

THE ITPA: A VALID PREDICTOR OF IQ?

ARTICLE REVIEW

BERNADETTE REFOSCO STAHLMAN

THE ITPA:
A VALID PREDICTOR OF IQ?

An Abstract
Presented to
the Graduate Council of
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In Partial Fulfillment
of the Requirements for the Degree
Master of Arts

by
Bernadette Refosco Stahlman

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ABSTRACT

The purpose of the present study was to determine the validity of the intelligence quotient derived from scores obtained from the Illinois Test of Psycholinguistic Abilities (ITPA), a diagnostic tool constructed to determine the learning strengths and weaknesses of children, when compared with an accepted and proven individual intelligence test, the Wechsler Intelligence Scale for Children-Revised (WISC-R).

The subjects were 25 children, ages 6 to 10 years, attending six schools in the Clarksville-Montgomery County public school system, and currently enrolled in special classes or special education programming.

The Pearson Product-Moment Correlation technique was used to compare ITPA Psycholinguistic Quotient (PLQ) scores, which are representative of the relationship between a child's chronological age and his Composite Psycholinguistic Age, with WISC-R Verbal, Performance and Full Scale IQ scores. The total sum of scaled scores for both instruments were also compared by this technique. Correlation coefficients obtained in this study ranged from .50 to .69 and were all significant beyond the .01 level with the exception of the correlation of .50

obtained between the ITPA PLQ and the WISC-R Performance IQ. This correlation was significant at the .05 level.

The correlations obtained in the present study are consistent with those reported in similar studies investigating the validity of intelligence tests, i.e. the relationship between the Stanford-Binet and Wechsler Intelligence Scale for Children. Correlations between the scaled scores of the WISC-R and ITPA indicate that these measures provide a more versatile and accurate means of comparing the child's performance than age scores. The ITPA should therefore be considered a valid instrument for measuring intelligence. Inasmuch as the ITPA is a diagnostic rather than classificatory tool, the author suggests that the ITPA be used with caution in measuring the intelligence of children in special classes or special programs until further research clarifies the nature of its relationship to tests specifically designed for this purpose.

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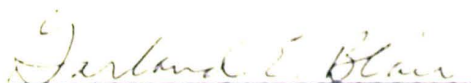
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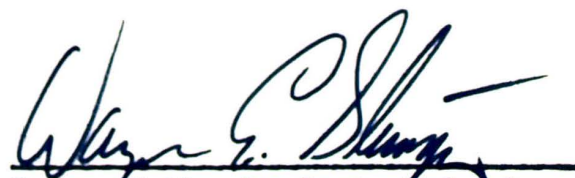

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CHAPTER I

INTRODUCTION TO THE PROBLEM

The Illinois Test of Psycholinguistic Abilities (ITPA) was constructed as a diagnostic tool for the purpose of distinguishing specific learning abilities, disabilities, and achievements in children in order that remediation of learning problems might be undertaken when needed. The ITPA was intended to serve as a model for evaluating learning problems and as a model for remedial procedures. The test is purported to be both a diagnostic test of specific cognitive abilities and a molar test of intelligence, but is not intended to be a classificatory tool according to Kirk (1968). The Composite Psycholinguistic Age (PLA), a score derived from the total or Composite Raw Score of the 10 basic subtests, is a global score comparable to the M.A., and is considered an overall index of the psycholinguistic abilities and disabilities of a child. According to Kirk, its value is one of classification of overall mental ability. The Psycholinguistic Quotient (PLQ) represents the relationship between a child's CA and his PLA, and is derived by dividing the Composite PLA by the CA and multiplying this figure by 100. The PLQ

is comparable in derivation to the ratio IQ, which was the original method of determining an intelligence quotient (Kirk, 1975).

The experimental edition of the ITPA was published in 1961. Subsequent summaries by Bateman (1965) and Kirk (1966) indicated that the test was a valuable tool for assessing learning strengths and weaknesses and therefore certain modifications and improvements were warranted (Paraskevopoulos and Kirk, 1969). A major area of controversy is the validity of the IQ score derived from the revised edition of the ITPA (Kirk et al., 1968) when compared to other measures of intellectual functioning.

Garms (1970a) correlated the Wechsler Intelligence Scale for Children (WISC) and the ITPA in order to determine the aspects of intellectual functioning actually measured by the ITPA. He proposed that if the WISC and ITPA measure common variables, it should be possible to avoid unnecessary duplication by administering all scales of both instruments. The sample for Garm's study was composed of 17 children, ages 6 to 9 years, who were referred to a community guidance center because of academic failure. These children were potentially able to perform average classroom work, but their

performance on the Bender Visual-Motor-Gestalt Test revealed "signs" indicative of perceptual disturbance (rotation, integrative difficulties, perseverations, angulation deviations, etc.). Pearson Product-Moment correlation coefficients (r) were obtained between each WISC subtest and each ITPA subscale. Garms concluded that there appears to be little need to administer both the total WISC and total ITPA to children given psychological evaluations. He proposes using the entire WISC, and the Visual Association, Verbal Expression, Manual Expression, and Grammatic, Visual and Auditory Closure subtests of the ITPA to supplement the WISC.

In a further effort to determine the variables measured by the WISC and ITPA, Garms (1970b) also completed a factor analytic study of the instruments. Both tests were administered to 19 children ranging in age from 7 years 4 months to 12 years 8 months with Full Scale IQs of 69 to 118. The sample included children with psychiatric as well as organic problems.

The WISC and ITPA subscales were factored by a principle components solution with a varimax rotation of the factor matrix resulting in two factors. Factor one, Verbal Organizational and Integrative Ability, contained the following loadings: Similarities (.92),

Auditory Association (.83), Auditory Reception (.80), Comprehension (.78), Grammatic Closure (.77), Manual Expression (.73), Arithmetic (.73), Vocabulary (.72), Information (.72), Visual Reception (.70), Visual Association (.69), Picture Completion (.64), Visual Memory (.60), Auditory Memory (.57), Digit Span (.55), Block Design (.45), Visual Closure (.45), Object Assembly (.43), and Coding (.20).

Factor two, Nonverbal Organizational and Integrative Ability, was loaded in the following manner: Coding (.90), Object Assembly (.13), Block Design (.80), Visual Closure (.77), Digit Span (.72), Visual Memory (.72), Auditory Memory (.71), Visual Association (.66), Manual Expression (.62), Verbal Expression (.61), Information (.58), Picture Completion (.57), Picture Arrangement (.53), Arithmetic (.50), Vocabulary (.49), Auditory Reception (.49), Visual Reception (.49), Auditory Association (.42), Grammatic Closure (.40), Comprehension (.36), and Similarities (.20).

Garms concluded that the WISC measures nonverbal learning ability much better than the ITPA, and that the WISC and ITPA may measure the same dimensions, supporting his earlier contention that if the WISC and ITPA measure common variables, it should be

possible to avoid unnecessary duplication by administering all scales of both instruments.

Some examiners are administering the ITPA in order to obtain global scores of psycholinguistic ability and intelligence as well as part scores and profiles of the child's learning abilities and disabilities, finding it resourceful to administer the ITPA alone instead of two or three different tests (Huizinga, 1973). Huizinga states that this procedure is being practiced without the confirmation of studies demonstrating the relationship of the ITPA global and partial scores to scores obtained from the Stanford-Binet Form L-M or WISC. In his study of 100 six-year-old children, Huizinga found the Stanford-Binet Form L-M, the WISC, and the ITPA render a similar IQ or PLQ.

Huizinga established a critical range and associated probabilities for estimating the Stanford-Binet Form L-M IQ and the WISC Full Scale IQ from any given ITPA Ratio PLQ. The formula for estimating a score on one test from a score on another test is dependent upon the correlation between the two measures and upon the standard deviation of the scores of the test which is to be estimated (Nunnally 1967, p.117).

Huizinga concluded that it appears that a clinician could use the appropriate estimation formulas to obtain an approximation of a Stanford-Binet IQ or a WISC Full Scale IQ from the PLQ obtained on the ITPA. He states that the standard error of estimating the WISC Full Scale IQ score from the ITPA Ratio PLQ score (6.68) compares with the standard error of measurement (4.25) of the WISC Full Scale IQ as reported by Wechsler (1946). This method provides an only slightly broader band (± 2.21 IQ points) than the band of error involved in estimating the child's true IQ from repeated administrations of the WISC itself. His findings indicated that the ITPA measures are not highly correlated with the WISC Performance Scale (.55), and that it is possible, though not proven, that additional information may be obtained from administration of the WISC. The Verbal Scale of the WISC correlated .76 with the ITPA PLQ and .57 with the Stanford-Binet IQ. The correlation between the ITPA PLQ and Stanford-Binet IQ was .90; between the ITPA PLQ and WISC Full Scale IQ .80; and between the Stanford-Binet IQ and the WISC Full Scale IQ .84.

Leton (1972) studied the relationship between the ITPA and WISC scores of 92 learning disabled pupils using factor analysis. He based his analysis on the assumption

that the WISC and ITPA both assess perceptual, conceptual, lingual, associative, and retentive abilities. He identified seven abilities in his analysis: Factor I, Verbal Association; Factor II, Visual Analysis and Motor Association; Factor III, Comprehension of Similarities and Differences; Factor IV, Auditory Memory; Factor V, Visual Sequencing; Factor VI, Logical Reasoning; Factor VII, Verbal-Educative. He identified only two factors as exclusive to either the ITPA or WISC. Factor I, Verbal Association, is primarily an ITPA auditory-vocal factor and Factor VII, Verbal-Educative, is a WISC verbal intelligence factor. Leton's correlation and factor matrix provide evidence of the common structure of the WISC and ITPA and justify their joint use.

Young and Cormack (1974) replicated the work of Austin (1970), Garms (1970b) and Huizinga (1973) assessing 78 emotionally disturbed children on the WISC and ITPA. Their findings were consistent with those of earlier investigations of the relationship between the WISC and ITPA. Young and Cormack found that the correlations between the scaled scores of the WISC and scaled scores of the ITPA were lower than those reported in studies for normal and/or perceptually handicapped children. The multiple correlation procedure indicated that six

of the revised ITPA subtests were related to the WISC Full Scale IQ. The multiple correlation coefficient was $+ .70$ ($F=9.00$, $p < .001$). Six of the revised ITPA subtests were also related to the WISC Verbal IQ ($+ .64$ $F=8.16$, $p < .01$), and six were related to the WISC Performance IQ ($+ .64$ $F=7.96$, $p < .001$). These findings indicate that the relationship between the WISC Full Scale IQ and the revised ITPA is stronger than the relationship between the ITPA and either the WISC Verbal or Performance IQ. This result was consistent with data in the WISC manual (Wechsler, 1949).

A hierarchial factor solution was obtained on correlations among WISC and ITPA subtests for 110 reading disabled children, which suggest that Vernon's hierarchial paradigm constitutes a useful framework for interpreting WISC and ITPA results for reading disabled subjects (Wallbrown et al., 1974). A more direct way of determining the similarity between the ITPA and WISC is canonical analysis (Darlington, Weinberg, and Walberg, 1973). Factor analytic studies have shown that the WISC and ITPA generally measure the same functions, but some investigators feel that this method makes the two instruments appear somewhat less related than they are (Wakefield and Carlson, 1975). Using

canonical analysis, Wakefield and Carlson's findings supported the earlier studies (Leton, 1972; Garms, 1970b), indicating that the two instruments measure similar dimensions. They did not support the use of one instrument in lieu of the other, but suggest that an adequate diagnosis should be possible on the basis of less than the entire set of ITPA and WISC subtests.

In canonical correlation analysis, a linear composite or canonical variable is formed separately for each of the two sets of variables, producing the maximum correlation between these two canonical variables (Elkins, 1973). Elkins (1973) employed the canonical correlation technique in his study of 63 children who were referred for reading problems. According to Elkins this provides an economical description of the relationship between the ITPA and WISC in as much as only two dimensions are used. In contrast, factor analysis uses six dimensions, and there are greater difficulties in interpretation with factor analysis, especially when using factors explaining less than 10% of the total variance. Elkins states that whereas the canonical solution is unique, factor analysis provides an arbitrary description of the relationship among the variables.

The Short Form of the Stanford-Binet Intelligence Scale (Form LM) was administered to the 962 children in the normative group of the ITPA, which made it possible to determine the relationship between the PLA on the ITPA and the Stanford-Binet M.A. (Kirk, 1975). These M.A.s were obtained by plotting mean mental ages against mean raw scores for the eight age groups of the normative population, and then smoothing the eight points to form a curve from which estimated mental age on the horizontal axis could be read from a raw score on the vertical axis (Kirk and Kirk, 1971). To obtain an estimated Binet IQ the estimated Stanford-Binet M.A. derived is applied to the Pinneau Revised IQ tables (Terman and Merrill, 1972).

In 1974, Wechsler published his revised form of the WISC, the WISC-R (Wechsler, 1974). Though the IQ is an often challenged concept, he felt it is a scientifically sound and useful measure, and retained the IQ as an essential aspect of his revised scale. While he correlated his revised model with several other measures of intelligence, the Wechsler Preschool and Primary Scale of Intelligence (WPPSI), Wechsler Adult Intelligence Scale (WAIS), and Stanford-Binet Form L-M, he did not correlate the revised WISC with the revised

ITPA (Wechsler, 1974), though earlier studies indicated that there may be a relationship between the intelligence quotients of the WISC and revised ITPA.

Because of the close correspondence between the PLA and the Binet M.A., it has been found quite satisfactory to use the PLA as a rough estimate of the child's overall intellectual level and the PLQ as his intellectual rate of development (Kirk et al., 1975). One of the purposes of the present study is to further investigate the assumption that the ITPA PLA score is a valid indicator of IQ when compared to an established and accepted measurement, the WISC-R by determining the correspondence between the ITPA PLQ and the WISC-R Verbal, Performance, and Full Scale IQs.

According to Kirk, the scaled scores provide a more versatile means of comparing the child's performance since they allow a more direct comparison (Kirk and Kirk, 1975). Scaled scores are transformations of raw scores which take into account both group means and variances, while the PLA that determines the PLQ only considers group means. Therefore, a second purpose of this study is to correlate the total sum of scaled scores obtained from the ITPA with the full scale score obtained from the WISC-R to determine if

this procedure is a more accurate method of comparison.

CHAPTER II

METHOD

The Sample

The sample used in this study was composed of 25 children (14 boys and 11 girls) attending six schools in the Clarksville-Montgomery County public school system; 15 of the children were Caucasian and 10 non-Caucasian. The ages ranged from 6 years 1 month to 10 years 3 months with a mean age of 8 years 6 months. The pupils had been certified as learning disabled or educably mentally retarded by a school psychologist or psychological intern for placement in special classes or special education programming.

Description of the Instruments

The Illinois Test of Psycholinguistic Abilities (ITPA) is a diagnostic test of specific cognitive abilities, as well as a molar test of intelligence. The ITPA bears the same relation to the field of communication and learning disorders that diagnostic reading tests bear to the field of reading (Kirk et al., 1975). The ITPA is used to identify areas of difficulty in communication more than to determine overall ability.

The test contains ten basic tests and two supplementary tests: Auditory Reception, Visual Reception, Auditory Association, Visual Association, Verbal Expression, Manual Expression, Grammatical Closure, Visual Closure, Auditory Sequential Memory, Visual Sequential Memory, Auditory Closure, and Sound Blending. These 12 tests are designed to isolate defects in three processes of communication: the receptive process, organizing process, and expressive process. It is also designed to isolate problems in two levels of language organization and/or two channels of language input and output: the representational level which includes behavior which requires the more complex mediating process of utilizing symbols which carry the meaning; and the automatic level, which includes communication behavior requiring less voluntary but highly organized and integrated patterns.

The ITPA is appropriate for children from 2 to 10 years of age, and the items are listed in order of difficulty. The test yields a Psycholinguistic Age Score (PIA) for each of the twelve subtests, and indicates the overall psycholinguistic age level of a child. The Composite PIA is derived from the total Composite Raw Score, and is an overall index of the child's learning

abilities and disabilities as measured by the ITPA. It is also possible to transform the raw scores into scaled scores for each of the 12 subtests, providing a mean performance for comparison to the norm group (mean = 36; standard deviation = 6). In addition to these scores, a single figure representing the relationship between a child's CA and his PLA can be obtained by dividing the Composite PLA by the CA and multiplying this figure by 100, thus deriving the Psycholinguistic Quotient (PLQ), purported to be an indicator of the rate of psycholinguistic development and used by many examiners as an indicator of intellectual ability.

The present writer selected the Wechsler Intelligence Scale for Children-Revised as the criterion with which to compare the ITPA because of its established reputation as a valid and reliable test of mental ability. The WISC-R manual (1974) provides evidence of high correlations between the WISC-R and other measures of intelligence. When correlated with the WPPSI, the Full Scale IQs of both instruments yielded a correlation of .82; similar high correlations were found between the two Verbal and Performance IQs. The correlation between the WISC-R and the WAIS Full Scale IQs is

.96; and the correlation between the WISC-R and WAIS Performance IQs is .83. Coefficients of correlation between the Stanford-Binet IQ and the Verbal, Performance, and Full Scale IQs of the WISC-R were .71, .60 and .73 respectively.

Administration and Scoring

The ITPA and WISC-R were administered individually to each subject by this researcher over a period of three months. To help control for any practice effect or learning that might take place, the testing was divided so that thirteen ITPA's and twelve WISC-R's were administered on the first day the subject was tested with the subsequent re-test on the remaining instrument one week later. Only the 10 basic subtests were used to compute scores on both instruments, and each test was scored according to the manuals of direction.

CHAPTER III

RESULTS

The Pearson Product-Moment technique was used to compute the correlation coefficients. The ITPA PLQ was compared with the WISC-R Verbal, Performance, and Full Scale IQ scores. The total sum of the scaled scores for each instrument were also correlated. Table 1 summarizes the correlations.

TABLE 1

Correlations between the ITPA and WISC-R

Item	r
1. ITPA PLQ and WISC-R Verbal IQ	.57**
2. ITPA PLQ and WISC-R Performance IQ	.50*
3. ITPA PLQ and WISC-R Full Scale IQ	.65**
4. Total Sum of Scaled Scores	.69**

N = 25 for all correlations

* $p < .05$

** $p < .01$

TABLE 2
Means and Standard Deviations

Item	Mean	SD
1. ITPA PLQ	74	11.87
2. WISC-R Full Scale IQ	73	12.45
3. WISC-R Verbal IQ	72	16.68
4. WISC-R Performance IQ	74	16.2
5. WISC-R Total Scaled Score	60	18.66
6. ITPA Sum of Scaled Scores	266	49.30

The differences between IQ scores obtained on the ITPA and WISC-R Full Scale ranged from 0 to 28 points, with the average difference between scores being 7.84.

CHAPTER IV

DISCUSSION

The validity coefficient of .65 between the revised ITPA PLQ and the WISC-R Full Scale IQ obtained in this study is slightly lower than the coefficients between the revised ITPA and the WISC reported in the review of the literature although it is still significant beyond the .01 level. Correlation of the total scaled scores for the ITPA and WISC-R resulted in a validity coefficient of .69, supporting Kirk's (1975) recommendation that scaled scores be used to compare a child's performance since they allow a more direct comparison.

The results of the present research also support studies between the revised ITPA and WISC which indicated that the relationship between the WISC Full Scale IQ and the revised ITPA is stronger than the relationship between either the WISC Verbal or Performance IQ and the ITPA. Huizinga (1973) obtained a correlation coefficient of .55 when he compared the ITPA PLQ with the WISC Performance IQ. This researcher obtained a comparable coefficient of .50 between the ITPA and WISC-R Performance IQ. When he correlated the ITPA PLQ and the Verbal IQ of the WISC, Huizinga obtained a coefficient

of .76. The correlation coefficient of .57 obtained in the present study for comparison of the ITPA PLQ with the WISC-R is slightly lower. This may be due in part to differences inherent in the revision of the WISC, which remain undetermined until research correlating the WISC and WISC-R is completed.

A review of the literatures revealed that the magnitude of the correlations obtained in the present study were consistent with correlations reported in previous studies. According to Sattler (1974) the Stanford-Binet is a popular instrument for determining the validity of other measures of intelligence. The correlation between the Stanford-Binet IQ and the WISC-R Full Scale IQ is .73. The median correlation of the Stanford-Binet and Peabody Picture Vocabulary Test (PPVT) is .66; while the PPVT and the WISC have a median correlation of .63 (Sattler, 1974). The Stanford-Binet and Slossen Intelligence Test have a median correlation of .90; while the Slossen has a median correlation of .67 with the WISC Full Scale IQ (Sattler, 1974). The ITPA appears to correlate as well with the WISC-R as do the previously cited accepted tests of intelligence, and therefore should be considered a valid instrument for measuring intelligence.

According to Kirk, the ITPA was conceived as a diagnostic tool constructed to distinguish specific learning abilities, disabilities, and achievements in children so that remediation of learning problems might be undertaken when needed. The low correlation coefficient (.50) obtained when comparing the ITPA PLQ and the WISC-R Performance IQ, and the average difference of 7.84 obtained between ITPA PLQs and WISC-R Full Scale IQs indicate that the relationship between the ITPA and WISC-R has not been clearly defined. It should appear from these results that further research is needed to clarify the nature of the relationship between the revised ITPA and the WISC-R before any conclusions are drawn.

CHAPTER V

SUMMARY

The purpose of the present study was to determine the validity of the intelligence quotient derived from scores obtained from the ITPA, a diagnostic tool constructed to determine the learning strengths and weaknesses of children, when compared with an accepted and proven individual intelligence test, the WISC-R. The selection of the Wechsler Intelligence Scale for Children-revised as the criteria was based on its reliability, validity and widespread use in educational and institutional settings, and the use of its predecessor the WISC as criteria in many previous studies.

The correlation coefficients obtained in the present study ranged from .50 to .69. All were significant beyond the .01 level with the exception of the correlation of .50 obtained between the ITPA PLQ and the WISC-R Performance IQ, which was significant at the .05 level.

In light of the present research findings, it is concluded that the ITPA is a valid instrument for measuring intelligence. However, inasmuch as the ITPA was constructed for the purpose of diagnosing learning strengths and weaknesses the test should be

used with caution for measuring intellectual functioning until further research clarifies the nature of its relationship to tests specifically designed for this purpose.

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