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A Relationship Between the Bender-Gestalt & the Burks Behavior Rating Scale for Organic Brain Dysfunction

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A RELATIONSHIP BETWEEN THE BENDER-GESTALT AND THE BURKS BEHAVIOR RATING SCALE FOR ORGANIC BRAIN DYSFUNCTION

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Sixty randomly selected first, second, and third graders were rated on the Burks Behavior Rating Scale for Organic Brain Dysfunction and were administered the Bender-Gestalt. The scores from each Burks category were compared to the Koppitz Developmental score on their corresponding Bender-Gestalt protocol. A Spearman Rho indicated significant correlations ($p \leq .05$) between the total Burks score and the Koppitz Bender-Gestalt, the Vegetative-Autonomic scale and the Koppitz Bender-Gestalt, and the Perceptual-Discriminative scale and the Koppitz Bender-Gestalt. A nonsignificant negative correlation was found between the Burks Social-Emotional scale and the Koppitz Bender-Gestalt.

Chapter I

Introduction

The practicing school psychologist generates many critical diagnostic questions in relation to the concept of brain damage and mental subnormality. Because the direct correlate involving abnormal electroencephalogram (EEG) tracings is virtually impossible to handle in an academic environment, the psychologist must depend upon the instruments relating behavioral correlates of organic brain dysfunction as screening devices for brain injury.

Several researchers (Denhoff, Davids, & Hawkins, 1971; Davids, 1971; Stewart, Pitts, Craig, & Dieruf, 1966; Bell, Waldrop, & Weller, 1972; Clements, 1969; Burks, 1960) have found the following behavior patterns to be correlates of brain impairment: short attention span, restlessness and overactivity, poor judgment and impulsive action, low frustration tolerance and irritability, poor perceptual and conceptual abilities, specific learning disabilities, defective memory, and poor muscular coordination.

These correlates have been shown or described as valid constructs in differentiating between brain injured and non-brain injured children. The school psychologist, then, depends heavily on behavioral manifestations of brain injury.

In dealing with these correlates, several screening instruments appear to meet the need of the school psychologist. Of these, two instruments stand out; the Visual Motor Gestalt Test as evaluated by

the Koppitz Developmental Scoring System (Koppitz, 1971) and the Burks Behavior Rating Scale for Organic Brain Dysfunction (Burks, 1968).

In relation to the Bender-Gestalt, surveys have shown the instrument to be one of the most widely used psychological tests (Sundberg, 1961; Louttit & Brown, 1947; Darley & Marquis, 1946). Besides ranking in competition with the Rorschach, Draw-A-Person, and the Thematic Apperception Test (Sundberg, 1961), the Bender increased in popular usage from 54th to 4th place in the 12 year period between 1946 and 1958 (Koppitz, 1971). The growing status of the Bender then, is indicative of its widespread and general usage.

The Bender-Gestalt, as analyzed by Koppitz's scoring system (Koppitz, 1971), is seen as a measure of perceptual motor functioning, as a screening agent for specific learning disabilities, and as an instrument which may suggest brain injury. Thus the Bender-Gestalt, when scored by the Koppitz scoring method (Koppitz Bender-Gestalt), is concerned with one, possibly two behavioral correlates associated with brain injury: perceptual motor difficulties and specific learning disabilities.

In contrast to the research conducted on the Bender-Gestalt, the Burks Behavior Rating Scale for Organic Brain Dysfunction has received little recognition of its reliability or wide usage. The scale may be seen as a screening instrument for those behaviors that indicate organic brain dysfunction (Burks, 1968) and was an outgrowth of research conducted by Burks (1960) on a group of behavior problem children. The scale was divided into three categories: Vegetative-Autonomic, Perceptual-Discriminative, and Social-Emotional scales.

The Vegetative-Autonomic category included such characteristics as

hyperactivity, impulsivity, poor muscular coordination, distractibility, and explosiveness (Burks, 1968). Burks believed the brain malfunction caused an abnormal "interaction between activities controlled by the cortex and those regulated by diencephalic mechanism [p. 5]." The result of such a dysfunction, caused an inability to attend to one stimulus without also attending to extraneous stimuli.

The Perceptual-Discriminative category measured specific learning difficulties such as difficulty in spelling, writing, arithmetic, reading, following directions, and reasoning. The confusion experienced might be attributed to impairment of visual motor integration according to Burks (1968).

The third category, the Social-Emotional classification, dealt with the expression of emotional tension. The behaviors assessed included: "demanding attention, becoming destructive, and evidencing difficulties in social relationship [p. 11]."

Thus, the Burks is a more global measure of brain dysfunction and screens for several behavioral correlates that the Bender does not. This instrument appears to be one of the broadest based psychometric techniques and screens for many behavioral correlates manifested in organic brain dysfunction.

The Koppitz Bender-Gestalt and the Burks Behavior Rating Scale for Organic Brain Dysfunction propose to screen for organic brain dysfunction. Previous studies of these instruments dealt with samples that were preselected, through medical diagnosis, as normal/brain dysfunction subjects. Using extreme, dichotomous groups, both techniques have been demonstrated to be measuring correlates of various types of brain dysfunction. The assumption was made that when dealing with a random

population, no dichotomy would exist. The correlation and the organic brain dysfunction should exist in degrees.

The purpose of the present research was to study the relationship between the Burks Behavior Rating Scale for Organic Brain Dysfunction, a teacher rating of behavioral correlates that proposes to measure organic brain dysfunction, and the Bender-Gestalt, a standard measure of perceptual motor skills that also purports to measure brain dysfunction, utilizing a random school-aged population.

Chapter 2

Review of Literature

The literature has revealed that perceptual motor difficulties and behavioral disorders may often be associated with organic brain dysfunction. However, few studies have examined the relationship between two different scales proposing to measure the same factor. It was, therefore, the purpose of the present research to study the relationship between the performance on the Koppitz Bender-Gestalt, as a measure of perceptual motor activities and organic brain dysfunction, and the Burks Behavior Rating Scale for Organic Brain Dysfunction, a teacher rating scale, in a random school-aged population.

Bender-Gestalt

Using nine of Wertheimer's (1923) configurations, Bender (1938) initiated the Visual Motor Gestalt Test to examine visual motor patterns or gestalten. The gestalt set was defined as that function which allowed a subject to respond to particular visual stimuli as a whole (Bender, 1938). An integrated organism was theorized to respond only in a constellation or gestalt or whole. According to Bender (1938), the gestalt response was a result of the "whole integrative state of the organism [p. 4]" as well as the whole setting of the stimulus. The gestalt process, according to Bender (1938), was a function of maturation and pathological state, functionally or organically induced. Maturation, then, became an important aspect in analyzing performance on the test.

Developmental maturation, according to Bender (1938), seemed to

culminate at about 11 years of age. The average child at that age would have progressed from large scribbled drawings to a controlled inhibited form.

Pascal and Suttell's (1951) study with school children concluded that the child's interpretation of the designs was involved in the maturation process and that increasing age resulted in a decrease in errors on designs, as was suggested by Bender (1938). Results from a study by Koppitz (1971) revealed that "children differ in the rate of maturation and in the sequence in which they learn the various visual motor gestalt functions [p. 5]." Thus, maturation has been determined to be a major consideration when dealing with performance on the Bender-Gestalt.

The Bender-Gestalt has proven to be not only a measure of visual motor perception and development (Koppitz, 1971), but a measure of emotional stability (Koppitz, 1971) and brain injury (Koppitz, 1962; Hanvik, 1953; Bensburg, 1952; Hanvik & Anderson, 1950; Quast, 1961; Cooper, Dwarshuis, & Blechman, 1967; Lacks, Colbert, Harrow, & Levine, 1970; Pelc, 1971). For the purposes of the present study the concern was with performance on the Bender-Gestalt, which was used as an indicator of brain injury.

Clawson (1962) conducted a study with 10 brain injured children, ages 8 to 13 years, to select those psychological tests which would adequately differentiate between those of average intelligence with a central nervous system dysfunction and a control group. Clawson found that the Bender-Gestalt was a reliable instrument in differentiating between brain injury and non-brain injury.

In a study concerning children with neurological impairment,

Wewetzer (1959) employed the use of the Bender-Gestalt and other psychological tests. Although the Bender could be considered a discriminatory instrument between brain injury and non-brain injury, Wewetzer encouraged the evaluator to score the total Bender when diagnosing brain injury. His concern developed after scoring several performances and finding specific visual motor problems and several emotional indicators present on the protocol of both control and brain injured subjects. However there was a significantly higher difference in frequency of visual motor problems and emotional indicators between the groups.

Quast (1961) conducted a study including 100 children, 10 to 12 years of age, who were patients of the Division of Child Psychiatry, University of Minnesota Medical Center. Using the Peek-Quast scoring system, he found a significant difference between brain damaged and emotional subjects on ten characteristics (Quast, 1961).

Operating from the hypothesis that Bender scores of brain injured subjects correlated highly with a "five point scale of severity of psychoneurological deficit [p. 506]," Cooper et al. (1967) studied 46 brain injured subjects ranging in age from 21 to 73 years. After rating the subjects and scoring the Bender according to the Cooper-Barnes (1966) technique, Cooper et al. found a significant correlation between the severity score and Bender scores. This study indicates that the Bender was an adequate indicator of brain injury. Pelc (1971) suggested that perceptual deviations existed to a greater degree in the brain damaged.

In 1962, Koppitz conducted a study to evaluate the use of the Bender-Gestalt and the Koppitz scoring system as a discriminatory instrument between brain injured and non-brain injured subjects. One of the

most current scoring systems in publication, Koppitz's system has been shown to adequately detect brain injury in comparison to non-brain injury (Parsons, McLeroy, & Wright, 1971; Oliver & Kronenberger, 1971; McConnell, 1967). Using school children ages 5 to 10 years, Koppitz found a significant difference between the performance of brain injured and non-brain injured children on the Bender-Gestalt.

In an attempt to justify the validity of the Koppitz developmental score as a measure of brain injury, Parsons et al. (1971) conducted a study utilizing 30 volunteers, 5 to 18 years of age, who had been diagnosed brain injured. When the control and experimental groups were found to be significantly different, the researchers concluded that the Koppitz method of scoring was a valid measure of organicity in children.

Oliver and Kronenberger (1971) also studied the validity of Koppitz's Bender-Gestalt scores in relation to brain damaged, emotionally disturbed and normal subjects ages 11 to 15 years. The developmental scoring system and brain damage indicators significantly differentiated between groups. The Koppitz scoring method, therefore, seems to be a valid indicator of organicity and could "differentiate immaturity or malfunctioning visual motor perception among the brain damaged...within the 11 to 15 year range [p. 252]."

In a study of 120 patients ages 5.4 to 25.0 years, McConnell (1967) attempted to discriminate between dysfunction due to brain injury and that associated with emotional disturbance, using the Koppitz developmental scoring system. He not only found that the greater the extent of brain damage the higher the Koppitz developmental score, but stated that "the total developmental score appears to be the most sensitive and reliable index of brain damage [p. 374]."

Although results from studies indicate that a poor Bender record may infer the possibility of brain injury, Koppitz continually warned against definite diagnosis made on the basis of one Bender test score (Koppitz, 1971). She explained that several brain injured subjects may have appeared normal after learning to compensate for difficulties in visual motor perception. Therefore, a diagnosis from one Bender score would possibly be invalid. Also brain injury should not be totally ruled out as a result of a good Bender performance. According Bender's (1938) original focus on perceptual motor maturation and the fact that the Bender measures limited behavioral correlates associated with brain injury, Koppitz's suggestion is valid. Therefore when the Koppitz scoring method is used, the Bender may be seen as giving possible indications of brain injury but would not be sufficient for definite diagnosis without other diagnostic implications.

According to Pascal and Suttell (1951) damage to the brain could be detected from direct Bender performance. However, because subjects at a maturation level of nine years were able to reproduce the designs error free, the damage would have to be extremely severe in older subjects to be detected. Similar to Koppitz's (1971) reasoning, Pascal and Suttell concluded that some lesions may be present but undetectable by the Bender. However, they felt that when the Bender did suggest brain damage, the magnitude was extensive.

Burks Behavior Rating Scale for Organic Brain Dysfunction

Few studies have shown the value of behavior rating scales in relation to organic brain dysfunction. However, in a study attempting to justify the value of behavioral correlates in suggesting brain injury,

Burks (1960) found 56.9% of the hyperkinetic children in the study exhibiting abnormal EEG's. Using a group of children with abnormal EEG patterns, Clawson (1962) also found that behavior traits were reliably suggestive of brain injury. When attempting to gather the most effective method of measuring behavior associated with brain injury, Graham, Ernhart, Craft, and Berman (1963) found a significant difference between examiner ratings of a brain injured versus non-brain injured group. These results infer that behavior ratings are an effective screening device for the detection of brain injury.

Kaspar, Millichap, Backus, Child, and Schulman (1971) conducted a study concerned with the relationship of brain dysfunction to hyperactivity and distractibility. The research employed children ages five to eight years diagnosed as brain damaged and a matched control group. Kaspar et al. hypothesized that brain injured children would have a higher activity level than the normals, in a structured situation. He also hypothesized that the brain injured children would be more distractible than non-brain injured children. The results indicated a significant difference between the activity of the two groups in a structured situation. The results showed the brain injured child to have more difficulty in controlling or reducing his activity level in structured situations and "...that activity levels and distractibility are increased in Ss with clinical evidence of brain dysfunction [p. 334]." In the Pope (1970) study, the brain injured subjects were also found to be more active in structured situations and to possess shorter attention spans than did the control subjects.

Of the categories used by the Burks Behavior Rating Scale for

Organic Brain Dysfunction, Vegetative-Autonomic, Perceptual-Discriminative, and Social-Emotional, Burks (1968) proposed that brain pathology was more accurately measured in the Vegetative-Autonomic and Perceptual-Discriminative categories. He conducted a study to test the hypothesis. After analyzing 121 ratings of behavior problem children, he correlated items in each category. Although coefficients did not exceed .61, the Vegetative-Autonomic and Perceptual-Discriminative classifications did show more evidence of intercorrelation than was present in the Social-Emotional category, thus supporting his hypothesis.

The studies cited infer the validity of using behavior rating scales as screening devices for brain impairment. The Burks Behavior Rating Scale for Organic Brain Dysfunction (Burks, 1968) was one of few instruments developed "specifically to gain an estimate of that behavior which might spring in part or whole from organic pathology of the central nervous system [p. 1]."

Realizing the evidence which associated abnormal EEG's with brain impairment, Burks (1968) conducted studies relating results of the Burks Behavior Rating Scale for Organic Brain Dysfunction to EEG findings. The rating scale was able to significantly differentiate between the abnormal and control groups. The total scores for the behavior problem children were consistently higher than for the normal group. It was also found that as age increased the tracings of brain impairment decreased. This finding may be compared to Bender's (1938) maturational hypothesis.

Although the rating scale did not differ significantly between conduct groups, differences were found between hyperkinetic children with and without abnormal EEG's. Burks found that the behavior problem

child with brain impairment would be rated as showing more difficulty in the Perceptual-Discriminative classification. The behavior problem children with normal EEG's exhibited more total difficulties in the Vegetative-Autonomic category. This evidence suggested that those children with abnormal EEG's showed more learning disabilities while the normal EEG child exhibited more uncooperative behavior. However, Burks (1968) emphasized "that both groups showed evidence (as established in the literature) of suffering from organic brain dysfunction...[p. 21]."

Burks operated from the hypothesis proposed by Strauss and Lehtinen (1947): "there is a functional difference between the old brain (diencephalon) and the new brain (cortex). The old brain (in terms of evolution) is vitally concerned with emotions, gestures and expressive movements. All the developing processes of perception and thought in the new brain have in the old brain an undergirding of feeling and other powerful forces [Burks, 1968, p. 21]."

Burks contended that EEG tracings did not measure pathology lying deep within the brain, diencephalon. The abnormal EEG group, he suggested, had impairment mainly in the cortex, surface, where the tracings could be easily detected. In contrast the behavior problem child with normal EEG readings had impairment in the diencephalon, an area too difficult to measure on EEG tracings. Thus he supported the view that both groups possess brain impairment.

Having established his instrument with EEG tracings, Burks (1968) compared results of his rating scale to different psychometric tests. Among selected instruments, Burks chose the Draw-A-Man test as a measure of visual motor activity. From a group of 84 children scoring high on the rating scale, the following results were attained: the behavior

problem group showed significant difficulty in visual motor activities as compared to the normal control group and the younger behavior problem children, nine years and under, performed poorly on the visual motor test. These results, similar to the Bender-Gestalt, suggest that brain impairment hampers performance on visual motor activity and may possibly be related to maturational development.

Statement of Problem

Several past studies (Clawson, 1962; Wewetzer, 1959; Quast, 1961; Cooper et al., 1967; Koppitz, 1962; Parsons et al., 1971; McConnell, 1967) have suggested that the Bender-Gestalt, a measure of perceptual motor activities, adequately differentiates between the brain injured child and the non-brain injured child. Using a sample of brain injured children, Koppitz (1962) found her scoring system to discriminate between the brain injured subjects and a normal control group. Several investigators (Parsons et al., 1971; McConnell, 1967) have found the Bender a valid screening instrument for brain injury, when using the Koppitz scoring system.

The Burks Behavior Rating Scale for Organic Brain Dysfunction has also been shown to discriminate between the brain injured and non-brain injured subject (Burks, 1968). Burks found his scale to correlate with EEG tracings and with other tests of visual motor activity. As with the Bender-Gestalt, the higher the total score the greater the possibility of brain dysfunction.

However, few studies have attempted to explore (1) the relationship of the two tests in measuring correlates of brain dysfunction within the general population and (2) the relationship between the Burks, a global measure of organic behavior, and the Koppitz Bender-Gestalt, a relatively

narrow based measure of organic behavior disturbances. Therefore it was the purpose of the present study to determine whether a significant relationship exists between the two measures obtained on the Koppitz Bender-Gestalt and the Burks Behavior Rating Scale for Organic Brain Dysfunction, using a normal population. A significant relationship between the instruments would indicate that the same general construct was being measured.

Chapter 3

Method

A minimum of literature has been published investigating the relationship between psychometric instruments purporting to measure organic brain dysfunction. Among those quantitative measures are the Koppitz Bender-Gestalt and the Burks Behavior Rating Scale for Organic Brain Dysfunction. Both tests propose to screen for brain injury especially in children. The purpose of the present study was to determine whether a significant relationship existed between the Koppitz Bender-Gestalt and the Burks Behavior Rating Scale for Organic Brain Dysfunction within a normal population.

Subjects

The population was composed of 60 randomly selected first, second, and third graders from a lower middle class elementary school in Western Central Kentucky. The sample consisted of ten students randomly selected from each of two classrooms per grade level. Forty-five percent of the sample were male, 55% were female.

Apparatus

The Visual Motor Gestalt Test (Bender, 1938) consists of nine figures drawn on separate 4" x 6" cards. It was an individually administered test measuring perceptual motor abilities and purporting to be a measure of brain dysfunction.

The Burks Behavior Rating Scale for Organic Brain Dysfunction consists of 28 statements of behavior divided into three categories:

Vegetative-Autonomic, Perceptual-Discriminative, and the Social-Emotional categories. The scale was designed to be used as a rating scale completed by teachers. The instrument includes five levels of rating from "You have not noticed the behavior at all" to"You have noticed the behavior to a large degree [Burks, 1968, p. 4]." The Burks scale measured organicity through ratings received on the behavioral correlates.

Procedure

In administering the Visual Motor Gestalt Test (Bender, 1938), each subject was removed individually from the distraction of the classroom. They were given an 8 1/2" x 11" sheet of paper and a no. 2 lead pencil and were asked to put their name at the top of the paper. They were then given the following instructions: "I have several cards here with designs on them. Now, what I want you to do is look at the designs and then draw them on your paper just the way you see them." At this point the cards were presented one by one and the subject attempted to reproduce each design on his paper. When the subject had completed his task, he was returned to the classroom.

The Bender was scored using the Koppitz (1971) method of scoring. The Koppitz method yielded quantitative results totaling 0 to 30 errors, receiving one point for each error. Each error was purported to be indicative of possible brain dysfunction depending on the magnitude of errors in relationship to each child's age or maturation. As the number of errors increased, the possibility of perceptual motor difficulties or brain dysfunction increased. Each child's protocol was scored and evaluated by the investigator, a psychologist-in-training.

A Burks Behavior Rating Scale for Organic Brain Dysfunction was given to each classroom teacher involved in the study. They were asked

to complete one rating scale for each student in their classroom who participated in the testing. The Burks consisted of 28 statements to be rated by the teacher. When the scales were completed, they were returned to the investigator.

Each rating scale yielded three subtotals and a total score. Each subtotal could result in scores from 9 to 50 depending on the rating given on each of 9-10 items in each category. The total score calculated could yield 28 to 140 points. The scores indicated severity of organic brain dysfunction; as the totals increased, the possibility of brain injury increased. Each scale was scored for the four quantitative scores.

Data Analysis

The data were analyzed by assigning a rank to each subject's performance. The Spearman Rho Correlation was calculated for (1) the total Burks score and the total Koppitz Bender-Gestalt score, (2) the total of the subcategory Vegetative-Autonomic and the total Koppitz Bender-Gestalt score, (3) the total of the subcategory Perceptual-Discriminative and the total Koppitz Bender-Gestalt score, and (4) the total of the subcategory Social-Emotional and the total Koppitz Bender-Gestalt score. A correction for tied ranks was employed in each case utilizing the procedure suggested by Siegel (1956). To test the significance of the correlations, a Student's t was calculated for each category.

If the correlations were found significant ($p<.05$), the null hypotheses would be rejected. The following null hypotheses were investigated: (1) The scores obtained on the total Bender Gestalt using the Koppitz scoring method and the total Burks score are unrelated in the population, (2) The scores obtained on the total Koppitz Bender-

Gestalt and the Burks Vegetative-Autonomic category are unrelated in the population, (3) The scores obtained on the total Koppitz Bender-Gestalt and the Burks Perceptual-Discriminative category are not related in the population, (4) The scores obtained on the total Koppitz Bender-Gestalt and the Burks Social-Emotional category have no significant relationship in the population.

Chapter 4

Results

After analyzing each subject's protocols, ranks were assigned and Spearman Rho Correlation Coefficients (r_s) were computed between the four Burks categories and the Koppitz Bender-Gestalt variable. The total Burks score and the Koppitz Bender-Gestalt yielded a significant r_s of .215 ($p<.05$). The null hypothesis was rejected.

The Burks Vegetative-Autonomic category and the Koppitz Bender-Gestalt yielded a significant r_s of .215 ($p<.05$). The null hypothesis was rejected. An r_s of .222 was obtained between the Perceptual-Discriminative category and the Koppitz Bender-Gestalt. The correlation was significant ($p<.05$) and the null hypothesis was rejected. The Spearman Rho calculated between the Burks Social-Emotional category and the Koppitz Bender-Gestalt was not significant ($r_s=-.013$). The null hypothesis was accepted.

Chapter 5

Discussion

The results seem to indicate that scores on the three categories on the Burks scale correlate significantly ($p<.05$) with the total scores obtained on the Koppitz Bender-Gestalt. The significant correlation between the Vegetative-Autonomic and Koppitz Bender-Gestalt scores is indicative of a positive relationship. Burks (1968) explained that this scale measured the subject's inability to attend to one stimulus and an extreme preoccupation with extraneous stimuli. He also reported this category to more accurately measure organic brain dysfunction than the Social-Emotional category. Thus, the present study found the correlation to be significantly related to the Koppitz Bender-Gestalt, also a measure of brain pathology.

The Perceptual-Discriminative category, a measure of visual motor abilities, also significantly correlated with the Koppitz Bender-Gestalt. Along with the Vegetative-Autonomic category, the Perceptual-Discriminative scale more accurately measured organic brain dysfunction, according to Burks (1968).

The Social-Emotional scale assessed the child's expression of emotional tension. Burks (1968) claimed that this category was mostly influenced by learned responses to the environment. If this were true, Burks felt that the Vegetative-Autonomic and Perceptual-Discriminative categories would be more heavily weighted than the Social-Emotional scale. The logic assumed that the expression of the child was less

hampered by organic factors. The present study found a nonsignificant negative correlation between the Social-Emotional and Koppitz Bender-Gestalt scores. The results were in accord with Burks findings. The total score on both scales also correlated significantly.

Even though the results of the present study appear quite significant, the coefficient of determination associated with the correlations between the Koppitz Bender-Gestalt and the Vegetative-Autonomic, Perceptual-Discriminative, and total Burks score equals only .04. Four percent of the variance between the two instruments was common variance. It can only be concluded that when using the instruments in a normal population, great precaution must be taken. Although the results show the two instuments to be significantly correlated and as measuring similar concepts, this relationship has not been established to be meaningful in practice.

In a school setting the Koppitz Bender-Gestalt is frequently utilized to assess perceptual motor difficulties. Because of its ease of administration and scoring, it is widely used. The Burks is commonly used as a behavioral indication of difficulties. If after using the Koppitz Bender-Gestalt and the Burks scale, without neurological evidence, the school psychologist suggested brain injury, this could lead to an incorrect diagnosis.

The Bender, however, may suggest some specific difficulties such as reading difficulties and other perceptual motor problems. The Burks may suggest such abnormalities as behavioral difficulties, reading, spelling, and writing problems, and emotional instability. Both instruments make suggestions concerning the source of specific disabilities. The instruments are not to be discredited for their separate indications of difficulties. However without further research, they can not be

assumed to measure the same construct and must be substantiated by neurological evidence to diagnose organic brain dysfunction.

Most literature that has dealt with the Burks instrument and the Bender as indicators of brain injury have used a sample of prescribed brain injured subjects. Clawson (1962) employed a brain injured sample to find the Bender-Gestalt a reliable discriminatory instrument between brain injury and non-brain injury. Wewetzer (1959), Quast (1961), Cooper, Dwarshuis, and Blechman (1967), and Koppitz (1962) used populations of brain injured subjects and found the Bender-Gestalt to be an adequate screening device for the recognition of brain injury.

The Burks rating scale was used in several studies (Burks, 1968) in an attempt to justify its usage by comparing it to EEG findings. All subjects previously exhibited abnormal behavior, such as hyperactivity, overt aggression, and other behavioral abnormalities. Burks' results showed the behavior rating scale to adequately differentiate between the brain injured and non-brain injured groups. Few studies however, investigated the use of either the Burks or Bender in a normal population for the purpose of screening for brain injury.

Implications for further research would include (1) a study exploring extreme groups and their functioning on each instrument, as well as a comparison with EEG tracings and (2) an investigation of the number of behavior correlates measured by an instrument, necessary for the indication of brain injury.

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