

**THE DRAW-A-PERSON: A QUANTITATIVE SCORING SYSTEM'S
MAN SCALE AS A PREDICTOR OF ACHIEVEMENT ON THE
TENNESSEE COMPREHENSIVE ASSESSMENT PROGRAM**

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THE DRAW-A-PERSON: A QUANTITATIVE SCORING SYSTEM'S
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TENNESSEE COMPREHENSIVE ASSESSMENT PROGRAM

An Abstract
Presented to the
Graduate and Research Council of
Austin Peay State University

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

by:
Alison L. Lankford
December, 1994

Abstract

The Draw-A-Person: A Quantitative Scoring System (DAP) is a recently normed assessment of nonverbal cognitive ability. The present study examined the DAP's utility as a predictor of achievement in an elementary population. The study proposed that if a significant relationship between the DAP and achievement were obtained, then it would greatly enhance the DAP's practical value as a screening tool. In addition, the study provided information on predictive validity which is absent in the DAP manual and in present literature. Eighty-eight kindergarten students from the Stewart County Public School System were administered the DAP Man Scale and these scores were correlated with their third grade achievement scores on the Tennessee Comprehensive Assessment Program (TCAP). Results indicated a small but significant relationship between the DAP and TCAP scores. The findings support the hypothesis of this study that the DAP indeed shows promise as a predictor of achievement.

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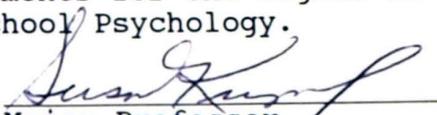
A Thesis
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Graduate and Research Council of
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of the Requirements for the Degree
Master of Arts

by:
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December, 1994

To the Graduate and Research Council:

I am submitting herewith a Thesis written by Alison L. Lankford entitled "The Draw-A-Person: A Quantitative Scoring System's Man Scale as a Predictor of Achievement on the Tennessee Comprehensive Assessment Program." I have examined the final copy and recommend that it be accepted in partial fulfillment of the requirements for the degree of Master of Arts, with a major in School Psychology.

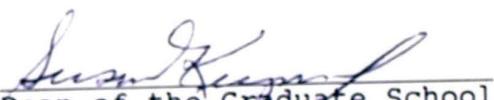

Major Professor

We have read this Thesis
and recommend its acceptance:


Second Committee Member


Third Committee Member

Accepted for the Graduate
and Research Council:


Dean of the Graduate School

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Chapter One

Introduction and Review of The Literature

In selecting an appropriate screening device for use in the educational setting, it is important that a test demonstrate significant concurrent and criterion related validity (Slansky & Short-DeGraff, 1989). An intellectual screener would be especially useful if it were found to significantly predict achievement (Anastasi, 1982). A recently normed intellectual screener is Naglieri's (1988) Draw-A-Person: A Quantitative Scoring System. Sufficient evidence has been provided for this test's concurrent and criterion related validity and studies which support its validity are cited in the test manual (Naglieri, 1988). However, there are no studies cited in the Draw-A-Person manual concerning its ability to predict achievement. Past correlational studies have reflected poor correlations between human figure drawing assessments and achievement (Scott, 1981). Therefore, a study examining the relationship between Naglieri's system and its ability to predict achievement would be highly relevant.

History, Purpose and Goals of the Draw-A-Person: A Quantitative Scoring System

The Draw-A-Person: A Quantitative Scoring System (1988) was designed as a nonverbal measure of cognitive ability (Willis, 1990). This recently normed scoring system for human figure drawings found its roots in the classic drawing test of Florence Goodenough (1926). Goodenough's assumption

was that the intelligence of early school age children could be estimated by their drawings of a man (Goodenough, 1926). Goodenough's drawing test was revised in 1963 by Harris. Harris added a scoring system for a woman figure and a self figure, updated the norms, and expanded the age of the norm group (Harris, 1963). However, Sattler (1982) posed criticisms of the Goodenough-Harris (1963) system by stating its need to refine the norms to half-year and quarter-year intervals for young children and the need to update the norms in general. Also, Sattler (1982) commented that the scoring system guidelines for the woman figure needed revising as the style of dress and hair have changed considerably since the 1950's affecting a child's score. All of these factors were taken into account in Naglieri's 1988 revision of the Goodenough-Harris scoring system. He introduced the Draw-A-Person: A Quantitative Scoring System (DAP).

The purpose of the DAP (1988), like its predecessors, is to provide a nonverbal measure of cognitive ability which can be used as an estimate of a child's general level of cognitive ability, although it is not interchangeable with more comprehensive measures of intelligence. The DAP can be effectively used as part of a test battery or as a screening device (Willis, 1990). The goals of the DAP other than those previously addressed are: (1) to provide a

scoring system which is normed on a large representative sample of students stratified according to recent U.S. Census Data, (2) to provide a less subjective scoring system for human figure drawings, (3) to provide norms for the self drawings, (4) to provide a composite score by combining the scores of all three drawings in an effort to increase the reliability of the test (Naglieri, 1988).

Development of The Scoring System

Naglieri's scoring system was developed with several factors in mind. A set of fourteen criteria, mainly consisting of body parts which were thought to be essential, were developed to be scored along three to seven categories. The categories in which the criteria are scored are: (1) presence of body part, (2) detail of body part, (3) proportion of body part, and (4) bonus credit (Kamphaus & Pleiss, 1991).

To ensure that each item in the final edition had good psychometric qualities, the items were subjected to an item analysis. An item was eliminated if it failed to have adequate discriminative validity over the age range or if its correlation with the total score was too low (Naglieri, 1988). Thus, the final DAP norms were established through a system of fourteen criteria that include a total of sixty-four scorable items (Kamphaus & Pleiss, 1989).

Standardization of The Scoring System

The man, woman, and self drawings used to standardize

the DAP (1988) were obtained from a sample of 4,468 individuals aged five to seventeen years. Two hundred individuals at each of the thirteen age groups between five and seventeen years was determined to be adequate to provide stable norms. Data from the 1980 U.S. Census was used to develop the demographic breakdown of the group needed to represent the U.S. population in terms of age, race, sex, geographic region, and ethnicity. The number of students from each grade in the thirteen test sites needed to obtain the proper geographic representation was determined according to the number of sites in each region. The resulting DAP standardization sample consisted of 2,622 individuals ages five through seventeen years.

Overall, the sample closely matches the demographic, socioeconomic, and racial distribution of the U.S. population according to the 1980 U.S. Census statistics (Naglieri, 1988).

Development of Standard Scores for the Total Score, and the Man, Woman, and Self Drawings

When standard score equivalents for the DAP total test score (man, woman, and self scores combined) were being derived, it became necessary to determine if separate norms according to sex were needed. The mean total test score for males and females was found to be so similar that separate norms for males and females were determined to be unnecessary (Naglieri, 1988). The next step in developing

standard score equivalents for the DAP total score was to examine the age to age progression of raw scores. Between the ages of five years and zero months and eight years and eleven months the progression of raw scores is rapid enough that construction of quarter-year intervals is justified (Naglieri, 1988). For ages nine and ten years only, norms for half-year intervals were thought to be necessary. For ages eleven through seventeen years the norms are consolidated into a single norm group because the mean scores for the individual years are so similar (Naglieri, 1988).

As in the total test standard scores, standard scores for the man, woman, and self drawings were developed. The t-test results for the man, woman, and self drawings indicate that there is not a significant difference between the mean scores for males and females on any of the three drawings. Therefore, separate norms for males and females are not needed (Naglieri, 1988). The means and standard deviations for the man, woman, and self drawings were also examined to determine whether separate conversion tables were needed for the three drawings. Results consistently demonstrated the similarity in means and standard deviations for all three drawings and, therefore, one conversion table was developed for all three drawings (Naglieri, 1988). Standard scores for the individual drawings, as in the total test score, are scaled to have a mean of one hundred and a standard

deviation of fifteen (Naglieri, 1988).

Reliability of the DAP

The reliability of the DAP was analyzed in three ways: internal consistency, test-retest reliability, and interrater reliability. The DAP total test score reliability coefficients range from .83 to .89 with a median of .86. These coefficients indicate good internal consistency of scores across the fourteen scoring criteria and the three drawings. Reliability coefficients for the man, woman, and self scores, individually, range from .56 to .78 with a median of .70. The individual reliability is somewhat lower than that of the total test score. However, the individual drawing scores do not have significantly lower reliability than the total test score (Naglieri, 1988). Results of test-retest analyses report mean coefficients of man, woman, and self scores as .70, .65, and .58 respectively. These results provide evidence of adequate test-retest reliability. Finally, interrater reliability studies indicate that interrater reliability coefficients for the DAP man, woman, and self, and total scores range from .92 to .95 which is solid evidence of interrater reliability (Naglieri, 1988).

Concurrent and Criterion Related Validity of the DAP

The primary method of establishing the concurrent validity of the DAP was through the analysis of its relationship to the Goodenough-Harris (1963) scoring system.

The Pearson correlations between the two scoring systems were examined. Bardos, Softas, & Petrogiannis (1989) conducted a study utilizing 114 students in grades one through six. In this study the Goodenough-Harris and the DAP were administered to each of the students. The DAP total test score correlated significantly ($p < 0.001$) with all three Goodenough-Harris drawings and with the total score. Correlation coefficients of .70, .82, and .71 were obtained with their respective Goodenough-Harris man, woman, and self drawings. Also, the DAP drawings of man, woman, and self were found to be significantly correlated to their corresponding Goodenough-Harris drawings (Bardos, Softas & Petrogiannis, 1989).

To examine the criterion related validity, the DAP was compared to another nonverbal measure of cognitive ability. In a study conducted by Naglieri (1988) the DAP was compared to the Matrix Analogies Short Form (MAT-SF, 1988). A sample of 594 students in grades kindergarten through third were administered both tests. The mean test scores for each grade were correlated and the resulting correlations were found to be significant. The DAP Total test score and man, woman, and self scores correlated significantly ($p < .01$) with the MAT-SF. This study provides additional evidence of the validity of the DAP as a nonverbal measure of cognitive ability.

Further support for the Draw-A-Person's criterion

related validity is found in the results of a study conducted by Prewett, Bardos, and Naglieri (1988). A sample of 77 students were administered the DAP, the MAT-SF, and the Kaufman Test of Educational Achievement (K-TEA). Forty-four of the students in the sample were from the regular classroom and thirty-three were from the learning disabilities classroom. Results from the study indicated that there was not a significant difference between the students in the regular classroom and students in the learning disabilities classroom on the DAP. This lends support to the DAP's use as a general screener of intellectual ability, since it would be expected that students in the regular classroom and students in the learning disabilities classroom would both possess average intellectual ability. It was also found that while those students in the regular classroom also performed within an average range on the achievement measure, the students in the learning disabilities classroom performed significantly lower on measures of reading and math achievement than on the DAP (Naglieri, 1988).

From the above studies, it is evident that the DAP has established firm concurrent and criterion related validity. There is still a need to establish the DAP's utility as a predictor of achievement. This study will focus on the relationship between the DAP male drawing and its ability to predict achievement as measured by the Tennessee

Comprehensive Assessment Program achievement battery or TCAP (CTB/McGraw-Hill, 1990).

The Tennessee Comprehensive Assessment Program (TCAP):
Background and Test Rationale

The Tennessee Comprehensive Assessment Program, or TCAP, (CTB/McGraw-Hill, 1990) is a group achievement battery which utilizes a customized format of combining elements of both criterion based and norm referenced testing. The basic goal for the development of TCAP was to provide valid measurements of basic skills in the areas of: reading, math, spelling, language, science, social studies, and study skills. The test intended to assess a student's ability to understand broad concepts developed by the overall curricula rather than competency in any one domain.

The test's creation was endorsed by the Tennessee Department of Education in January of 1988 due to concerns about the following areas: (1) the lack of continuity of test score statistics from grade to grade, (2) the increasing amount of classroom time being taken up by testing, test preparation, and teacher's tendencies to teach to the test, (3) pressure felt by high school teachers to prepare students for the Tennessee Proficiency Test. All of these issues factored into the decision to submit a review of these issues to the State Testing Advisory Committee in December of 1987. The program was first implemented in the 1989-90 school year across the state of Tennessee. One of

the major advantages of this new program was that students in the eighth grade who performed at an established level of minimum proficiency on the test would be exempt from having to take the ninth grade proficiency test. Thus, the program greatly helps to reduce the overall amount of time spent in testing students (Tennessee Department of Education, 1990).

Reliability of the TCAP

The Tennessee Comprehensive Assessment Program Achievement Battery is actually a survey edition of a lengthier test entitled Criterion Testing of Basic Skills/4, or CTBS/4 (1990). All of the normative information available is based on testing conducted with the CTBS/4 Achievement Battery. Normative information utilizing the TCAP is unavailable at this time since the TCAP is a customized assessment for the state of Tennessee, and the studies are presently in process. With this in mind, the following reliability information is based on testing conducted with the CTBS/4.

One of the major methods of establishing the reliability of the TCAP achievement battery has been through the examination of the internal consistency of the CTBS/4. The internal consistency of the achievement battery was analyzed through the use of split-half coefficients which were derived through the use of the Kuder-Richardson formula and then readjusted with the Spearman-Brown formula so that the correlations would then be applicable to the entire

test.

Correlation coefficients are as follows for grades one through three who were tested in the Spring of the year: In grade one, the total reading, language, mathematics, and total battery scores had reliability estimates of .89, .87, .84, and .95, respectively. In the second grade sample, the total reading, language, mathematics, and total battery scores had reliability estimates of .88, .88, .85, and .95, respectively. Finally, in the third grade sample, the total reading, language, mathematics, and total battery scores had reliability estimates of .85, .87, .84, and .94, respectively (CTB/McGraw-Hill, 1990). Therefore, the soundness of the test's internal consistency is evident in the above reliability coefficients.

Studies were also conducted to obtain the test-retest reliability for the achievement battery and to examine the alternate form reliability of the battery. In order to obtain short interval repeated testing reliabilities for the TCAP, data was collected from a geographically dispersed and heterogeneous sample of school districts in February of 1990. A Benchmark test-retest study and a complete battery alternate form study were carried out during this time period. The alternate form study was counterbalanced so that half of the subjects took Complete Battery A first and then Complete Battery B. The other half of the subjects utilized in the study took the tests in the opposite order.

The data were aggregated to compute the reliabilities and a two week interval was scheduled in between test administrations. However, the resulting reliability coefficients from the test retest and alternate form studies are not available at this time to report.

Validity of the TCAP

The Tennessee Comprehensive Assessment Program achievement battery was developed as previously stated to combine elements of a norm referenced and criterion based assessment. The educational objectives that would be measured by the battery were formulated through the use of a variety of resources. Among the resources used to develop the domains of the test battery were state and district curriculum guides, textbook series, and instructional programs already being used by school districts. The development staff for TCAP developed a list of skills, concepts, and processes which they thought the battery would truly assess. From there, the development staff came up with broad categories to provide the framework for the achievement battery. Specific items in the various domains were developed with the intent of analyzing students thinking abilities as well as their knowledge of a specific content area. The State Testing Division of the Tennessee Department of Education is in the process of conducting studies which will examine the relationship between the criterion based facet of the TCAP and its norm referenced

component. At this time, as the studies are in process, the results are pending. Once available, these studies will help to shed light on the construct validity of the TCAP's domains.

Since this study will focus on the relationship between the DAP intellectual screener and student achievement as measured by the total battery score of the TCAP, a brief description of the major sections of the TCAP will be reviewed. The reading composite includes the areas of word analysis, vocabulary, and comprehension. The word analysis section of the reading test is designed to assess a student's ability to visually and auditorially discriminate between similar words. The vocabulary section of the reading test is designed to assess a student's ability to express the meaning of words. The comprehension section of the reading test is designed to measure a student's ability to construct meaning and to expand upon the meaning in many ways (CTB/McGraw-Hill, 1990). The total reading score is an average of the student's performance on the three sections of the reading test. The language composite includes sections organized around specific skills such as those skills involved in speech or dialogue writing, skills involved in editing passages, and skills involved in the correct use and expression of language. Throughout the language test students are required to practice problem solving based on their knowledge base of language mechanics and expression,

and must demonstrate an ability to detect nuances in the English language. The mathematics composite includes the sections of math computation, math concepts, and applications. The math computation section taps a student's ability to perform the traditional computation operations performed with whole numbers, decimals, fractions, integers, percents, and algebraic expressions. The computation section also assesses a student's ability to apply the standard order of operations and provides opportunities to use problem solving skills by estimating rather than having to write out all the calculations. The Mathematics Concepts and Applications Test focuses primarily on problem solving which is assessed in this section largely through word problems.

Research Rationale

The purpose of this paper is to examine the predictive validity of the Draw-A-Person: A Quantitative Scoring System (Naglieri, 1988). This was accomplished by administering the DAP Man Scale to a sample of kindergarten students at the close of the school year and correlating these scores with this same cohort's scores on their TCAP achievement battery at the close of their third grade year. It is hypothesized that there will be a significant relationship between the DAP scores from this cohort's kindergarten year and their subsequent achievement at the end of their third grade year. A study on the predictive validity of the DAP

with achievement is relevant in that while concurrent and criterion validity studies are cited in the manual for the DAP, there is a lack of information on the predictive validity both in the DAP manual and in present literature.

If found to significantly predict achievement over a three year period, this will greatly enhance the test's validity and utility as a screening measure in that the DAP will be useful in locating children at risk for academic difficulty.

Chapter Two

Methodology

Subjects

Eighty-eight kindergarten students from the two elementary schools in Stewart County Tennessee participated on a volunteer basis in this study. These subjects comprised the entire kindergarten population of the Stewart County Public School System in the Spring of 1991 who were enrolled three years later in the Stewart County School System in Spring of 1994. Forty-six males and forty-two females comprised the sample.

Materials

Only the Man scale of Naglieri's Draw-A-Person: A Quantitative Scoring System (1988) was administered to the sample of kindergarten students. The total battery score from the Tennessee Comprehensive Assessment Program achievement battery was analyzed from the cohort's TCAP battery scores in the Spring of their third grade year.

Procedures and Design

Testing involving the Man scale of the DAP required a single session. Testing of the subjects was conducted by this graduate student in the Spring of 1991, utilizing the standardized instructions for group administration from the DAP manual. The subjects were given a plain white sheet of paper and a pencil with which to draw their figure. Testing time was approximately five minutes to complete the Man

scale of the DAP. The subjects have also been tested (as a part of the Tennessee State Testing Program) with the Tennessee Comprehensive Assessment Program achievement battery. The TCAP was administered by the students' respective classroom teachers. Only the total battery score from the TCAP achievement battery was included in the analysis of the DAP's ability to predict achievement.

A print out of the TCAP scores from this cohort in the Spring of their third grade year, 1994, was obtained from the Stewart County School Board. Once students' scores for the DAP and achievement were paired, they were recorded by a subject number on a sheet of paper attached to the individual DAP protocols. Student names were then removed from their DAP assessment and the TCAP printout was destroyed.

Analysis

In order to examine the relationship between the DAP scores and the TCAP, each students normal curve equivalent score for their total battery score on the TCAP was correlated with their standard score on the DAP Man Scale. A Pearson product moment correlation was the statistic utilized in the analysis.

Chapter Three

Results

A Pearson product moment correlation was used to analyze the pair of measures for each student, the DAP Man Scale and the total battery score of the TCAP. The relationship between the DAP Man Scale and the TCAP total battery score was significant with a correlation $r(87) = .216, p < .05$ (See Table 1).

Table 1

Correlation Between the Draw-A-Person Man Scale and Tennessee Comprehensive Assessment Program Total Battery Score

	TCAP TOTAL BATTERY SCORE
DAP MAN SCALE	0.216*

* $p < .05$.

The means and standard deviations for the DAP and TCAP were $\bar{X} = 99.23, SD = 15.32$; and $\bar{X} = 55.82, SD = 18.68$, respectively.

The results indicate that a significant, though small, relationship does exist between the DAP and subsequent achievement on the TCAP. As hypothesized the DAP did significantly predict achievement on the TCAP in this sample. However, due to the size of the correlation the practical value of the finding is less clear.

Chapter Four

Discussion and Summary

Past correlational studies between human figure drawing assessments and achievement have yielded poor correlations (Sattler, 1982). Specifically, correlational studies conducted between the Goodenough-Harris scoring system and achievement have resulted in low order correlations (Sattler, 1982). This led Scott, in 1981, to conclude that the Goodenough-Harris had "little utility as a predictor of academic achievement" and was "flawed as a screening test", (p.493).

In light of Scott's statements on the Goodenough-Harris and the fact that it has been largely through correlations between the Harris system and the Naglieri system that the Naglieri system established its construct validity, there is a need to conduct further research on Naglieri's Draw-A-Person: A Quantitative Scoring System in terms of its ability to predict subsequent achievement.

The present study examined the ability of Naglieri's DAP Man Scale to predict achievement three years later for the same cohort on the TCAP. The eighty-eight students in this study were administered the DAP Man Scale in the Spring of their kindergarten year and these scores were correlated with their third grade achievement scores on the TCAP. Though small, a statistically significant correlation was obtained between the DAP Man Scale and achievement on the

Due to the small size of the correlation, it makes the practical value of this correlation less clear. However, it is thought that a couple of factors may have impacted the size of the correlation. When examining the printout of achievement scores provided by the Stewart County School Board, it was observed that eighteen out of the eighty-eight students in the sample are currently enrolled in Special Education due to testing significant for possessing a learning disability. By definition, students testing positive for a learning disability exhibit a significant difference between their cognitive ability and their scores on an achievement measure. The fact that the correlation included those students whom it would be expected would exhibit an inverse relationship between these two areas, likely lowered the overall correlation obtained. In addition, the use of the Man Scale by itself, without the Woman and Self scales, perhaps lowered the DAP scores for students, which may have negatively impacted the correlation.

Whether either of the above factors played a significant role in the small correlation obtained in this study is unclear. What is evident is that further studies in this area are necessary. Perhaps a focus on the relationship between the DAP and achievement for students in regular classrooms versus those students in learning

disabilities classrooms would provide information on the degree to which the DAP predicts achievement in each of these groups. This type of study might indicate that while the DAP provides a valid indicator of achievement with students in the regular classroom, there would be an inverse relationship between the DAP and achievement in the learning disabilities group. This does not mean that the DAP is without use in identifying students with suspected learning disabilities. The DAP might be administered as a gross screening measure in order to refer those students for further psychoeducational assessment who attain average scores on the DAP yet continue to experience academic difficulty in the classroom.

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INFORMED CONSENT STATEMENT

The purpose of this investigation is to provide predictive validity information on the Draw-A-Person: A Quantitative Scoring System by correlating it with the Tennessee Comprehensive Assessment Program (TCAP). No individual student will be identified by name. The investigator will have sole access to the student data. The scores for these tests will be matched and any reference to student names on the data will be removed. There are no foreseen risks to any students participating in the study. The demographic information will be used only for analysis. Student participation will be on a voluntary basis and without penalty for nonparticipation. The scope of the project will be explained upon its completion.

Thank you for your cooperation.

I agree to participate in the present study being conducted under the supervision of a faculty member of the Department of Psychology at Austin Peay State University. I have been informed about the procedures, risks and benefits involved. The investigator has offered to answer any inquiries that I may have regarding the study. I understand that I may terminate the participation of these students at any time without penalty and to have all existing data obtained from these students withdrawn and destroyed.

NAME (PLEASE PRINT)

SIGNATURE

DATE