsler,<sup>5</sup> in his work The Range of Human Capacity, considered the difficulties of measurement of human capacities and pointed out that

. . . our inability to obtain quantitative data is due not so much to lack of an adequate measuring tool as to the inadequacy of our knowledge of the thing we wish to measure itself.

Wechsler<sup>6</sup> defined intelligence as:

. . . the overall capacity of an individual to understand and cope with the world around him. Intelligence is not a kind of ability in the same sense that reasoning, memory and verbal fluency, etc. are. Rather it is something that is inferred from the way these abilities are manifested under different conditions and circumstances.

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<sup>5</sup>David Wechsler, The Range of Human Capacity (Baltimore: Williams and Wilkins, 1952), p. 19.

<sup>6</sup>David Wechsler, Manual for the Wechsler Intelligence Scale for Children--Revised (New York: Psychological Corporation, 1974), p. 5.

When referring to intelligence, Matarazzo commented that it is composed of elements or abilities which are qualitative differentials but not entirely independent.<sup>7</sup> These abilities, when measured through scores from a test like the Wechsler Scale, provide objective data which are invaluable in the evaluation of intelligence.

The Wechsler Scale measures Verbal and Performance behavior. The WISC-R has six subtests for the Verbal and six subtests for the Performance section.<sup>8</sup> The Verbal subtests are: Information, Similarities, Arithmetic, Vocabulary, Comprehension, and Digit Span. The Performance subtests are: Picture Completion, Picture Arrangement, Block Design, Object Assembly, Coding, and Mazes. The results are converted into an IQ for each age group.

Following is a theoretical description of what each of the subtests measure, as given by Glasser and Zimmerman.<sup>9</sup>

### Verbal Scales

1. Information. General information is abstracted from the surrounding environment. It calls into operation

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<sup>8</sup>Wechsler, Manual for the WISC-R, p. 8.

<sup>9</sup>Alan J. Glasser and C. L. Zimmerman, Clinical Interpretation of the Wechsler Intelligence Scale for Children (WISC) (New York: Grunne and Straton, 1967), pp. 36-105.

remote memory, ability to comprehend, capacity for associative thinking, as well as reading background of the subject and intellectual ambition as influenced by cultural background.

2. Comprehension. An attempt is made to determine the level of a child's ability to use practical judgment in everyday social actions, to the extent of which social acculturation has taken place, and the extent to which a maturing conscience or moral sense has developed.

3. Arithmetic. This subtest requires meaningful manipulation of complex thought patterns. It is a measure of the child's ability to utilize abstract concepts of numbers and numerical operations, which are measures of cognitive development.

4. Similarities. This subtest is basically constructed to determine the qualitative aspects of relationships. The subject is assumed to have obtained facts and ideas from his everyday experiences and should be able to see basic essential relationships between them.

5. Vocabulary. This subtest is probably the best single measure of general intellectual level. It gives an excellent picture of the child's learning ability, fund of information, richness of ideas, kind and quality of language, degree of abstract thinking, and character of thought process. Vocabulary reflects a child's level of education and environment.

6. Digit Span. This subtest measures the level of a child's ability to attend in a rather simple situation. Auditory recall or immediate auditory memory span, capacity to understand, and mastering methods of grouping operations are needed for success on this subtest.

### Performance Scales

1. Picture Completion. This subtest calls for visual identification of objects around, and for the further capacity to identify and isolate essentials from non-essential characteristics. Attention and concentration are important elements in the subtest.

2. Picture Arrangement. This subtest involves such factors as perception, visual comprehension, planning involving sequential, causal events and synthesis. It indicates social alertness, common sense intelligence applied to social, interpersonal situations.

3. Block Design. Perception, analysis, synthesis, and reproduction of abstract designs are among the aspects measured by this subtest. Logic and reasoning must be applied to space relationships, and nonverbal concept formation involving an implicit verbal manipulation is necessary. Visual-motor coordination is also measured.

4. Object Assembly. This subtest measures visual-motor coordination and simple assembly skills, anticipation of part-whole relationships and flexibility of working toward a goal which may be unknown at first. A synthesis

of concrete visual forms is required.

5. Coding. This subtest measures visual motor dexterity, particularly pencil manipulation and ability to absorb new material in an associative context. Speed and accuracy in making associations is important.

6. Mazes. This subtest calls for planning and foresight, attention to instructions, pencil control, and, hence, verbal-motor coordination, speed, and accuracy.

Wechsler<sup>10</sup> considered that there is a high positive correlation between achievement and intelligence level, but he has not said that the latter depends on the former. The amount of schooling an individual achieves depends in part upon his native endowment, as well as upon many other socio-cultural variables that are acting in the process of school achievement. The correlation between school achievement and intelligence scores is not as simple as it sometimes may appear.

All intelligence test scores are influenced by the amount of schooling a child has had, but this schooling has to be understood in a broad sense which includes both the education received in the classroom and that acquired through the socio-cultural environment.

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<sup>10</sup>David Wechsler, The Measurement of Adult Intelligence (Baltimore: Williams and Wilkins, 1944), pp. 103-4.

Mexican-American children perform lower than Anglo-American children in the mathematics and reading achievement tests, and psychologists have been concerned about how cognitive style affects the reading and mathematics achievement of elementary school children.<sup>11</sup>

Buriel,<sup>12</sup> using Witkin's field dependence-independence construct, studied the characteristics of field dependence in Anglo-American and Mexican-American children of the third generation in the United States. The Mexican-American children presented a more field-dependent characteristic in their cognitive style and Anglo-American children had a field-independent cognitive style.

A field dependent cognitive style is defined by a global mode of perception so that the organization of the field as a whole dominates perception of its parts. In contrast a field independent cognitive style is characterized by a more analytic approach to the stimulus field which is reflected in greater ease in overcoming an embedding context.

Wechsler<sup>13</sup> himself recognized the problem that can exist regarding errors that are made when the test is used on subjects with language limitations.

It is absurd to attempt to measure the intelligence of an illiterate community by any test involving language as there is a strong positive correlation between amount of schooling and intellectual ability.

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<sup>11</sup>Raymond Buriel, "Relationship of Three Field-Dependence Measures to the Reading and Math Achievement of Anglo-American and Mexican-American Children," Journal of Educational Psychology, 70 (2) (1978), pp. 167-74.

<sup>12</sup>Ibid., p. 167.

<sup>13</sup>Wechsler, Range of Human Capacity, p. 25.

### Significance of the Study

Day by day there is more concern among educators and authorities about the lack of valid instruments to assess the Mexican-Americans and provide them with the appropriate education to fulfill their individual educational needs. This concern was expressed at the Conference on Special Education Needs of Multi-cultural-Multi-lingual Children held at the University of Wisconsin in Milwaukee March 8 and 9, 1979.

No study has been published up to now using the WISC-R Spanish version with Mexican-American children. This study represents a preliminary step that may contribute to the process of working for a valid WISC-R for Mexican-Americans.

### Purpose

The fields of Psychology and Education have an extensive area of research on the problems of bilingualism and appraisal of intelligence. This study has been done to obtain information about Mexican-American children and the evaluation of their intelligence.

### Problem

The level of performance of Mexican-American children on mathematics and reading achievement tests is

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<sup>13</sup>Wechsler, Range of Human Capacity, p. 25.

lower compared to their Anglo-American middle-class peers.<sup>14</sup>  
The dropout rate for Mexican-Americans is significantly  
higher in high schools.<sup>15</sup> Many Mexican-American children  
are placed in special classes for the mentally retarded.<sup>16</sup>

Confronting this reality, school psychologists,  
teachers, social workers, and many other professionals in  
the field, are concerned about the learning situation.  
According to Hannon<sup>17</sup> many efforts have been made on the  
federal, state, and local levels for the provision of an  
adequate education for Mexican-American children.

Mexican-American children need the academic skills  
necessary to obtain the benefits of the educational system  
in this country. A valid test of intelligence is needed  
that would provide a better evaluation and understanding of  
the limitations and problems faced by the Mexican-American  
children on the English tests, and a better assessment of  
their potentials.

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<sup>14</sup>Buriel, "Relationship of Three Field-Dependence  
Measures," pp. 167-74.

<sup>15</sup>Manuel Guerra, "Educating Chicano Children and  
Youth," Phi-Delta-Kappan, 53 (January, 1972), p. 5.

<sup>16</sup>John T. Chandler and John Plakos, "Spanish-  
Speaking Pupils Classified as Educable Mentally Retarded,"  
Integrated Education, 7 (6) (December, 1969), pp. 28-33.

<sup>17</sup>Hannon, "Special Education Needs," pp. 15-20.



### Statement of the Problem

Is there a significant difference between the performance of Mexican-American children when tested in Spanish and the performance of the American original standardization sample on the WISC-R?

### Statement of the Hypotheses

1. There is no significant difference between the verbal IQ obtained from the WISC-R taken by Mexican-American children using the Spanish adaptation and the verbal IQ obtained from the standardization sample of the WISC-R.

2. There is no significant difference between the performance IQ obtained from the WISC-R taken by Mexican-American children using the Spanish adaptation and the full scale IQ obtained from the standardization sample of the WISC-R.

3. There is no significant difference between the full scale IQ obtained from the WISC-R taken by Mexican-American children using the Spanish adaptation and the full scale IQ obtained from the standardization sample of the WISC-R.

4. There is no significant difference between the scores obtained from the subtests of the WISC-R taken by Mexican-American children using the Spanish adaptation and the results obtained from the standardization sample of

the WISC-R.

### Limitations of the Study

This study has been limited to Mexican-American children who may or may not have been bilingual, who were eight, nine, or ten years of age, and were living in the cities of Wichita, Garden City, and Goodland in the State of Kansas at the time of the testing (February to July, 1978).

### Definition of Terms

For the purpose of this study, several terms have been operationally defined as follows:

1. Mexican-American: an individual of Mexican ancestry who may or may not be bilingual (Spanish-English), is not necessarily a citizen of the United States but lives in this country, and who is sometimes referred to as a "Mexican" or "Chicano."

2. Bilingual children: those children who are able to communicate in both Spanish and English.

3. Anglo-American: white population that is considered linguistically and culturally to be characteristic of the entire population of the United States.

4. Migrant: an individual who travels with his/her family group to work in agricultural fields, and who follows the harvest seasons in different areas of the United States. In general he/she does manual work, gets paid in wages, has a low educational background and low socio-economic level.

5. IQ (Intelligence Quotient): converted scores from the WISC-R.

6. Standardization sample: sample of children, ages six to sixteen, considered representative of the population of the United States, where the norms of the WISC-R were established.

## Chapter 2

### REVIEW OF THE LITERATURE

The studies presented in this chapter are divided into three sections: 1) studies concerning the measurement of the intelligence of minorities using the WISC, 2) studies of the WISC-R subtests, and 3) WISC-R studies on minorities.

Analyzing the language barrier and the tests currently in use with subjects who have limited English language backgrounds, Guilliams<sup>18</sup> considered the Wechsler Scale to have at least the Performance IQ which is less culturally biased. The differential between the Verbal IQ and the Performance IQ is an orientation toward the lack of knowledge instead of a lack of intelligence. Guilliams recognized that the major problem involved with these scales is the required particular background of experience.

#### WISC Studies on Minorities

Different studies have been conducted to compare the results of the WISC used on Mexican-Americans and other

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<sup>18</sup>Clark I. Guilliams, "Item Analysis of American and Chicano Responses on the Vocabulary Scales of the Stanford-Binet LM and Wechsler Batteries, Final Report," National Institute of Education Project No. 3-1955, Missouri Southern State College, Joplin, Missouri, 1975, pp. 15-16.

tests in use. Milne<sup>19</sup> studied the relationship among scores obtained on the Columbia Mental Maturity Scale (CMMS), and Leiter International Performance Scale and the WISC, testing thirty Mexican-American children in the regular classes in the Laredo Public Schools in Laredo, Texas, in the school year 1973-74.

Among the findings it was considered important to point out that there was a significant difference between the Leiter and the WISC Performance IQ. Since the Leiter is a nonverbal test, such results were not expected. The WISC Verbal IQ was lower than the CMM and Leiter IQ. The children performed lowest in Vocabulary, Information, and Digit Span on the WISC-R.

Purl and Curtis<sup>20</sup> studied the relationship of the Progressive Matrices Test (PM) to the Lorge-Thorndike Intelligence Test (LT IQ) and the Wechsler Intelligence Scale for Children (WISC). They explored the predictive power of these tests with respect to a number of achievement

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<sup>19</sup>Nidia D. Milne, "Relationships Among Scores Obtained on the Wechsler Intelligence Scale for Children, Columbia Mental Maturity Scale and Leiter International Performance Scale by Mexican-American Children," Dissertation Abstracts International, 35 (10-A) (April, 1975), p. 6510A.

<sup>20</sup>Mabel C. Purl and Jonathan Curtis, "Raven's Progressive Matrices Test Correlations with Measures of Lorge-Thorndike and Wechsler Intelligence Tests," California State Department of Education, Office of Compensatory Education, Department of Research and Education, Sacramento, California, September 1970, pp. 2-10.

measures. The scores associated with the PM, LT IQ, and WISC showed a low and erratic relationship. PM was found to be a poor predictor for the Mexican-American sample, but was a good predictor for all other groups. LT IQ was superior to PM and WISC as a predictor for all groups.

Goldman<sup>21</sup> did a study on the validity of the WISC for predicting teacher's ratings on several criteria for primary-grade Black, Anglo, and Mexican-American children. The validity within each group was good for Anglos but near zero for Black and Mexican-American children. These results suggest that the WISC may be of little value in the assessment of the educability of minority children.

Mercer<sup>22</sup> made an intensive analysis of the relative value of using the Vocabulary and Block Design subtests of the WISC to predict full scale IQ. The test was administered to a sample of six to eleven year old Anglo, Black, and Mexican-American school children. The findings support the results of other studies: the Mexican-Americans do better on Performance than on Verbal tests. So, an estimate of IQ based on Block Design and Vocabulary could lead to

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<sup>21</sup>Roy D. Goldman and Linda K. Hartig, "The WISC May Not Be a Valid Predictor of School Performance for Primary-Grade Minority Children," American Journal of Mental Deficiency, 80 (May, 1976), pp. 583-87.

<sup>22</sup>Jane R. Mercer and Joyce M. Smith, "Subtest Estimates of the WISC Full Scale IQs for Children," National Center for Health Statistics Series No. 2, No. 47, Publication No. HSM-72-1047, Health Service and Mental Health Administration, Rockville, Maryland, March 1972, pp. 29-30.

misclassification.

According to Chandler and Plakos<sup>23</sup> Mexican-American students have been placed in Educable Mentally Retarded (EMR) classes solely on the basis of the results of one IQ test, a test that in fact can be termed invalid because of the language barrier. Using the WISC, Chandler and Plakes tested forty-seven Mexican-Americans enrolled in EMR classes in selected school districts in California. The test was conducted in Spanish, and English was used when comprehension was lacking and it was evident that some of the students were not proficient either in Spanish or English.

A comparison between the test scores used for placement in EMR classes and the new scores for the study showed an increase of 13.15 points in the IQ mean, the prior IQ mean being 68.61 and the new IQ mean being 81.76.

Silverstein's<sup>24</sup> study investigated the factor structure of the WISC for three ethnic groups: Anglo, Black, and Chicano. He found two main factors: 1) verbal comprehension and 2) perceptual organization. His findings suggest that the test measures the same abilities in Anglo,

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<sup>23</sup>John T. Chandler and John Plakos, "Spanish-Speaking Pupils Classified as Educable Mentally Retarded," Integrated Education, 7 (6) (December, 1969), pp. 28-33.

<sup>24</sup>A. B. Silverstein, "Factor Structure of the Wechsler Intelligence Scale for Children for Three Ethnic Groups," Journal of Educational Psychology, 65 (3) (December, 1973), pp. 408-10.

Black, and Chicano children. Silverstein emphasized that his findings do not imply that it is fair or proper to use the WISC with subjects from other ethnic groups than Caucasian children.

#### Analysis of WISC-R Subtests

The earliest work available in relation to the use of the WISC-R since its publication in 1974 is the one by Silverstein in October 1975. Since then the literature on the WISC-R has increased considerably, which shows the acceptance of this revised version of the WISC.

Silverstein<sup>25</sup> explored the validity of the WISC-R short forms. The unreliability of the subtests was taken into account in testing the manual data for the standardization sample. Correlations were determined with the full scale of all possible short forms of subtests 2, 3, 4, and 5. Silverstein concluded that great reliance can be placed on the results of the data from the standardization sample because of the size and validity of the sample. However, data from small clinical samples may suggest specific different short forms.

The increase in the number of items on the WISC-R helped to increase its internal validity, as shown by

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<sup>25</sup>A. B. Silverstein, "Validity of WISC-R Short Forms," Journal of Clinical Psychology, 31 (4) (October, 1975), pp. 696-7.



evidence from the study by Vance et al.<sup>26</sup> Analysis of the data regarding the internal consistency of the test indicates that the majority of the items operate as significant discriminators.

Only slight differences were noted in the mean variance components of the tests done by Dinning.<sup>27</sup> Both the WISC and WISC-R subtests appear to possess relatively less specific variance than do several other psychological tests.

A major finding in Kaufman's<sup>28</sup> work was that the WISC-R profiles of normal children exhibit much scatter, probably more than most of the test users realize. In an analysis of the subtests, Silverstein<sup>29</sup> studied the intercorrelation among the twelve subtests for all age groups in the standardization sample, and he concluded that the two-factor solution proved somewhat more stable, but

<sup>26</sup>Hubert Vance, Patricia Gaynor, and Margaret Coleman, "Item Analysis of the Wechsler Intelligence Scale for Children--Revised," Psychology in the Schools, 14 (2) (April, 1977), pp. 132-9.

<sup>27</sup>David W. Dinning, "Variance Components of the WISC-R in Eleven Age Groups," Psychological Reports, 38 (3) (June, 1976), pp. 1001-02.

<sup>28</sup>Alan S. Kaufman, "A New Approach to the Interpretation of Test Scatter on the WISC-R," Journal of Learning Disabilities, 9 (3) (March, 1976), pp. 160-67.

<sup>29</sup>A. B. Silverstein, "Alternative Factor Analytic Solutions for the Wechsler Intelligence Scale for Children--Revised," Educational and Psychological Measurement, 37 (1) (Spring, 1977), pp. 121-24.

the difference was relatively small, and some may actually prefer the three-factor solution.

Vance<sup>30</sup> and Wallbrown studies indicated an ability hierarchy composed of a strong general factor and two sub-general factors corresponding to the spatial-perceptual and verbal-educational parameters.

Piotrowski and Grubb,<sup>31</sup> referring to the significant difference of scaled score differences between the subtests, said that generally a minimum difference of three to five points is necessary at the .05 level and four to six points at the .01 level. Therefore, caution is recommended concerning the interpretations of statistically significant differences.

#### WISC-R Studies on Minorities

Reschly,<sup>32</sup> in his study using the WISC-R with Anglo, Black, Mexican-American and American-Indian students,

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<sup>30</sup>Hubert Vance and Fred H. Wallbrown, "Hierarchical Factor Structure of the WISC-R for Referred Children and Adolescents," Psychological Reports, 41 (3) (December, 1977), pp. 699-702.

<sup>31</sup>Richard J. Piotrowski and Richard D. Grubb, "Significant Subtest Score Differences on the WISC-R," Journal of School Psychology, 14 (3) (Fall, 1976), pp. 202-06.

<sup>32</sup>Daniel J. Reschly, et al., "Analysis of Different Concepts of Cultural Fairness Using WISC-R and Mat Scores for Four Ethnic Groups," Science and Humanities Research Institute, Annual Meeting of the American Educational Research Association, San Francisco, California, 19-23 April 1976, pp. 2-8.

recognized the concern about the social consequences of test use with minority groups. Those consequences and attempts to rectify current social inequities through adjustment of test scores are issues which cannot be resolved through merely an empirical approach, and Reschly recommended caution in the use of the test with minority groups.

Information about the possibility of differentiating between the problem of language deficiency and learning disabilities was provided by Dean<sup>33</sup> in his paper presented to the Annual Convention of the Rocky Mountain Psychological Association in Phoenix, Arizona, in May 1976. Dean used the Peabody Individual Achievement Test (PIAT), the Wide Range Achievement Test (WRAT), and the Wechsler Intelligence Scale for Children--Revised (WISC-R) on thirty-one Mexican-American and thirty-one Anglo-American children. He concluded that the PIAT may be of value when used in conjunction with the WISC-R to differentiate between specific learning difficulties and an English language deficiency with a Mexican-American population. Analysis of subtest means and concurrent validity between ethnic groups showed general equivalence with the exception of WISC-R Verbal IQ means, which were significantly lower for the Mexican-American group.

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<sup>33</sup>Raymond S. Dean, "Comparison of PIAT Validity with Anglo and Mexican-American Children," Annual Convention of the Rocky Mountain Psychological Association, Phoenix, Arizona, May 1976, pp. 1-3.

Smith, Hays, and Solway<sup>34</sup> obtained Culture Fair Intelligence Test and WISC-R scores from fifty-one delinquent juveniles of Black, White, and Mexican-American background. Comparison of mean scores on the tests demonstrated the Culture Fair to be less culturally biased than the WISC-R.

In a brief report on the WISC-R's reliability with Mexican-American children, Dean<sup>35</sup> found that these children, who were referred for psychological evaluation because of learning difficulties in the regular classroom, generally had reliabilities for the Verbal IQ scale subtests exceeding those found in the Performance area. The reliabilities were not significantly different from those reported in the WISC-R (1974) manual for eleven and one-half year olds.

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<sup>34</sup>Anita L. Smith, Ray J. Hays, and Kenneth S. Solway, "Comparison of the WISC-R and Culture Fair Intelligence Test in a Juvenile Delinquent Population," Journal of Psychology, 97 (2) (November, 1977), pp. 179-82.

<sup>35</sup>Raymond S. Dean, "Brief Report on the WISC-R: V. Reliability of the WISC-R with Mexican-American Children," Journal of School Psychology, 15 (3) (Fall, 1977), pp. 267-8.

## Chapter 3

### METHODS AND PROCEDURES

The Dade County Spanish Adaptation of the WISC-R was given to a sample of Mexican-American children. This sample population was obtained from Wichita, Garden City, and Goodland, Kansas. The research was conducted through the school system.

Permission was granted for the use of the unpublished Dade County Spanish Adaptation of the WISC-R by the Psychological Corporation in New York on December 21, 1977.

Previous to the initiation of testing in the different cities, five Mexican-American children not included in the sample and eight Mexican-American adults, teachers, administrators and others were consulted. The test was discussed and some questions were asked the children in order to be aware of inappropriate words or those unknown to the Mexican-American population. A set of words considered appropriate was prepared and used at the time of testing as a supplement to the Vocabulary, Information, and Comprehension tests. The discussion about words was conducted at all testing locations, in order to learn regional or specific migrant groups' ways of expression.

Conferences were held with the Head of the Bilingual Program in conjunction with the principal of each of the schools selected by the school authorities in each of the cities. The project was discussed in detail, and needs for the implementation of the program were defined, such as the availability of Mexican-American children of the required ages, their availability during school hours, time required for each individual, total time needed, use of the school building, its location and physical facilities (i.e., desk and two chairs, light, privacy, and quiet).

The principal of each school provided a list of Mexican-American children who were eight, nine, and ten years of age and spoke Spanish at home. The principal also introduced the examiner to the teachers and other appropriate personnel. Individual conferences with teachers provided information about class and playground schedules, and appropriate testing times for individual students. Tests were scheduled one or two days in advance, and substitute subjects chosen in case of the unexpected absence of a child scheduled to be tested.

Children were scheduled for testing during school hours, but no lunch time or other recreational activity period was used, and no class was interrupted. Special permission written in English and Spanish was signed by the parent or guardian before each child was tested.

### Design of the Study

The eighty-one children in the sample were Mexican-Americans living in the state of Kansas at the time of the testing. Children who had Spanish as the predominant language at home were selected whether or not they were bilingual. The children in the sample were limited to eight, nine, and ten years of age. The age was defined by the date of birth to eleven months and thirty days for each age.

In Wichita, only children attending the Bilingual Program were obtained. The children tested in Garden City were attending the Bilingual Program, regular public school, or parochial school. In Goodland, the children tested were attending the Migrant Bilingual Program exclusively. The sample covered part of the southeast and northwest area of Kansas.

### Data Collection

The test was given under the standard procedures used for the English version of the WISC-R. The physical facilities were highly satisfactory in all the schools: private, quiet rooms with good light, adequate temperature and ventilation, and at least one table and two chairs. A minimum of interruption was observed during the entire testing.

The Spanish adaptation instrument in use was followed, with the appropriate adjustments. All the

subtests were given starting with the first item for all the children. Even the words considered unknown or unfamiliar to the Mexican-Americans were initially given to the children. Once a child did not give an appropriate answer, the selected supplementary word was given without interrupting the fluency of the testing process. The child's responses to the supplementary words were accepted and scored. This procedure was followed in the Vocabulary, Information, and Comprehension subtests only. Localisms and English words or phrases were accepted as responses as long as the child was able to understand the Spanish question without help. There were no more than four consecutive English word responses in any of the children's protocols.

Some exploration on the Picture Arrangement test and Information test was conducted in order to discover the children's conceptualization of words and situations presented in the test. The child was penalized whenever required by the standard procedure. Notes were taken of different conceptualizations but were not counted for scoring the test.

According to Wechsler's<sup>36</sup> instructions in the WISC-R manual, ". . . unless the child earned a raw score above zero (0) on at least three verbal tests," no verbal IQ was computed for him, and he was therefore regarded as untested.

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<sup>36</sup>David Wechsler, WISC-R Manual (New York: Psychological Corporation, 1974), p. 24.



The same rule was applied to the performance IQ. Furthermore, if the child did not obtain scores above zero (0) on at least three Verbal and at least three Performance tests, a full scale IQ was not computed and the child was classified as untestable with this instrument. Two cases in Wichita and one in Garden City were found under this classification.

As the examiner had Spanish as her native language, and had previous information and familiarity with Mexican and regional words, it was possible to establish good rapport with the children to be tested.

One hundred and two (102) Mexican-American children were classified for the research. The sample included only eighty-one (81), as some children moved, or passed the age level before the time of their testing, or parent/guardian permission was not obtained. The time invested in each test was forty-five minutes to one hour, and the test was given in two sessions when the circumstances required. No more than four children were tested each day. Total time invested in the collection of the data was six months-- from January to the end of July, 1978.

### Data Analysis

The basic data obtained for this study were the raw scores of eighty-one Mexican-American children at an age range of eight to ten years. The Spanish adaptation version of the WISC-R in its complete form was used.

Means and standard deviations from the raw scores of the 200 children for each age eight, nine, and ten of the standardization sample were provided by the Psychological Corporation. This included mean and standard deviation of the six Verbal subtests (Information, Similarities, Arithmetic, Vocabulary, Comprehension, and Digit Span) and five of the six Performance subtests (Picture Completion, Picture Arrangement, Block Design, Object Assembly, and Mazes). Coding means and standard deviations of the raw scores of the standardization sample were not available. The IQs on Verbal, Performance, and Full Scale were computed for the whole sample and compared with the corresponding IQs of the standardization sample.

A t-test was computed to determine whether there was a significant difference between the IQ of the Mexican-American children on each of the tests, using the Dade County Spanish Adaptation of the WISC-R, and the IQ of the standardization sample on the English version of the WISC-R. The scores were analyzed through the raw scores of each of the six Verbal and five of the Performance subtests, using the t-test for correlated observations.

## Chapter 4

### ANALYSIS OF DATA

Statistical analysis was based upon the raw scores: the scaled scores and IQs of the Mexican-Americans were computed by the usual procedure using the WISC-R manual.<sup>37</sup> The mean of the IQs of the Mexican-Americans was obtained and is shown in Table 1.

Table 1  
Mexican-Americans' IQ Means

Verbal	<u>Scales</u>	
	Performance	Full Scale
$\bar{x} = 75.90$	$\bar{x} = 90.49$	$\bar{x} = 81.32$

The mean IQ of the Mexican-American sample is lower on the three scales than the IQ mean of the standardization sample of the WISC-R.

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<sup>37</sup>David Wechsler, Wechsler Intelligence Scale for Children--Revised (New York: Psychological Corporation, 1974), p. 217.

To test the significant difference between the means of the total sample and the standardization sample, the one sample t-test was conducted.<sup>38, 39</sup>

One Sample t-test

Population

$\mu$

Population  
under study

$\bar{x}$

t-test for verbal performance and full scale:

$$\underline{t} = \frac{\bar{X} - \mu}{S_{E_{\bar{x}}}}$$

$\bar{X}$  = mean of the sample under study

= mean of the comparison population

$S_{E_{\bar{x}}}$  = standard error estimated of the sample mean

$$S_{E_{\bar{x}}} = \frac{\sigma}{\sqrt{n}}$$

The results of the comparison of the scores of the total sample are shown in Table 2.

Comparison of the Subtest

The mean and standard deviation of the raw scores obtained by the Mexican-American children on each of the

<sup>38</sup>John T. Roscoe, Fundamental Research Statistics for the Behavioral Science, 2nd ed. (New York: Rinehart and Winston, 1975), p. 214.

<sup>39</sup>William Mendenhall, Introduction to Probability and Statistics, 4th ed. (North Actuate, Mass.: University of Florida Dusbury Press, 1975), p. 217.

Table 2  
t-test IQ Means

	<u>Scales</u>	
Verbal	Performance	Full Scale
<u>t</u> = 24.68	<u>t</u> = 9.10	<u>t</u> = 44.29
Level of significance, one tailed test = .01		

subtests of the Verbal and Performance scales were computed and compared with the mean and standard deviation of the raw scores obtained on each of the subtests by the 600 children (200 of each age) of eight, nine, and ten years of age on the standardization sample. Coding subtest means and standard deviations were not available.

A t-test for comparison of the means of the subtest by age was conducted:

t-test for correlated data:

$$t = \frac{\bar{x}_1 - \bar{x}_2}{S_{E_{\bar{x}_1}} - S_{E_{\bar{x}_2}}} = \frac{\bar{x}_1 - \bar{x}_2}{\sqrt{S_{x_1}^2 + S_{x_2}^2}}$$

$\bar{x}_1$  = mean of Mexican-American sample

$\bar{x}_2$  = mean of standardization sample

$S_{E_{\bar{x}}}$  = standard error for  $\bar{x}_1$  and  $\bar{x}_2$

Df =  $N_1 + N_2 - 2$

(Age 8) N = 29, N = 600; Df = 627  
 (Age 9) N = 28, N = 600; Df = 626  
 (Age 10) N = 24, N = 600; Df = 622

Level of significance for one tailed test:

R = .05 (1.645)  
 R = .01 (2.326)

The t scores obtained by the Mexican-American children are shown in Table 3.

Table 3

t-test Value for the Mexican-American Children Subtest  
 on Verbal and Performance Scale

Verbal	Age 8	Age 9	Age 10
Information			
Similarities			
Arithmetic			-1.389
Vocabulary			
Comprehension	1.152	-0.9777	-1.885
Digit Span			
Performance			
Picture Completion			
Picture Arrangement	-0.075		
Block Design	-2.222		-1.444
Object Assembly	-1.016	-2.291	-0.159
Coding			
Mazes	-0.700	-1.044	-1.086

On the Verbal subtests there was no significant difference in Comprehension at ages eight, nine, or ten and in Arithmetic at age ten at the .01 level.

On the Performance subtests for Mazes at all three age levels, Object Assembly at eight and ten years of age, Block Design at age ten, and Picture Arrangement at age eight, there was no significant difference even at the .05 level.

Object Assembly at age nine and Block Design at age eight can be included as having no significant difference at the .01 confidence level. The null hypothesis was rejected in most of the Verbal subtests and retained only in Comprehension at all three age levels studied, and on Arithmetic at age ten.

On the Performance scale, with the exception of Picture Completion, all of the other subtests showed no significant difference at least for one age level; therefore, the hypothesis was retained on those subtests at the specific ages at the .01 level of confidence.

## Chapter 5

### SUMMARY

The purpose of this study was to find if there was a significant difference in the IQs obtained by Mexican-Americans tested in Spanish, and the IQs of the standardization sample for the Wechsler Intelligence Scale for Children--Revised (WISC-R).

An unpublished Spanish adaptation of the WISC-R, supplied by the Psychological Corporation in New York, was given to eighty-one Mexican-American children of ages eight, nine, and ten attending school in Wichita, Garden City, and Goodland, Kansas, from January to July 1978.

The IQ means of the Mexican-Americans were lower than the standardization sample means on the three scales (Verbal IQ mean = 75.90; Performance IQ mean = 90.49; Full Scale IQ mean = 81.32). All three scales were significantly different at the .01 level. The null hypothesis was rejected for the IQ means on all three scales.

Verbal subtest results were lower than Performance, but some of the subtests in both Verbal and Performance scales retained the null hypothesis. On the Verbal subtests there was no significant difference in Comprehension at ages eight, nine, or ten. Also, in Arithmetic, there was no



significant difference at age ten, either at the .01 or even at the .05 level of significance.

In the Performance subtests there was no significant difference on Mazes at any of the three ages, on Object Assembly at ages eight and ten, on Block Design at age ten, and on Picture Arrangement at age eight, even at the .05 level of significance. Object Assembly at age nine and Block Design at age eight can be included with no significant difference at the .01 level.

The null hypothesis was rejected in most of the Verbal subtests and retained only in Comprehension at all the three ages studied, and on Arithmetic at age ten. In the Performance subtests the null hypothesis was rejected in Picture Completion. All of the other subtests showed no significant difference at least for one age group; therefore, the hypothesis was retained on those subtests at the specific ages.

#### CONCLUSIONS

The statistical analysis has shown the following results: there was a significant difference between the mean IQ of the Mexican-Americans and the standardization sample on Verbal, Performance, and Full Scale. The null hypothesis for all three scales was rejected at the .01 level of significance. The Mexican-Americans' IQs were much lower than the standardization sample.

In the analysis of the subtests, it was found that in the Verbal subtests there was no significant difference in the Comprehension subtest at any age or in the Arithmetic subtest at age ten. The number of subtests that presented no significant difference between the mean scores of the Mexican-Americans and the standardization sample were more on the Performance than on the Verbal scale.

Through the analysis of what each of the subtests measures it would be possible to attempt some conclusions about the peculiar profile of the Mexican-American children in this study. The Mexican-American children performed with no significant difference from the children in the standardization sample on the Verbal scale on Comprehension at any age and in Arithmetic at age ten.

As seen in Chapter 1, the Comprehension subtest measures the level of the child's acculturation and the extent to which maturing conscience and moral sense have developed. The language barrier being omitted by giving the test in Spanish, the Mexican-American children were able to perform with no significant difference from the considered normal child population of the United States--which seems to indicate that basic social and moral rules are no different for the two cultures. From the results it may be observed that in Arithmetic at age ten the Mexican-Americans perform at the same level as the standardization sample. A basic factor in performing well on this subtest is cognitive development and the capability to utilize

abstract concepts of numbers and numerical operations. These are essentially obtained through formal education. The fact that the Mexican-American children perform well at the older age makes it possible to conclude that previous schooling may be the factor which determines this result.

On the Performance scale the Mexican-American children present no significant difference from the children in the standardization sample on Mazes and Object Assembly at any age. These two subtests require visual-motor coordination, anticipation of schemes, manual skill, speed and accuracy, and recognition of only concrete visual forms. No social or specific cultural experience is expected to show in the performance of these subtests.

The performance of the Mexican-American children presented no significant difference on Block Design at eight and ten years of age. This subtest requires a process of perception, analysis, synthesis, and reproduction of design. Even when some implicit verbal manipulation plays its role in the process of thought on this subtest, nonverbal or social concept formation is essentially involved. The significant difference presented by the children at nine years of age has no explanation at hand, and it may be attributed to other factors than a sign of low intellectual ability.

The Mexican-American children at age eight present no significant difference from the children in the standardization sample on the Picture Arrangement subtest. This

subtest requires social alertness, common sense and intelligence applied to social interpersonal situations.

It is not surprising that at nine and ten years of age the minority group of Mexican-American children performs differently from the normal population of Anglo-American children of the same age, as the interpretation of social and interpersonal situations and its causal events is determined by experiences acquired by the individual in a cultural and social context. In a review of the other subtests it is observed that common factors of formal education, social and everyday experience are required to perform equally to the Anglo-American children.

The Information subtest detects judgment of social action, reading and ambitions influenced by cultural background. The Similarities subtest requires the child to obtain facts and ideas from everyday experience and be able to see basic essential relationships between them. The Picture Completion subtest calls for identification of objects around. The Vocabulary subtest, which is the best single measure of general intelligence, even when given in their own language, measures the level of education and environment where the child is growing. The Digit Span subtest requires methods of grouping operations.

The Mexican-Americans perform significantly differently from the standardization sample on all of those subtests. The subtests require certain social and life experiences and levels of formal education. The Mexican-

American children, being a minority group, possess a different background of experiences from the Anglo-American children. Most of them are living in the process of transferring to a different country and do not have the pattern of everyday experience, social interaction, and educational background considered basic to measure responses and intellectual capacity with the WISC-R.

In the subtests where life experiences and formal education are less important in order to be able to perform well, the Mexican-Americans perform as well as the children in the standardization sample.

The Mexican-American children in the sample demonstrated their capacity in planning and anticipation of new situations and visual-motor coordination on the Mazes and Object Assembly subtests. The capacity to work with abstract designs was demonstrated on the Block Design subtest. The introjection of moral and social rules shows in the Comprehension subtest. The capability to acquire formal instruction was demonstrated in the Arithmetic subtest at the ten year age level.

The WISC-R, even when used in Spanish, does not seem to be an adequate instrument for determining the level of intelligence of Mexican-American children.

#### RECOMMENDATIONS

The process of standardization of the WISC-R is essentially important in order to understand the different

conceptualizations of the Mexican-American children within the frame of reference of their own culture and specific experiences as a group, and to determine what responses have to be acceptable in their own logical way of reasoning and problem solving. There is a need for more research to obtain the appropriate words to be used with Mexican-Americans in specific areas. Variables that play an important role in the child's performance on the subtests, and that should be controlled, are as follows: language proficiency detected by some objective scale, not only vocabulary but measurement of language syntactical proficiency; educational background, the number and stability of previous years, and the years of schooling in this country; socio-economic level, relating to the number of children in the family, and its stability and financial income, and whether there is alcoholism or mental disturbance; geographical location, whether rural or urban; physical condition, relating to health and nutrition, brain dysfunctions, and handicaps such as ear-eye impairment; personality factors such as self-concepts and social adjustments, which need to be explored using valid psychological scales.

The comparison of the performance of Mexican-American children with the performance of other sub-cultural groups such as Anglo-American rural children would be an interesting work to be pursued.

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