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**Cognitive performance of English and Spanish speaking Mexican
American children on the WISC-R and EIWN-R**

Zappia, Irene Antonia, Ph.D.

The University of Arizona, 1987

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COGNITIVE PERFORMANCE OF ENGLISH AND SPANISH
SPEAKING MEXICAN AMERICAN CHILDREN ON THE WISC-R AND EIWN-R

BY

IRENE ANTONIA ZAPPIA

A Dissertation Submitted to the Faculty of the
DIVISION OF EDUCATIONAL FOUNDATIONS AND ADMINISTRATION
With a Major in Educational Psychology
In Partial Fulfillment of the Requirements
For the Degree of
DOCTOR OF PHILOSOPHY
In the Graduate College
THE UNIVERSITY OF ARIZONA

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THE UNIVERSITY OF ARIZONA
GRADUATE COLLEGE

As members of the Final Examination Committee, we certify that we have read
the dissertation prepared by Irene Antonia Zappia

entitled Cognitive Performance of English and Spanish Speaking
Mexican American Children on the WISC-R and EIWN-R

and recommend that it be accepted as fulfilling the dissertation requirement
for the Degree of Doctor of Philosophy.

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ACKNOWLEDGEMENTS

The author would like to express gratitude to Dr. Shitala Mishra for serving as dissertation director and to all committee members for their support, guidance, and constructive criticism. Great appreciation is expressed to Pat McCorquedale for support, patient listening, reading and re-reading of drafts, continued encouragement, and especially for her friendship.

Special acknowledgement is also made to Steve Powers for his statistical expertise and encouragement, to Rick Axelson for help with the LISREL program, and to Darrell Sabers for his initial help and support in the design of this study.

Great appreciation is also extended to Larry Curry for generosity with Escala protocols, and for his continued support and encouragement. Gratitude is also expressed to Service Center III psychologists for opening up their files to me and helping me match protocols. Appreciation is also expressed to Peggy Dunlap for encouragement to finish and proofreading the initial proposal, and a thanks also to Barbara Torgeson, at the office, for periodically asking me how I was coming along and providing me with encouragement to continue.

I am very grateful to family and friends, Fran, Carolee, Suzie, Mary, and Ellen, who heard about my studies to the point of boredom, were understanding of my time away and continued their support, encouragement and especially friendship.

Finally, thanks to Macey Taylor for hours of dealing with computer program problems to produce this final draft.

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ABSTRACT

The purpose of this study was to do a comparative analysis of the Wechsler Intelligence Scale for Children-Revised (WISC-R), a test of intelligence which is frequently used with Mexican American students, and its Spanish translation the Escala de Inteligencia Wechsler Para Niños-Revisada (EIWN-R). The WISC-R was administered in English to 109 bilingual English proficient Mexican American students, and the EIWN-R was administered in Spanish to 109 other than English proficient or monolingual Spanish speakers. Language proficiency was determined according to students scores on the Language Assessment Scales (LAS). The groups were matched by sex, school and grade. Students tested were students who were referred for testing because of academic difficulties or students placed in Special Education classes who are required to be re-evaluated every three years.

Using Confirmatory factor analysis, the first objective was to determine if the factor structures underlying the EIWN-R and the WISC-R are equivalent to the factor structure of the WISC-R normative population. The correlation matrices of both groups were compared to the correlation matrix of the normative population. Factor

structures of the WISC-R and the normative population were found to be statistically different, while the factor structures of the EIWN-R and the normative group were not found to be different:

The second objective was to determine if the subtest means of the WIC-R and EIWN-R were significantly different. To determine this, the subtest means of both groups were subjected to MANOVA. Significant differences between subtest means were found on four of the subtests.

A MANOVA was also utilized for the third objective which set out to determine if significant differences in performance are present in the EIWN-R between those students who are placed in Special Education programs and those students who are not placed. So as not to confound the results, the EMR population was removed from the sample. Significant differences in the placed and the non-placed groups were found on eight of the eleven subtests.

Implications of research findings are discussed as well as future trends regarding the assessment of language minority students.

CHAPTER I

INTRODUCTION

Historically, the intellectual assessment of other than English proficient (OTEP) children has been criticized by practitioners as well as researchers. The concern for the validity of evaluation procedures stems from the fact that traditional methods include the evaluation of children in their non-dominant language and the assessment with instruments standardized primarily on a white middle class population (Esquivel, 1985). Minimal regard has been given to environmental, cultural and language variables that could affect test performance. The traditional assessment practices have resulted in inappropriate labeling and misplacement of many language minority students in special education classes (Mercer, 1973).

Traditionally, racial and ethnic minorities have scored lower than their majority counterparts on standardized tests of intelligence and achievement. Factors that have been identified to account for the observed differences between majority and minority groups fall into two distinct clusters

(Olmedo, 1981). The first cluster involves student characteristics such as relevance of cultural values and extent of acculturation, levels of English proficiency or degree of bilingualism, and failure of schools to provide comparable education. The second cluster is composed of factors related to testing itself specifically, the nature of the testing conditions, language of administration, and inappropriateness of test instruments (Olmedo, 1981).

The problems inherent in the use of standardized tests to assess the intelligence of children whose language and cultural backgrounds differ from those in the standardization sample have long been known and recognized. More than half a century ago, Sanchez (1934) warned that a test score is valid only to the extent that the items of the test are as common to each child tested as they were to the children upon whom the norms were based. Since the 1960's, testing of linguistic minorities has been increasingly scrutinized by federal legislation (PL 94-142), by litigation (Diana v California State Board of Ed, 1968; Lau v Nichols, 1974; Guadalupe v Tempe Unified School District, 1972), and by the scientific community (Bernal, 1984; Mercer, 1984; Hilliard, 1984; Oakland, 1977; Samuda, 1975). The impact of legislation and litigation on local schools created requirements for screening and identification of handicapped students by means of non-discriminatory procedures including

tests administered in the child's most proficient language. With the lack of appropriate instruments in languages other than English, and the lack of qualified examiners who speak other languages, this becomes a difficult requirement to fulfill. The growing research in the area of test bias with minorities (Bernal, 1984; Harrington, 1984; Hilliard, 1984) further demonstrates the potential bias in the testing of bilingual and other than English proficient students.

The purpose of this study was to examine the cognitive performance patterns of OTEP and bilingual Mexican American students referred for psychoeducational assessment. To accomplish this objective, scores on the Escala de Inteligencia Wechsler Para Ninos-Revisada (EIWN-R) (Wechsler, 1982), which is a Spanish translation and experimental version of the Wechsler Intelligence Scales for Children-Revised (WISC-R) (Wechsler, 1974), were compared to the scores on the WISC-R of another group of Mexican American students. The students who were administered the EIWN-R are either monolingual Spanish speakers or other than English proficient (i.e., Spanish dominant), while the students who were administered the WISC-R had been judged to be English proficient. It should be noted that the purpose of this study was not directed toward investigating the cultural appropriateness of these two tests, but to compare the

performance patterns of sampled Mexican American students on the WISC-R and its translated version.

Because the EIWN-R is a relatively new instrument, very little research has been conducted with populations of Mexican American students. Since the WISC-R and its translated version are typically used with students referred for psychoeducational assessment, there seems to be a need for studying the response patterns of those with whom the tests are most often used.

The use of Mexican Americans in this study is related to the rapid growth of minority populations in general, and Mexican Americans in particular. In the 1950's, people of Mexican descent comprised the third largest minority group in the United States (Carter & Segura, 1979). Twenty years later the Hispanic population comprised the second largest minority in the United States. The rapid increase of Mexican Americans in our society demonstrates that Mexican Americans are the fastest growing minority in the United States. Across the United States 6.4%, about 20 million, of the population are Hispanic. Sixty-three percent of them live in the southwestern states, where Hispanics comprise 20% - 30% of the population. In Tucson, Arizona, about 21% of the total area population are Hispanic (Tucson Newspapers Incorporated, 1986), the vast majority of those being Mexican American. In Tucson's largest school district about 32% (approximately 18,000 students) are Hispanic (Tucson Unified School District, 1986).

With the increasing Hispanic population, problems of adjusting to the educational system will also grow, and more Hispanics will be referred for testing because of academic problems. Statistics indicate that 66% of Hispanic students in the United States drop out of school before completing 12 years of education (U.S. Bureau of the Census, 1980) and almost 48% of non-English speaking students in the United States are two grades below age level in achievement (Duran, 1983).

Keeping in mind demographic characteristics and educational history, it is essential that the cognitive assessment of bilingual children separate cultural factors from learning problems in order to provide the most appropriate placement. Because the above mentioned tests are commonly used in the evaluation of referred students, and because more knowledge is needed in the testing of minority students, the results of this research will provide much needed empirical data on OTEP and bilingual students.

More specifically, this study examined the construct validity of the EIWN-R as well as the construct validity of the WISC-R. Factor structures were identified for the performance of OTEP and bilingual students in order to compare the factorial compositions of both of these instruments to the factorial composition of the

standardization population and to each other. This study also compared the test results of both instruments to determine performance pattern differences between these two groups of students. Additionally, the study investigated differences in test performance of OTEP students who were placed in special education programs and those who were not placed.

Importance of the Study

This study will be useful to Tucson's school psychologists assessing OTEP and bilingual Mexican American children. Since bilingualism itself is likely to present learning difficulties, many of the students referred for testing and evaluation in this particular school district are Spanish speaking children. The effective use of the EIWN-R with OTEP children and the WISC-R with English speaking Mexican American students will help school personnel make appropriate test decisions and will facilitate the proper placement of Mexican American students in special education programs.

CHAPTER II

REVIEW OF RELATED LITERATURE

This study explored the cognitive performance patterns on the Escala de Inteligencia Wechsler Para Ninos-Revisada (EIWN-R) and the Wechsler Intelligence Test for Children-Revised of a group of Mexican American students who were referred for psychoeducational assessment. For the purposes of this study it is important that the nature of second language acquisition be fully understood. The purpose of this chapter, then, is to review the related literature in six parts: a theoretical background of language acquisition, the WISC, the WISC-R, the EIWN, the EIWN-R, and a summary.

Theoretical Background of Language Acquisition

In order to fully understand studies of OTEP students, it is essential that the reader have a fundamental understanding of the process that children undergo in acquiring two language systems. Erroneous judgments are often made regarding the language proficiencies exhibited by children with two linguistic codes. Often it is assumed that because a bilingual child speaks English, that child can be

fairly and adequately evaluated in English. To understand why a student who appears to be English proficient may not be completely so, it is important that we understand some important distinctions of language. The work of a variety of researchers has provided us with a theoretical perspective for understanding why a child who appears to be proficient in his second language may, in fact, not be so.

Skuttnab-Kangas and Toukoma (1976) have hypothesized that there exists a distinction between the surface aspects (top of Figure 1) of a language and the academic aspects (bottom of Figure 1) of language proficiency. Shuy (1978, 1981) proposed the Iceberg Metaphor which was adapted as shown. He compared our use of language to an iceberg, and separated the surface features of a language, such as pronunciation, vocabulary, and grammar (Language Process), from semantic meaning and functional meaning, the academic aspects of a language. Chamot (1981) and Skinner (1981) further elaborate the same issue in terms of Bloom's taxonomy of educational objectives (Bloom & Krathwohl, 1977) (Cognitive Process).

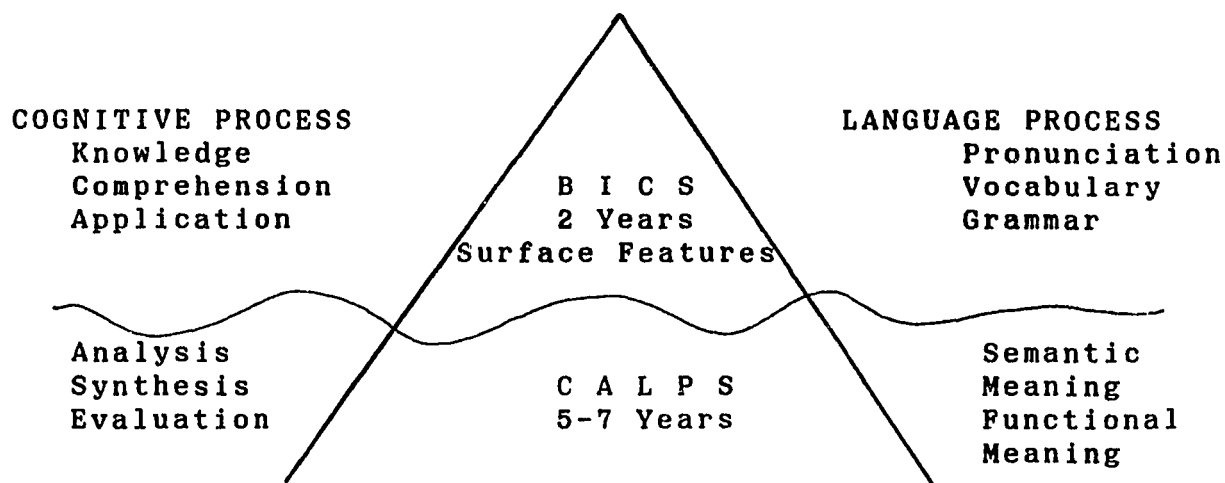


Figure 1. Surface and Deeper Levels of Language Proficiency.

In combining the views of the three analyses, Cummins (1980, 1984) hypothesized that in learning a language, whether it be our first or second language, we first develop Basic Interpersonal Communication Skills (BICS). These are surface features of language that take about two years to develop, and rely heavily on the visual cues received from others. As we learn to use the language and acquire more practice with it, we develop Cognitive Academic Language Proficiency Skills (CALPS). These deeper cognitive functions take 5-7 years to develop, and are what we attempt to measure with intelligence tests.

Cummins further elaborated this view into a scheme that proposes that language can be divided along two continua (Figure 2). The first is a continuum of cognitively demanding to cognitively undemanding, while the second is a continuum of context embedded to context reduced. In context-embedded communication, the participants can provide feedback that the

message has not been understood, so that the language is supported by a wide range of paralinguistic situational cues. Context-reduced communication, on the other side of the continuum relies exclusively on language to interpret the meaning. In the standardized testing situation, meaning is context reduced, and by its very nature, cognitively demanding.

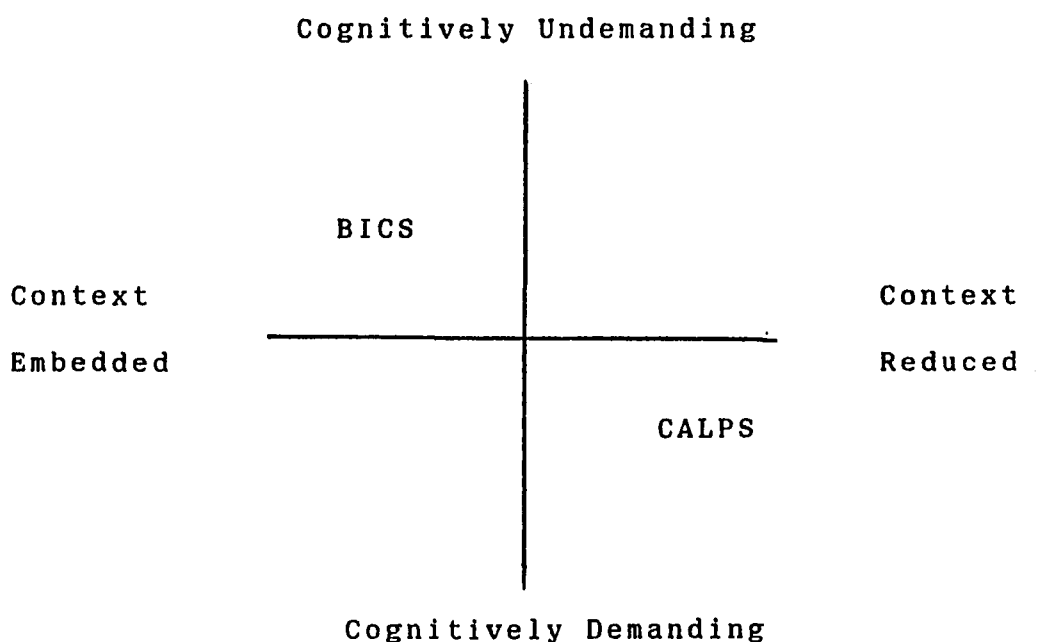


Figure 2. Range of Contextual Support and Degree of Cognitive Involvement in Communication Activities.

In traditional monolingual English intellectual assessment, children are required to perform cognitively demanding tasks in a context-reduced situation. Because these students appear to be relatively fluent in English, their poor academic performance seemingly cannot be attributed to their English deficiency. Referrals for a psychoeducational

evaluation are then made to determine if there are cognitive deficiencies. Because of the nature of the testing situation, and what we know of second language acquisition, a low score obtained by the OTEP student may not be a true measure of his/her intellectual potential. What is needed for OTEP students is an examination of the deeper cognitive functions by using Spanish as the language of evaluation.

The WISC And Its Use With Hispanics

A number of studies have been directly concerned with comparing an administration of the WISC in Spanish to an administration in English. In Dallas, Texas, 100 bilingual Spanish Americans in grades 3 - 5, whose primary spoken language was Spanish, were administered English and Spanish versions of the WISC (Galvan, 1967). Results showed that these children scored significantly higher on the Spanish version.

In contrast, Swanson & De Blasie (1971) gave the WISC to 41 first grade children from two rural elementary schools in central New Mexico. All of the children had attended Head Start, started first grade at the same time and had parents who were both Mexican American. Half the children were given the WISC with the help of an interpreter, and the other half were tested entirely in English. No significant differences between groups were found.

In a study conducted in southern Arizona, one-half (N=150) of the entire 5th grade class of an elementary school was randomly selected and given the WISC in English (Palmer & Gaffney, 1972). One year later a random sample of 30 was selected and given a Spanish translation of the WISC which had been developed at the University of Arizona. No significant differences between scores on the two versions were found.

Swanson (1975) tested 90 Spanish dominant first and second graders. He controlled for IQ and administered the WISC in English or Spanish, or English with an interpreter. He found English on the Verbal section, and Spanish on the Performance section to elicit optimum performance.

Finally, in 1978 De Jesus examined the performance of 60 first grade Chicano children who were administered the WISC under four different conditions (15 students in each). De Jesus looked at two variables: whether a Chicano or an Anglo administered the test and whether the test was administered in English or bilingually. He found a weak but significant effect by language for Verbal IQ but not for Performance IQ, and a strong ethnicity effect, favoring Chicano examiners for both Verbal IQ and Performance IQ. The children tested in English by Chicano examiners were found to achieve significantly higher scores than the other treatment groups.

The WISC-R and Its Use With Hispanics

In 1975, Kirchev called the WISC-R "a revision that really is." It was believed that, as a result of the revisions, the WISC-R had the potential to be more culturally fair to American minorities than the WISC. In reality, a number of studies found the opposite to be true. In fact, virtually all studies of WISC/WISC-R comparisons have shown the WISC-R to yield lower scores than the WISC (Kaufman, 1982). Swerdlik (1976) compared WISC and WISC-R scores for a group of 164 Black (39), White (104), and Latino (21) children referred for testing because of suspected mental deficiency. Swerdlik found significantly higher scores on the WISC than the WISC-R. In 1978 Swerdlik used the same data to show that these referred three groups differed less on the WISC and WISC-R than other children in the general population.

Goody (1981) collected data on 90 subjects, 30 Anglo, 30 Chinese and 30 Hispanic children, tested on the WISC from 1966-1974. These groups were compared with similar samples of children who had been tested with the WISC-R from 1974-1979. Like Swerdlik, his findings showed nearly all of the subtests and IQ scores of the WISC group to be consistently higher than the WISC-R group.

Hispanics have consistently performed more poorly on the WISC-R than on the WISC. In looking at the performances

of Hispanics referred for testing as compared to Anglos, Hispanics are found to score lower than Anglos on the WISC-R. In a review of the research of the Wechsler tests, McShane & Cook (1984) concluded that mean differences do exist among ethnic groups. Hispanic children score lower than Anglo children on all three WISC-R IQ's. Since mean differences exist among different ethnic groups on the WISC-R, some scholars contend that this is evidence of test bias (Mercer, 1979; Williams, 1974). Others (Clarizo, 1982; Jensen, 1984) argue that such differences reflect true differences among the ethnic groups.

The following table presents a summary of WISC-R mean IQs and Standard Deviations reported in studies of referred samples of Hispanic children.

Table 1. WISC-R Studies of Referred Hispanic Children.

STUDY	<u>N</u>	VERBAL		PERFORMANCE		FULL SCALE	
		\bar{x}	<u>SD</u>	\bar{x}	<u>SD</u>	\bar{x}	<u>SD</u>
Swerdlick, 1978	21	76	--	93	--	84	--
Dean, 1979	60	85	12	88	13	87	13
Gutkin, 1979	87					77	9
Dean, 1980	123	86	14	89	14	86	13
Gutkin & Reynolds, 1980	142	80	13	83	14	80	13
Hays & Smith, 1980	30	72	13	86	13	78	12
Reynolds & Gutkin 1980	174	70	12	83	18	75	11

NOTE: IQ's rounded to nearest whole number

Both of Dean's samples (1979; 1980) were from the Phoenix, Arizona area. The 1979 sample met clear criteria for diagnosis of learning disabilities, while the 1980 sample had been referred due to suspected learning disabilities. Gutkin's (1979) sample had been diagnosed as learning disabled, while Swerdlik's (1978) sample was from children in Illinois, Ohio and Michigan who had been referred for evaluations because of concerns about their intellectual ability.

Factor Analytic Studies of the WISC-R

Factor analysis can be used to provide evidence of a test's construct validity (Anastasi, 1982). Factor analytic studies of the WISC-R have been conducted with Black children (Gutkin & Reynolds, 1981; Reschley, 1978; Vance & Wallbrown, 1978), Spanish speaking children (Dean, 1980; Gutkin & Reynolds, 1980; Reschly, 1978; Stedman, Lawlis, Cortner & Achterberg, 1978) and Native Americans (Reschly, 1978). Factor analytic studies have also been conducted with mentally retarded (Schooler, Beebe, & Koepke, 1978; Van Hagen & Kaufman, 1975), learning disabled (Schooler et al, 1978), emotionally disturbed and behavior disordered (Schooler et al, 1978; Finch, Kendall, Spirito, Entin, Montgomery & Schwartz, 1979).

Kaufman (1975) performed a series of factor analyses using the WISC-R standardization sample. From this, Kaufman concluded that a three factor solution is the best fit. Kaufman (1975, 1979) organized the three factors as Verbal Comprehension, made up of Information, Similarities, Vocabulary, and Comprehension subtests; Perceptual Organization, which includes Picture Completion, Picture Arrangement, Block Design, Object Assembly, and Mazes; and the third factor, Freedom From Distractibility, consisting of Arithmetic, Digit Span and Coding. When using an unrotated principal factor solution, one large general factor emerged supporting the concept of the Full Scale IQ. If the factor

structure for Mexican American children were to vary from this, then one could question the validity of using the WISC-R with them.

Kaufman (1982) states, in an article on the impact of WISC-R research, that regardless of the factor-analytic technique used, the age, background or the nature of the sample, a consistent and recurring finding of the WISC-R in factor analytic studies is the emergence of verbal comprehension and perceptual organization factors. A general intelligence factor precedes the emergence of the verbal and perceptual factors (Vance & Wallbrown, 1978; Wallbrown, Blaha, Wallbrown, & Engin, 1975); and, in factor analysis of principal components, verbal comprehension and perceptual organization factors emerge first, usually followed by a distractibility factor (e.g. DeHorn & Klinge, 1978; Kaufman, 1975; Reschley, 1978).

Greenberg, Stewart, Hanche (1986) factor analyzed the 10 subtests scores of the WISC-R for a sample of 928 White and Black children. All students were evaluated to determine their eligibility for placement in the gifted and talented program of a large southern urban school system. The Verbal and Performance factors were found, but compositional differences were found on the third factor when compared to the three factor solutions reported for similar samples. Their results indicated that routine interpretation of a

WISC-R third factor by practitioners may be inappropriate. The meaningfulness of a third factor for Blacks remains a question for further research.

Cognitive alternatives to the behavioral explanation of the third factor have been proposed. Bannatyne (1971, 1974) believes that arithmetic, digit span, and coding all require sequencing ability and might be grouped together on that basis alone, while Meeker (1969, 1975), using Guilford's structure-of-intellect model, believes that the subtests of this triad are primarily measures of symbolic content. It is evident, then, that since there are numerous hypothetical explanations of this third factor, it cannot be interpreted in isolation.

In looking at alternate factors in the WISC-R, Naglieri, Kamphaus, and Kaufman (1983) factor analyzed the subtest intercorrelation matrices reported by Wechsler (1974) for normal children; Van Hagan and Kaufman (1975) for mentally retarded children; and Stedman, Lawlis, Cortner, and Achterberg (1978) for referred children. They found that simultaneous and successive processing factors emerged. Even though the simultaneous and successive factors resemble, respectively, the perceptual organization and freedom from distractibility dimensions, they are not clearly identical to the other WISC-R factors. Normal and exceptional children may apply simultaneous and successive processes differently. The perceptual organization factor resembles simultaneous

processing, and the freedom from distractibility factor resembles successive processing. The authors believe that although the results of their analysis suggest that reconceptualization of the WISC-R according to a processing model is possible, caution should be used since the WISC-R was not designed to measure processing abilities.

WISC-R Factor Analytic Studies With Hispanic Children

A number of studies have been conducted using the WISC-R with Hispanic children. Reschly's (1978) factor-analytic investigation using data obtained in the Pima County mental retardation prevalence study supported Kaufman's (1975) WISC-R three-factor solution for Blacks, Chicanos, and Native American Papagos. Reschley concluded, however, that either two or three factors adequately described the pattern for Chicano children.

In 1980, Dean compared the underlying factor structure of the WISC-R for Anglo and Mexican American children. His sample included 109 Anglo and 123 Mexican American children ranging from 8 - 15 years of age. Since Dean's sample "...came from homes in which Spanish was spoken at least part of the time."(p. 235), there is a possibility that he did not control adequately for degree of bilingualism. In addition, all children were tested by Anglo examiners. Dean also found that three WISC-R factors emerged, which closely correspond to those usually reported for the

WISC-R, but he found that Block Design loaded on Factor III (Freedom from Distractibility) for both Mexican American and Anglo children referred for learning difficulties. Coefficients of congruence (.84-.89) among the factors, he believes, indicated a high degree of similarity in constructs being measured. Lawlis, Stedman, and Cortner (1980) found a third factor composed of Coding and Object Assembly for their referred sample of bilingual Mexican American children.

Gutkin and Reynolds (1980) found a two-factor solution of Verbal Comprehension and Perceptual Organization for both Anglo and Chicano referred children. Using the Sempa standardization sample, Sandoval (1982) conducted a factor analysis for each of the three ethnic groups included in the standardization sample. While he found a three-factor solution for Anglos, a two-factor solution (Verbal and Performance) was best for Blacks and Mexican Americans.

In summary, the underlying factor structure of the WISC-R does not appear to be comparable across ethnic groups; a two-factor solution, Verbal Comprehension and Perceptual Organization, seems to be the best for Hispanic children. Therefore, it is difficult to know whether the WISC-R has adequate internal validity for use with Hispanic children.

The EIWN And Its Use With Hispanics

Since 1949 the WISC has been widely used in the United States and in foreign countries. As of 1974, twelve

foreign translations of the Scale have been approved and published by Wechsler (1974).

In 1955 the WISC was translated by a group of persons from the Department of Public Instruction of Puerto Rico. All of the WISC subtests (12) were translated and adapted to the Puerto Rican culture. It was then validated with a total of 128 subjects in three different experiments (Roca, 1955). The final form was called Escala de Inteligencia Wechsler Para Ninos (EIWN). Few changes were made in the final form of the EIWN. The changes involved adaptations to knowledge common to Puerto Rican children, and reranking of items in their order of difficulty. Because the sample was not representative of the total population, norms were not established by the standardized testing of the Puerto Rican sample. The EIWN used the norms developed for the standardization procedure of the United States English version.

The first of the three experiments conducted by Roca (1955) in the process of adapting the WISC included the administration of the test to three children in each grade (one average, one above average, and one below average). Roca found the range of IQ's on the Verbal Scale to be from 70 to 114, and from 47 to 120 on the Performance Scale. The Full Scale IQs ranged from 59 to 106. As a result of Roca's study, and to make the WISC more appropriate and applicable for Puerto Rican children, changes were made in the Verbal Scale. No changes were made in the Performance Scale.

In a second experiment 69 children (three from each grade) of middle-class socioeconomic status (SES) were selected from three schools. All questions from the Spanish verbal subtests were given to the sample in order to find the difficulty level in Spanish. As a result, the questions were arranged in a new order of difficulty. All questions were tested for validity for the upper and lower groups.

A third experiment utilized 40 subjects (20 boys and 20 girls), with the group of children selected in the same manner from the elementary grades in three schools.

The subject's scores of the three experiments were combined and the test questions analyzed. The distribution of IQ's in Roca's (1955) compilation ranged from 46 to 138, with a median of 87.94. The mean was 88.01 and the deviation was 21.6. The conclusion reached was that, on average, the Puerto Rican child scores 12 IQ points lower than the average American child. Roca (1955) pointed out that 77 to 99 as given by the WISC adaptation is normal for the Puerto Rican population.

In the United States, Chandler and Plakos (1969) tested 47 Spanish dominant students, grades 3-8, placed in classes for the Educable Mentally Retarded (EMR) with the EIWN. Students had been originally been placed according to their performance in the WISC. In looking at the differences between the WISC and the EIWN, it was found that the student's EIWN performance was 13.15 points higher than the

previous WISC performance on record. The median IQ for the previous WISC testing was 70, while the median IQ in this study was 83. WISC records also showed an average of 7 points discrepancy between Verbal IQ and Performance IQ which was also found in the EIWN administration. Examiner ethnicity was not reported.

The EIWN-R And Its Use With Hispanics

Martin (1977), as a dissertation topic, conducted a study to translate the WISC-R into Cuban Spanish and to establish norms for Dade County, Florida. She used the same procedures as were used in the standardization of the original instrument. From this study, the Psychological Corporation published an experimental version of the WISC-R in Spanish, the Escala de Inteligencia Wechsler Para Ninos-Revisada (EIWN-R). (See more detailed description in Chapter III.)

Oplesch and Genshaft (1981) compared the scores of 20 Puerto Rican bilingual children on the WISC-R and the EIWN-R to see whether there were any differences in scores based on the language in which they were tested. They did not find differences between the Full Scale and the Verbal Scores on either test, but significant differences were found between the Verbal and Performance Scores on both tests. This finding supports previous research showing that a bilingual child

will generally score higher on a non-verbal subtest than a verbal subtest (Anastasi and Cordova, 1953).

Rodriquez-Prewitt (1984) conducted a study to look at the linguistic appropriateness and validity of the EIWN-R on a random sample of 51 Puerto Rican children living in Puerto Rico. She found the EIWN-R to be linguistically appropriate for a sample of upper elementary school children. Rodriquez-Prewitt found moderate to high correlation between subtests.

Ruiz (1984) explored the linguistic applicability of the EIWN-R and its predictive validity on a group of seventh- and eighth-grade Puerto Rican students in Hartford, Connecticut. In this exploratory study, Ruiz concluded that the EIWN-R is linguistically applicable to administer to middle school Puerto Rican children in Hartford, Connecticut.

Since an extensive review of the literature revealed only the above studies with the EIWN-R, it is evident that (1) research using the EIWN-R is grossly lacking, and (2) research using the EIWN-R with a Mexican American population is either non-existent and extremely difficult to find.

Summary

In summary, although there is a significant amount of research with the WISC and the WISC-R with Mexican American students, there is a dearth of studies dealing with the EIWN-R. Contemporary theories of language acquisition would

suggest that a Spanish dominant child should be tested in the dominant language. A number of studies looked at administration of the WISC in Spanish versus an English administration for Spanish dominant students. Results were inconclusive. In terms of the WISC-R, it was found that Hispanics have consistently performed more poorly on it than on the WISC. Factor analytic studies of the WISC-R indicate that the factor structure does not appear to be comparable across ethnic groups. Research using the EIWN-R with a Mexican American population seems to be non-existent. Consequently, the findings of this study should provide much needed information about these frequently used tests for researchers and practitioners involved in the psychoeducational evaluation of Mexican American children.

CHAPTER III

METHODOLOGY

The purpose of this chapter is to describe the procedures of the present study. More specifically, the chapter will contain a description of the sample, an overview of the instruments to be used in the study, hypotheses to be tested, and an overview and description of the statistical procedures that were used to test the hypotheses.

Sample

A sample of 218 Mexican American subjects within the age range of 6 years to 16 years were used in this study. The total population was subdivided into 2 groups of 109 Spanish dominant and 109 bilingual subjects. All the Spanish dominant subjects were administered the EIWN-R, and the remaining 109 bilingual subjects were administered the WISC-R in English. The proficiency of Spanish and English was determined by scores on the Language Assessment Scales (LAS) (De Avila & Duncan, 1983). Only those students who scored three or less in English on the LAS were given the EIWN-R. The subjects who

were evaluated with the WISC-R came from a pool of students who obtained an English score of 4 or more on the LAS. Subjects were students referred for testing because of academic difficulties.

Students experiencing academic difficulties are generally referred by a teacher, counselor, principal, or parent for psychoeducational assessment. Students currently placed in a Special Education program are also referred for a re-evaluation every three years to determine the most appropriate placement. Students identified as limited English proficient (English LAS score of 3 or less) are referred to a Bilingual Diagnostic Team, composed of a bilingual psychologist, diagnostician, speech pathologist, and social worker, whose members are certified and trained to look at cultural and linguistic variables. Students referred to the bilingual diagnostic team were evaluated with the EIWN-R, while students referred to the regular school diagnostic team were evaluated with the WISC-R.

Subjects in both groups were matched for age, sex, and socioeconomic status. Similarity of socioeconomic status of sampled subjects in both groups is reflected by the fact that all subjects resided in the same geographical region of the city and whenever possible attended the same school. The following table details the characteristics of the subjects and sample size.

Table 2. Sample Size And Characteristics

	Subjects	Age Range	Sex		Placement Status	
			M	F		
EIWN-R	109	6 - 16	63	46	Placed	61
					Non-placed	36
WISC-R	109	6 - 16	65	44		

Subjects for the investigation were selected from a school district in the southwestern United States that has approximately 54,000 students. The ethnic composition of the schools is as follows: 3% American Indian, 5% Black, 2% Asian, 32% Hispanic, and 58% other ethnic groups. The total minority population is approximately 42% (Tucson Unified School District, 1986).

Instrumentation

History and Development

Most of the items of the WISC (Wechsler, 1949) were developed from Form II of the adult scales of the Wechsler-Bellevue Intelligence Scales (Wechsler, 1944). To make the scales appropriate for younger children, easier items were added to the low end of the subtests.

The WISC (1949) introduced different innovations from other individual tests of intelligence. The first innovation was to eliminate the concept of mental age (MA). A second innovation was to compare each child's test performance not with a composite age group, but exclusively with the scores earned by individuals in that child's own age group.

In 1955 the WISC was translated by a group of persons from the Department of Public Instruction of Puerto Rico. All of the WISC subtests (12) were translated and adapted to the Puerto Rican culture. It was then validated with a total of 128 subjects in three different experiments (Roca, 1955). The final form was called Escala de Inteligencia Wechsler Para Niños (EIWN). Few changes were made in the final form of the EIWN. The changes involved adaptations to knowledge common to Puerto Rican children, and reranking of items in their order of difficulty. Because the sample was not representative of the total population, norms were not established from the standardization testing of the Puerto Rican sample. The EIWN used the norms developed for the standardization procedure of the United States English version.

In 1971 David Wechsler and the Psychological Corporation performed a three-year revision and restandardization of the WISC which was called the WISC-R (Wechsler, 1974). Because of its widespread use and acceptance, much of the 1949 WISC was retained or modified. Only those items which were considered by test users

to be ambiguous, obsolete, or differentially unfair to particular groups of children were eliminated. New items were added to enhance each test's reliability.

The WISC-R reflects four basic changes:

1. Age range. The 1949 WISC used children 5 - 15 years of age while the WISC-R sample ranged from 6.5 to 16.5 years of age.

2. There were changes to accomodate for the representation of non-whites: Blacks, American Indians, and Orientals (Puerto Rican and Mexican American populations were identified as white or non-white according to visible physical characteristics).

3. The content of many of the items was modified or altered.

4. The sequence of test administration was changed to have Verbal and Performance tests alternating.

Since the publication of the WISC-R in 1974, there has been a continuing need for a version of that scale for examining children that are Spanish-language dominant. In 1977 Martin conducted a study to translate the WISC-R into Spanish. The translation incorporated two independently executed translations, and then took into account the comments and suggestions of 21 bilingual school psychologists from the Dade County Public schools. After a review and revision by the staff of the Psychological Corporation, the

translated WISC-R was pilot-tested by Martin at the University of Miami (Martin, 1977).

Because the Spanish speaking community in the United States comprises various strains of the Spanish language, the development of one Spanish-language version of the WISC-R that would be equally suitable for all Spanish-speaking groups in the United States is probably impossible. The problem of lexical variation among Spanish-language subgroups has been addressed in the research edition of the EIWN-R by providing alternate words or phrases for words or phrases not universally familiar. These alternate expressions came from recommendations made by Mexican Americans, Puerto Ricans and Cuban native speakers of Spanish. It is left up to the discretion of the examiner to select the word or phrase judged to be most appropriate for a particular child. Consequently, it is believed that the range of alternatives included in the manual is comprehensive enough to permit its use with children from the three major United States Spanish speaking groups: Mexican American, Puerto Rican, and Cuban.

The EIWN-R is an experimental version of the WISC-R published without norms. In the absence of appropriate norms, WISC-R norms were used in this study. Because norms are not available in actual practice, psychologists who use the test would be most likely to score the test with the WISC-R norms.

As stated in the WISC-R manual (Wechsler, 1974) the WISC-R is not predicated on any particular definition of

intelligence. Wechsler (1974, p. 5) briefly summarized his view on intelligence with the following definition:

"Intelligence is the overall capacity of an individual to understand and cope with the world around him." Wechsler believes that this definition avoids equating general intelligence with intellectual ability. This definition rather conceives of intelligence as a global, multidimensional and multifaceted entity rather than a unidimensionally defined trait. Ultimately, Wechsler believes that intelligence is not a kind of ability at all, but rather something that is inferred from the manifestation of these abilities under different conditions and circumstances.

Content and Format

The core of the EIWN-R is a translation of the WISC-R. Data from the pilot study were subjected to item analysis, which resulted in a slight re-ordering of items on the Information, Vocabulary, and Comprehension subtests. One item was also eliminated from the Comprehension subtest. With the exception of the above mentioned changes and the use of Spanish as the language of administration, the EIWN-R is identical to the WISC-R. The EIWN-R is published without norms for representative samples of Hispanic children. The Psychological Corporation made available the EIWN-R research edition to serve as an experimental research instrument.

Psychometric Properties

The edition of the EIWN-R used in this study is an experimental edition (Wechsler, 1982). Consequently, psychometric properties of the test are not reported in the test manual. Since the EIWN-R is a translation of the WISC-R, psychometric properties of the WISC-R will be presented in this section.

The standardization sample of the WISC-R included 2200 children. The sample was stratified according to the 1970 census and was stratified for age, sex, race, geographic region, occupation of head of household, and urban vs rural residence. The sample was limited to "normal" children, and bilingual children were tested only if they could speak and understand English. The level of language dominance was determined by the testers. Puerto Ricans and Chicanos were categorized as white or non-white in accordance with visible characteristics (Wechsler, 1972).

Reliability. Split half reliability coefficients for the Verbal, Performance and Full Scale IQ's ranged from .90 (Performance) to .96 (Full Scale). The WISC-R reliabilities for the individual subtests ranged from .77 to .86 for the Verbal tests, and from .70 to .85 for the Performance tests. Martin (1977) reports that split half reliability coefficients on the EIWN-R were comparable to the WISC-R.

Procedures

One hundred and nine Spanish dominant Mexican American children ages 6 - 16 years were tested with the EIWN-R, and another 109 English proficient, Mexican American children were tested with the WISC-R. Testing with the EIWN-R was conducted by three certified school psychologists who speak both English and Spanish and are members of a bilingual diagnostic team. The scores on the WISC-R for English proficient students were obtained from a pool of ten certified school psychologists who are not bilingual. All of the psychologists are employees of the school district in which the data were gathered.

Both tests were administered to sampled subjects at an appropriate location and consistent with the standardized procedures outlined in the manuals of both tests.

Hypotheses

Consistent with the purposes of this study, the following null hypothesis were tested:

1. Factor Structures underlying the EIWN-R and WISC-R will conform to the normative WISC-R factor structure.
2. The overall performance of sampled subjects will be the same on the EIWN-R and WISC-R.
3. The overall performance of OTEP students placed

in Special Education classes will be the same as the overall performance of non-placed OTEP students.

So as not to confound the results of Hypothesis 3, the EMR population was removed from the sample before the analysis.

Analysis of the Data

Consistent with the above stated hypotheses two types of statistical analysis were performed. First, confirmatory factor analyses were performed on the WISC-R and EIWN-R to determine equality of factor structure. The second type of analysis utilized Multivariate Analysis of Variance (MANOVA) for comparing the performance differences of the two groups of children on the two assessment instruments. This analysis, which is somewhat similar to Analysis of Variance (ANOVA), helped to control alpha slippage which could have been a problem in this study, considering the large number of comparisons which were made between these two groups. Hypothesis one was examined using exploratory and confirmatory factor analysis, while data concerning the remaining hypotheses were subjected to MANOVA.

A major purpose of factor analysis is to simplify the description of behavior by reducing the number of categories from an initial multiplicity of test variables to a few

common factors or traits (Anastasi, 1982). With factor analysis, it is possible to determine the number and nature of the underlying variables among larger numbers of measures. In this study, confirmatory factor analysis was used to determine if the underlying factorial composition of the WISC-R and EIWN-R are equivalent to the underlying factorial composition of the WISC-R normative population.

Limitations of the Study

The following paragraphs intend to outline some of the limitations of the present study in reference to its generalizability and replicability. More specifically, the section will contain possible confounding issues created by the sample, procedures, and instrumentation used in the present study.

1. The fact that the final sample consisted of students who were referred because of academic difficulties presupposes that this was a very selective group and not representative of the typical Mexican American student population. That is, scores for this group may very well be lower because this is a group experiencing academic difficulties.

2. Inherent in the design of the present study are difficulties caused when using any measure of language proficiency. Specifically, it is very difficult to control

for language proficiency due to inadequate instrumentation. Both groups vary in terms of English and Spanish proficiency. The instrument used to assess this is also not without difficulties.

Despite the limitations inherent in the present study, the immediate educational needs of students warrant that some degree of control be sacrificed in order to interface educational research and practical applications. The intellectual assessment of language minority students is a major critical issue that needs to be addressed from a practical point of view.

CHAPTER IV

RESULTS

This chapter will be devoted to the results obtained in the study. Consistent with the purposes of the study, results related to the comparison of an English administration of the WISC-R to a bilingual, English proficient group of Mexican American students, and a Spanish administration of the EIWN-R (a translation of the WISC-R) to a group of other than English proficient (OTEP) Mexican American students, will be examined. The obtained results will be summarized, and the three hypotheses will be restated and examined in light of the obtained results.

Results Related to Hypothesis 1

Hypothesis 1 stated that the factor structures underlying WISC-R and EIWN-R performances of the bilingual, English proficient and the OTEP would conform to the normative WISC-R factor structure. In order to determine factorial similarity for sampled groups, intercorrelation matrices were produced from the standard scores for both groups (Tables 3 and 4) and then compared to the average

Table 3: Intercorrelation Matrix for the WISC-R.

	Info	Sim	Arith	Voc	Comp	DS	PA	PC	BD	OA	Co
Info	1.00										
Sim	.482	1.00									
Arith	.368	.261	1.00								
Voc	.561	.439	.372	1.00							
Comp	.492	.630	.410	.643	1.00						
DS	.481	.384	.461	.382	.487	1.00					
PA	.273	.446	.371	.366	.389	.419	1.00				
PC	.356	.407	.389	.368	.331	.355	.466	1.00			
BD	.223	.275	.464	.256	.301	.380	.529	.468	1.00		
OA	.140	.200	.367	.253	.159	.295	.384	.424	.561	1.00	
Co	.156	.007	.233	.070	.029	.067	.039	.059	.057	.069	1.00

Table 4: Intercorrelation Matrix for the EIWN-R.

	Info	Sim	Arith	Voc	Comp	DS	PA	PC	BD	OA	Co
Info	1.00										
Sim	.568	1.00									
Arith	.536	.577	1.00								
Voc	.511	.693	.596	1.00							
Comp	.541	.664	.625	.725	1.00						
DS	.323	.354	.592	.390	.362	1.00					
PA	.359	.395	.362	.299	.470	.335	1.00				
PC	.468	.477	.514	.431	.505	.394	.372	1.00			
BD	.352	.372	.471	.365	.389	.367	.497	.442	1.00		
OA	.365	.313	.400	.287	.358	.237	.526	.486	.605	1.00	
Co	.346	.357	.452	.417	.364	.310	.318	.302	.400	.276	1.00

intercorrelation matrix of the normative group as given in the WISC-R Manual (Wechsler, 1974, p. 47). Tests of equality of factor structure, comparing the intercorrelation matrices, for the WISC-R and normative population and the EIWN-R and normative population were performed using the LISREL model (Joreskog & Sorbom, 1986). The results, summarized in Table 5, clearly indicate that the factor structures of the WISC-R group and normative population are significantly different ($p < .0001$), while the factor structures of the EIWN-R group and the normative group were not found to be significantly different. A comparison of the intercorrelation matrices of both sampled groups did not reveal significant differences.

Since the purposes of this study necessitated testing of hypotheses about similarity of factorial structure by use of confirmatory factor analysis, results from an exploratory factor analysis are not presented and discussed in this chapter. For the purposes of describing underlying factor structure, the results of Exploratory Factor Analytic data have been included in Appendix A.

In summary, the obtained findings led to the conclusion that there is factorial similarity between the EIWN-R performance for the sampled subjects and the WISC-R performance obtained for the normative population. However, such a similarity could not be established when the equality of factor structures was examined through confirmatory factor

Table 5. LISREL Tests of Equality of Factor Structure:
EIWN-R and WISC-R Groups Compared with the
Standardization Population.

Comparison	<u>DF</u>	X^2	Goodness of fit	Rt. Mean Sq Res	<u>p</u>
WISC-R(S1)/WISC-R(N)	66	113.84	.794	.128	<.0001
EIWN-R(S2)/WISC-R(N)	66	72.16	.833	.076	ns
WISC-R(S1)/EIWN-R(S2)	66	79.18	.904	.074	ns

(S1) Bilingual, English Proficient Sample
(S2) OTEP Spanish Sample
(N) Normative Group

analysis for the WISC-R sample data and data obtained for the normative group. It is noteworthy that when the performance of the sample was compared on both the EIWN-R and the WISC-R no significant differences in factor structure were evident. These findings led to the rejection of hypothesis one.

Results Related to Hypothesis 2

Hypothesis 2 stated that the overall performance of sampled subjects will be the same for the WISC-R bilingual, English proficient, and the EIWN-R OTEP groups. Descriptive statistics for both the WISC-R group and the EIWN-R group are summarized in Appendix B. The bilingual group scored higher on the WISC-R than the OTEP group on the EIWN-R on 8 out of 11 subtests (Figure 3).

Using the computer program SPSSx (1986), the means of the subtest scores were subjected to a MANOVA to determine the differences in overall performance of the two groups of subjects. The significant multivariate F ratio, $F(11,205)=7.91$, $p<.0001$, indicated the two groups were significantly different on at least one of the eleven dependent variables. Pillias, Hotellings, and Wilks procedures yield the same multivariate F -statistic. Results of this analysis are summarized in Table 6.

In order to determine which of the tests were significantly different the results were then subjected to

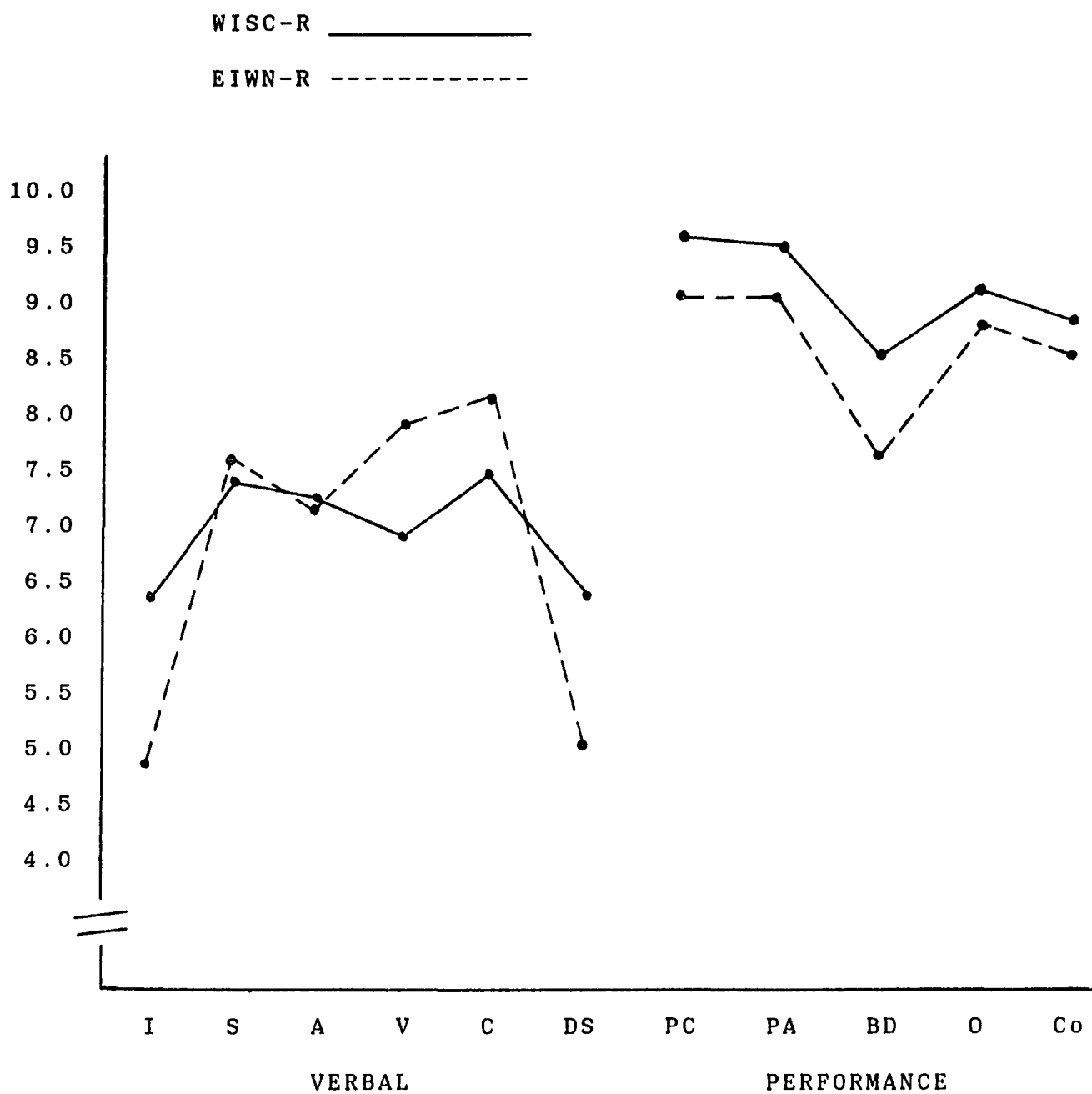


Figure 3. Subtest Means of the WISC-R and EIWN-R Groups.

Table 6. Summary of Multivariate Analysis of Variance of
EIWN-R and WISC-R Subtest Means.

Test Name	Hypoth <u>df</u>	Error <u>df</u>	<u>F</u>	<u>p</u>
Pillais	11	205	7.91	<.0001
Hotellings	11	205	7.91	<.0001
Wilks	11	205	7.91	<.0001

univariate F tests. The following subtests were found to be significantly different in each group; Information (p <.0001), Vocabulary (p .01), Digit Span (p <.0001), Design (.04). Differences in the remaining tests were found to be non-significant. Results for all subtests are summarized in Table 7.

Average performances were also obtained for the three global scores (Figure 4) for both groups. The Verbal Scores for both groups were very similar with the WISC-R group scoring \bar{X} =81.7 and the EIWN-R group scoring \bar{X} =81.8. The largest discrepancy was seen in the Performance Scores with the WISC-R group obtaining a higher score (\bar{X} =94.17) than the EIWN-R group (\bar{X} =90.0). The Full Scale Scores were also higher for the WISC-R group (\bar{X} = 86.5) than the EIWN-R group (\bar{X} = 84.8).

The three IQ scores for both groups were analyzed with t-tests to determine if there were significant differences between them (Table 8). Significant differences were not found on any of the global scales. Therefore, even though significant differences were found on the means of 4 of the subtests, the means of the global scores do not reflect this.

The findings obtained from the analysis of data by MANOVA procedure suggest that differences in performance on the EIWN-R and WISC-R existed for these two groups of

Table 7. Summary of Univariate F-tests with (1,216) Degrees of Freedom For the EIWN-R Group and the WISC-R Group.

Subtests	Hypoth <u>SS</u>	Error <u>SS</u>	Hypoth <u>MS</u>	Error <u>MS</u>	<u>F</u>	<u>p</u>
Information	141.79	1304.70	141.79	6.07	23.37	<.0001
Similarities	.41	1803.78	.41	8.39	.05	ns
Arithmetic	1.99	1304.49	1.99	6.07	.33	ns
Vocabulary	63.43	1703.63	63.43	7.92	8.00	.005
Comprehension	23.74	1651.64	23.74	7.68	3.09	ns
Digit Span	124.44	1402.98	124.44	6.53	19.07	<.0001
Picture Comp.	13.28	1502.14	13.28	6.99	1.90	ns
Picture Arran.	5.87	2428.82	5.87	11.30	.52	ns
Block Design	41.43	2042.56	41.43	9.50	4.36	.04
Object Assembly	2.86	1977.71	2.86	9.20	.31	ns
Coding	9.06	2113.70	9.06	9.83	.92	ns

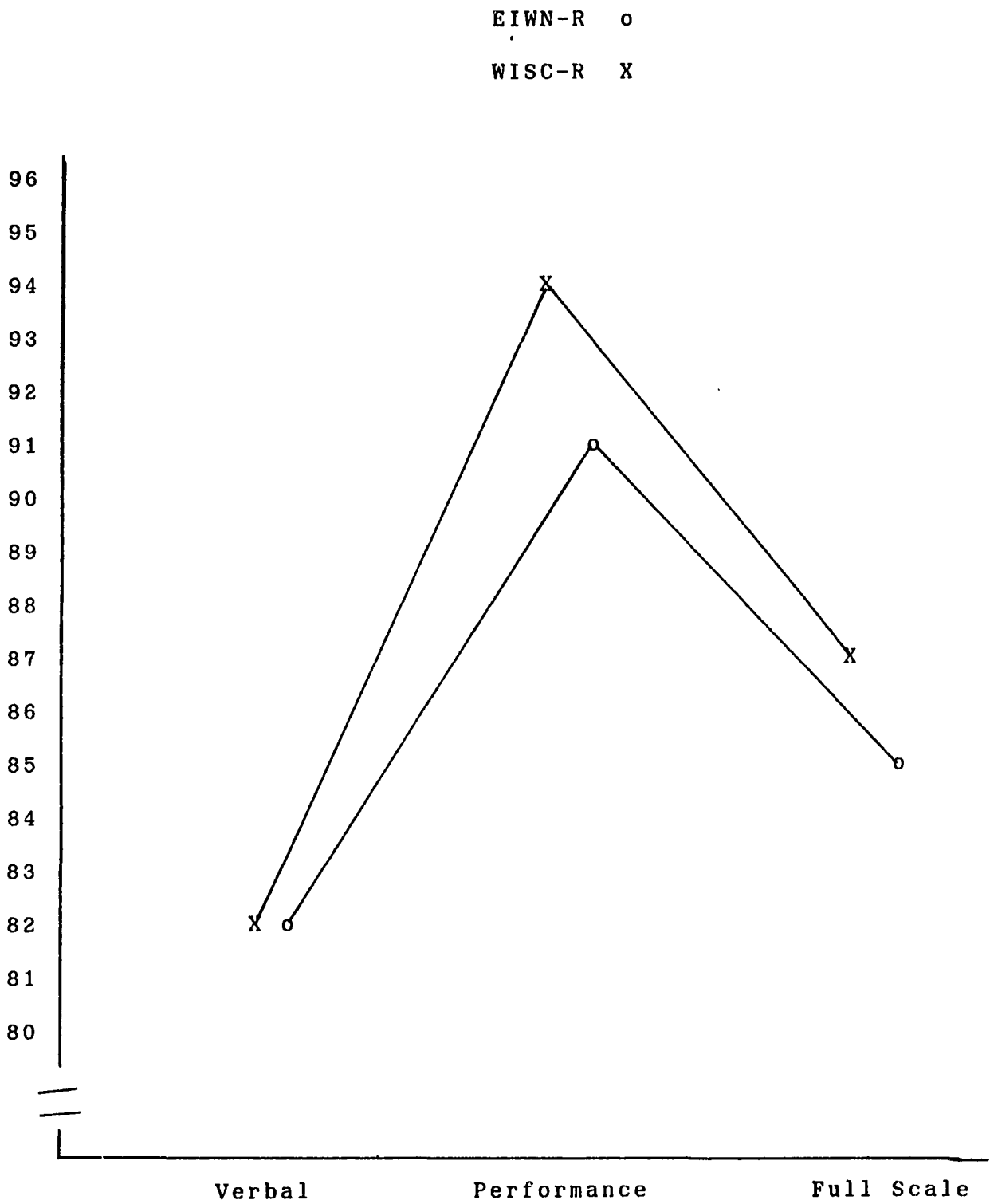


Figure 4. Means of the Combined Scores for the WISC-R and EIWN-R Groups.

Table 8. T-Tests of WISC-R and EIWN-R Combined Scores Means.

	WISC-R		EIWN-R		<u>t</u> -Value	<u>df</u>	<u>p</u>
	<u>X̄</u>	<u>SD</u>	<u>X̄</u>	<u>SD</u>			
Verbal	81.7	11.7	81.8	14.4	-.07	216	ns
Performance	94.2	12.9	90.9	15.7	1.66	216	ns
Full Scale	86.5	11.4	84.8	14.7	1.00	216	ns

children. These results led to the rejection of Hypothesis 2, which stated that there would be no significant differences in the mean performance of both groups.

Results Related To Hypothesis 3

Hypothesis 3 stated that the overall performance of OTEP students placed in Special Education classes would be the same as the overall performance of the non-placed OTEP students. It should be noted that this hypothesis, in contrast to the others, only related to the EIWN-R. Descriptive statistics for both the placed and the non-placed groups on the EIWN-R are summarized in Appendix C. The non-placed group scored higher than the placed group on every subtest (Figure 5). The largest differences were seen on the Vocabulary and Comprehension subtests where the placed group obtained means of 9.7 and 9.8 compared to the means of the non-placed group, 7.6, and 7.9 respectively.

As in hypothesis 2, the means of the subtest scores were subjected to a MANOVA to determine if the overall performance of the two groups is significantly different. The significant multivariate F ratio, $F(11,85)=2.0$, $p.04$, indicated the two groups were significantly different on at least one of the eleven dependent variables. Pillias, Hotellings, and Wilks procedures, yield the same multivariate F -statistic. Results of this analysis are summarized in Table 9.

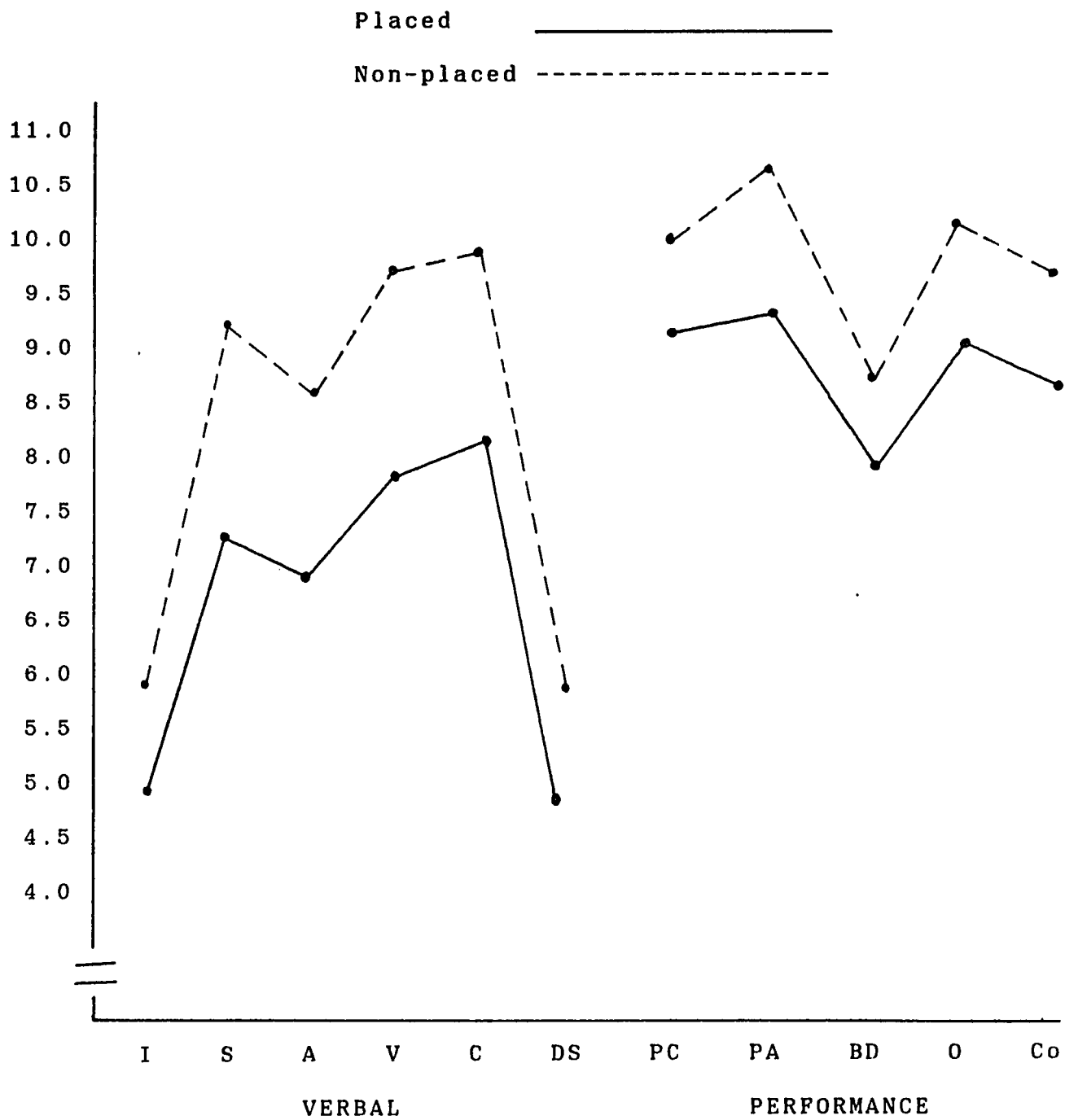


Figure 5. Subtest Means of the EIWN-R Placed and Non-Placed Groups.

Table 9. Summary of Multivariate Analysis of Variance of
EIWN-R Placed and Non-Placed Subtest Means.

Test Name	Hypoth <u>df</u>	Error <u>df</u>	<u>F</u>	<u>p</u>
Pillais	11	85	2.0	.04
Hotellings	11	85	2.0	.04
Wilks	11	85	2.0	.04

In order to determine which of the tests were significantly different, the data were then subjected to Univariate F tests. The differences in Picture Completion, Block Design and Coding were found to be non-significant, while significant differences were found in the remaining subtests. Results of this analysis are summarized in Table 10.

Average performances were also examined for the three IQ scores (Figure 6) for both groups. The mean IQs of the placed group were lower than the means of the non-placed group. The mean Verbal IQ Score for the placed group was 91.2 as compared to the non-placed group which was 80.6, the average Performance IQ for the placed group was 99.0 and 91.3 for the non-placed group. Full Scale IQ Scores for both groups were 94.3 for the placed group and 84.2 for the non-placed group. The largest discrepancy observed was 10.6 in the Verbal Scores.

The three IQ scores for both the placed and the non-placed groups were subjected to a t-test analysis to determine if significant differences between the means of the three composite scores were present. Significant differences in the means of the global scores of the two groups were found (Verbal $<.0001$, Performance $.004$, and Full Scale $<.0001$). Results of this analysis are shown in Table 11.

The findings emerging from MANOVA t-test analysis, suggest that non-placed students obtain higher scores than do placed students. These results clearly indicate that

Table 10. Summary of Univariate F-tests With (1,95) Degrees of Freedom For the EIWN-R Placed and Non-placed Groups.

Subtests	Hypoth <u>SS</u>	Error <u>SS</u>	Hypoth <u>MS</u>	Error <u>MS</u>	<u>F</u>	<u>p</u>
Information	26.93	507.09	26.93	5.34	5.04	.027
Similarities	79.19	566.98	79.19	5.97	13.27	<.0001
Arithmetic	58.66	453.56	58.66	4.77	12.29	.001
Vocabulary	100.72	733.05	100.72	7.72	13.05	<.0001
Comprehension	84.48	534.41	84.48	5.63	15.02	<.0001
Digit Span	31.74	516.24	31.74	5.43	5.84	.02
Picture Comp.	18.87	559.17	18.87	5.89	3.21	ns
Picture Arran.	37.28	744.00	37.28	7.83	4.76	.03
Block Design	23.26	826.02	23.26	8.69	2.68	ns
Object Assembly	38.59	875.64	38.59	9.22	4.19	.04
Coding	30.12	920.79	30.12	9.69	3.11	ns

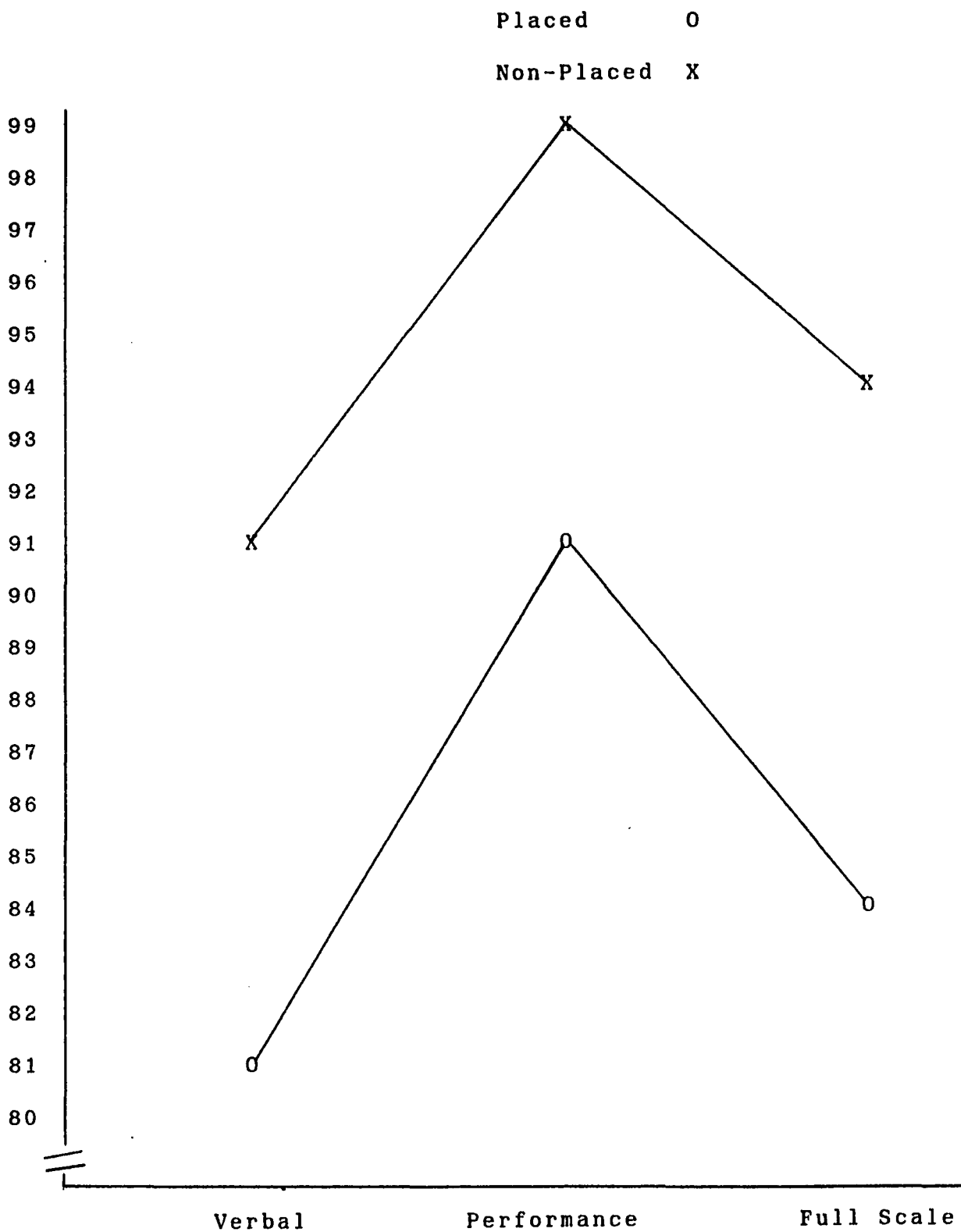


Figure 6. Combined Scores Performance Profile of the EIWN-R Placed and Non-placed Groups.

Table 11. T-Tests of EIWN-R Combined Scores Means For Placed and Non-Placed Groups.

	Non-Placed		Placed		<u>t</u> -Value	<u>df</u>	<u>p</u>
	<u>X̄</u>	<u>SD</u>	<u>X̄</u>	<u>SD</u>			
Verbal	91.2	12.5	80.6	10.5	4.48	95	<.0001
Performance	99.0	12.6	91.3	12.4	2.96	95	.004
Full Scale	94.3	12.0	84.2	9.7	4.52	95	<.0001

Hypothesis 3, which stated that there would be no significant differences in the means of both groups, can be rejected.

Summary

This chapter presents the results derived from the administration of the WISC-R to 109 bilingual, English proficient Mexican American students and EIWN-R to 109 OTEP Mexican American students. The first part of the study focused on the factorial similarity of both groups to the standardization population, and to each other. Factor structures of the WISC-R group in this study and the WISC-R normative population were found to be significantly different, while significant differences were not found between the EIWN-R and the WISC-R normative population. The factor structures underlying both sampled groups (WISC-R/EIWN-R) did not reveal significant differences. The second part of the study dealt with significant differences between the WISC-R and EIWN-R groups. Significant differences were found on 4 of the 11 subtests; Information, Vocabulary, Digit Span and Block Design. Differences in the remaining subtests and global scores were found to be non-significant. The last analysis, which looked at differences between the placed and non-placed groups on the EIWN-R, suggests that non-placed students obtain higher scores than do placed students. The strongest and most consistent differences were found between the placed and non-placed groups.

CHAPTER V

DISCUSSION

The present investigation was an attempt to examine the construct validity of a psychological test commonly used with bilingual and Spanish dominant Mexican American children. Consistent with this overall issue of the usefulness of psychological tests with minority group children, an attempt was made to establish the factorial similarity of the WISC-R and its experimental, translated version (EIWN-R) with its standardized form. In addition, performance patterns were also compared for the sampled groups.

The lack of systematic research concerning the use of the EIWN-R with a bilingual population clearly suggests a need for a comparative study of the WISC-R and EIWN-R with a population of Mexican American students. Especially, there appears to be a lack of research data utilizing the EIWN-R, with Mexican American students. Additionally, the rapid growth of this minority group will contribute further to the already depressed statistics associated with Mexican American students.

The study revolved around three primary issues. First, the question of construct validity was examined by determining if the underlying factor structures of the EIWN-R and WISC-R are equivalent to the factor structure underlying the performance of the normative population and to each other.

Comparing the intercorrelation matrices directly, revealed that the underlying factorial composition of the WISC-R in this study was statistically different from that of the WISC-R standardization sample. This difference may be due to the fact that children who are culturally and linguistically different from the norm are not well represented in the standardization sample. Consequently, the validity of the use of the WISC-R with a bilingual Mexican American population is questionable. The EIWN-R, on the other hand, did not reveal significant differences between the group in this study and the WISC-R standardization sample. This indicates more support, in terms of construct validity, for use of the EIWN-R with Spanish dominant children.

Even though similarity of constructs (EIWN-R and WISC-R) was established by the findings of this study, the finding may not help in answering the question pertaining to the comparative usefulness of these instruments with a Mexican American population. Further investigation with

regard to the predictive utility of these tests may be needed to resolve each issue.

The factorial similarity underlying the performance of the WISC-R and EIWN-R groups used in this study for both bilingual and OTEP groups may partly be explained by the fact that the two groups might be more similar culturally and in terms of the environment in which they live.

Even though the purpose of the study was not to compare performances by the use of exploratory factor analysis, it might be interesting to note that a principal components analysis of the WISC-R (Appendix A) suggested the emergence of the same three traditional factors as found in the standardization sample. However, the pattern of factor loadings obtained in the present investigation contradicts previous research. For example, Factor I was made up of the same tests as the standardization sample with the addition of Digit Span. Factor II again was made up of the same tests as Factor II of the standardization sample, however in this case Arithmetic loaded on Factor II and on Factor III which was made up of Arithmetic and Coding.

A principal components analysis of the EIWN-R revealed only two factors (Appendix A). Factor I was made up of the same subtests as the standardization group with the additions of Arithmetic, Digit Span, Coding, and Picture Arrangement which loaded on both Factor I and Factor II. Factor II was made up of Picture Completion, Picture

Arrangement, Block Design, and Object Assembly, suggesting a different pattern of factor loadings for all three groups. A practical application of this knowledge is that the Freedom from Distractibility Factor which is so frequently associated with learning disabilities must be interpreted with great caution when using either the WISC-R or the EIWN-R with Mexican American children to prevent inappropriate placement decisions.

In summary, these results indicate more support for use of the EIWN-R with a Spanish dominant Mexican American population, than of the WISC-R with a bilingual population. Caution is indicated in interpretation of either version of the test as a diagnostic tool for learning disabilities. The usefulness of the WISC-R with bilingual English proficient Mexican American children warrants a high degree of caution. Further research, which controls for degree of language proficiency, with both versions of the WISC-R and Mexican American students is needed.

In regard to hypothesis 2, an attempt was made to determine the similarity in the mean performance of the two groups taking the EIWN-R and the WISC-R. Consistent with previous research (Cummins, 1984), the obtained findings revealed that language minority students performed closer to the average range on the Performance subtests than compared to the Verbal subtests. Both groups showed relatively little variation among Performance subtests, while the EIWN-R showed

considerably more variation in the means of the Verbal subtest scores than did the WISC-R. The fact that both groups received their lowest scores on the Information subtest is not surprising, since this test tends to exclude the learning experiences of children who have grown up in a different cultural and linguistic milieu. The fact that the Information subtest score is significantly higher for the WISC-R probably reflects facility and exposure to middle class learning experiences that are more readily attainable with the acquisition of English.

Even though only the differences in Vocabulary are significant, it is interesting to note that mean scores are higher on the EIWN-R on two of the three subtests in which the rank order of items was changed -- Vocabulary and Comprehension. Changing the rank order of items seemed to have a positive effect on performance.

The Verbal/Performance differences on both tests support previous research showing that a bilingual child will generally score higher on a non-verbal subtest than a verbal subtest (Anastasi & Cordova, 1953; Cummins, 1984). The results of this study would indicate that the same patterns are present for monolingual or Spanish dominant children as are for English dominant bilingual children.

The overall trend was for the bilingual group to score higher on the WISC-R than did the OTEP group on the EIWN-R. This trend may tend to suggest that the Bilingual

group seemed to have a superiority in intelligence performance as compared to their Spanish dominant counterparts. This would tend to support previous research about cognitive advantages of bilingual children (Bain, 1975; Swain & Lapkin, 1982). This could be validated with further research using a larger sample.

Since the degree of bilingualism varies in children, their ability to express themselves in either language depends on the nature of the task or the context in which a specific skill was acquired. Further research with Bilingual children is needed that examines bilingual test administration in which the examiner may switch from one language to another and translate specific items or directions.

Finally, the performance patterns of the children who took the EIWN-R were examined to determine if the scores of those students who are placed in Special Education programs, based on the results of testing, are significantly different from those of students who are not placed. Even though the same patterns were present with the placed and non-placed group, the placed group scored lower than the non-placed group on every single subtest. This sample which was tested only in Spanish, indicates that Verbal/Performance discrepancies may continue to exist whether the language of administration is English or Spanish. Verbal/Performance differences are frequently associated in the diagnosis of

children with learning disabilities. Caution is therefore recommended in the interpretation and placement of Mexican American children into programs for the Learning Disabled due to these discrepancies.

Further research with language minority students is needed so that cultural performance patterns can be established. Students who then deviate from these patterns or do poorly in typical areas of strengths can be assessed further for possible learning or perceptual difficulties.

Although there is some evidence suggesting a relationship between parental occupation and IQ performance (Kaufman, 1982), future research is needed to explore the relationship between background and test performance patterns of children differing in ethnicity.

Serious difficulties occur when a standardized test of intelligence is used with children whose language or cultural backgrounds differ widely from those in the standardization group, however, the need for the use of intelligence tests has been fully established for various purposes particularly related to the schools. An intelligence test commonly used in the schools for psychoeducational purposes is the WISC-R. Because the EIWN-R is a relatively new instrument, very little research has been conducted with populations of Mexican American students. This study, then, was an outgrowth of the need to add further research on intelligence testing for the Mexican American population

of the Southwest, and to examine the cognitive performance patterns of OTEP and bilingual Mexican American students referred for psychoeducational assessment.

APPENDIX A
EXPLORATORY FACTOR ANALYTIC
DATA

Varimax Rotated Factor Loadings of the WISC-R Group.

Subscales	Factor I	Factor II	Factor III	h^2
Information	.76672	.08178	.24494	.6545
Similarities	.74644	.22351	-.17178	.6366
Arithmetic	.36147	.51747	.43988	.5919
Vocabulary	.76289	.18046	.08572	.6219
Comprehension	.84089	.16675	-.01849	.7361
Digit Span	.56473	.39119	.14145	.4920
Pic. Completion	.37110	.65512	-.05500	.5742
Pic. Arrangement	.35329	.63269	.00859	.5252
Block Design	.13845	.83586	.04882	.7202
Object Assembly	.00643	.80802	.07227	.6582
Coding	.01518	.00784	.91748	.8420
Variance				
Accounted For	41.2%	13.0%	10.0%	

Varimax Rotated Factor Loadings of the EIWN-R Group.

Subscales	Factor I	Factor II	h^2
Information	.67652	.27130	.5312
Similarities	.81706	.18178	.7006
Arithmetic	.74678	.34659	.6778
Vocabulary	.86100	.10941	.7532
Comprehension	.80574	.25125	.7123
Digit Span	.50982	.31645	.3601
Pic. Completion	.25723	.71941	.5837
Pic. Arrangement	.50543	.50290	.5084
Block Design	.25938	.79180	.6942
Object Assembly	.14970	.84927	.7437
Coding	.46384	.34343	.3331
Variance			
Accounted For	49.0%	11.0%	

APPENDIX B
MEANS AND STANDARD DEVIATIONS
OF THE WISC-R AND EIWN-R

Means and Standard Deviations of the WISC-R and EIWN-R Groups.

	<u>WISC-R</u>		<u>EIWN-R</u>	
	<u>X</u>	<u>SD</u>	<u>X</u>	<u>SD</u>
<u>Subtest</u>				
Information	6.4	2.4	4.8	2.5
Similarities	7.4	3.0	7.5	2.8
Arithmetic	7.3	2.4	7.1	2.6
Vocabulary	6.8	2.3	7.9	3.2
Comprehension	7.5	2.6	8.1	2.9
Digit Span	6.4	2.6	4.9	2.5
Picture Completion	9.6	2.7	9.1	2.6
Picture Arrangement	9.5	3.3	9.1	3.4
Block Design	8.6	2.9	7.7	3.2
Object Assembly	9.2	2.7	8.9	3.3
Coding	8.9	2.8	8.5	3.4
<u>Global Scores</u>				
Verbal	81.7	11.7	81.8	14.4
Performance	94.2	12.9	90.9	15.7
Full Scale	86.5	11.4	84.8	14.7

APPENDIX C
MEANS AND STANDARD DEVIATIONS OF
PLACED AND NON-PLACED GROUPS

Means and Standard Deviations of the EIWN-R Placed and Non-Placed Groups.

	<u>NON-PLACED</u>		<u>PLACED</u>	
	<u>X̄</u>	<u>SD</u>	<u>X̄</u>	<u>SD</u>
<u>Subtest</u>				
Information	5.9	2.6	4.8	2.2
Similarities	9.1	2.4	7.2	2.4
Arithmetic	8.5	2.6	6.9	1.9
Vocabulary	9.7	2.9	7.6	2.7
Comprehension	9.8	2.6	7.9	2.2
Digit Span	5.9	2.6	4.7	2.2
Picture Completion	10.0	2.5	9.1	2.4
Picture Arrangement	10.6	2.6	9.3	2.9
Block Design	8.8	2.6	7.8	3.1
Object Assembly	10.3	2.8	9.0	3.2
Coding	9.7	3.7	8.5	2.7
<u>Global Scores</u>				
Verbal	91.2	12.5	80.6	10.5
Performance	99.0	12.6	91.3	12.4
Full Scale	94.3	12.0	84.2	9.7

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