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THE CANTER BACKGROUND INTERFERENCE PROCEDURE AS AN IDENTIFIER OF VISUAL PERCEPTUAL DYSFUNCTION IN CHILDREN

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THE CANTER BACKGROUND INTERFERENCE PROCEDURE AS AN IDENTIFIER OF VISUAL PERCEPTUAL DYSFUNCTION IN CHILDREN

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ABSTRACT

THE CANTER BACKGROUND INTERFERENCE PROCEDURE AS AN IDENTIFIER OF VISUAL PERCEPTUAL DYSFUNCTION IN CHILDREN

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The present study was designed to compare three methods of diagnosing visual-perceptual learning disabilities: (1) the original Canter Background Interference Procedure, (2) the standard Koppitz System, and (3) the Koppitz System of scoring applied to the background interference condition. The purpose of the study was to apply a scoring system to the interference condition which took into account age-level developmental factors found in children. This was accomplished by combining the Canter BIP interference sheet with the Koppitz scoring system to determine if it was a more efficacious method of identifying children with learning disabilities than the BIP or the Koppitz System independently.

A total of 67 children were tested. The control group consisted of 36 children who were considered normal, characterized by the fact that they were functioning in a regular classroom setting and were not receiving remedial or tutorial help of any nature. The experimental group consisted of 31 children who were identified and classified by educational diagnosticians or psychologists as children who had visual perceptual learning disabilities and were receiving remedial help. Each child was tested using the scoring method of the Canter BIP and the Koppitz System on both the standard administration of the Bender on a blank sheet of paper, and on the interference sheet.

The results of the research revealed that there was a statistically significant difference where the experimental groups, i.e., children with visual-perceptual handicaps made more errors on both procedures than the control, or normal group made. Children with visual perceptual problems tended to make more mistakes under the interference conditions than they did under the standard conditions, but this was not evident for children with normal visual perception.

There were highly significant correlations between the BIP scoring method and the Koppitz scoring method for both groups. The Canter Background Interference Procedure sheet with the Koppitz scoring system applied was an effective and more powerful method for identifying children with visual perceptual learning disabilities. The method was more efficacious in identifying those children with visual perceptual difficulties than the method under standard conditions using the blank sheet of paper. Consequently, further work utilizing this approach to the study of identification seems warranted.

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CHAPTER I

INTRODUCTION

With the recent litigation and legislation concerning the educational needs of handicapped children and the change in Public Law 84-142, Education of Handicapped Children, Implementation of Part B of the Education of the Handicapped Act of 1977 (Federal Register, 1977), there exists a need for increased accuracy in the use of diagnostic educational tests, which are used in the assessment of children's learning problems. The new public law requires the establishment and implementation of individual educational plans that require all children to have measurable objectives for their school program. The diagnostic instruments employed must be readily adaptable for use in the development and implementation of individual educational plans. Comprehensive psychological and educational assessment is now required by law in order to designate the different handicapping conditions of children.

A frequently used instrument in diagnosis and assessment of educationally handicapped children is the Bender Motor Gestalt Test. In Bender's study (1938), the designs were presented to and reproduced by children, adults, mentally defective, and emotionally disturbed patients. The gestalt function upon which the Bender Test was based is as follows:

> The gestalt function may be defined as that function of the integrated organism whereby it responds to a given constellation of stimuli as a whole: the response itself being a constellation, or pattern, or gestalt. All integrative processes not by summation or subtraction or associations, or patterns, or gestalten. Integration occurs not by summation or subtraction or association but by increasing or decreasing the internal complexity of the pattern in its setting. It appears that an integrated organism never responds in any other way. The whole setting of the stimulus and the whole integrative state of the organism determine the pattern of the response (1938, p. 3-4).

In Bender's discussion of the principle of Gestalt, a person's gestalt depends on two things, "the biologic characteristics of the sensory fields at the different maturation levels and the integrative integrity of the functioning nervous system" (p. 59) and "that the area most probably involved in disturbances of the visual-motor gestalt function, as exemplified by these copied test forms, is that between the temporal, parietal and occipital lobes of the dominate hemisphere" (p. 75). Pascal and Suttell (1951) supported this notion in that they pointed out that if the intellectual quotient was within average limits, and if the records were indications of primitivation, it may be suspected that there was damage to the cortex.

Koppitz' (1975) review of the research of the data published on learning disabled children, showed that their visual-motor integration matured at a rate slower than normal, and it was dependent upon the child's age and mental ability. Even learning disabled children with above average intelligence developed slower than the normal functioning child in their perceptual motor integration. Koppitz stated that a single Bender Test reflected only the child's current level of functioning, but with its repeated administration it reflected a learning disabled child's maturation rate of visual-motor perception.

Canter (1963) showed dissatisfaction with the lack of work done on differentiating organicity on the Bender Test from other dysfunctions and proceeded to establish a method of his own by introducing the Canter Background Interference Procedure (BIP) for the Bender Gestalt Test. Canter used several studies in which he asked the subjects to complete different graphomotor tests. They were administered an interpolated task and given a paper with an interference background of curvy intersecting lines, randomly placed, resembling a jigsaw puzzle. This method allowed him to contrast the subject's performance on the BIP with his performance under standard conditions. Canter used organic patients, non-organic patients, neurotic and personality disorder patients. He found that the background interference sheet had stressful properties

for some patients, while having "alerting properties" for others. This ability to differentiate gave the BIP some promise for diagnostic value.

Bender (1938) researched a wide range of dysfunctions which included mental retardates, sensory aphasia, various organic brain diseases, schizophrenia, mania depressive psychoses, malingering, Ganzer Syndrome, and psychoneuroses. She found each group to exhibit some form of gestalt disturbances.

Statement of the Problem

The intent of this investigation is to determine the potential of the Canter Background Interference Procedure, using the Koppitz-Bender Developmental Scoring System, as a diagnostic psychological device with children who would fall under the category of learning disabled with visual-perceptual or visual-motor learning problems. Because of the need to differentiate those children who are suffering from visual-perceptual problems, this study is designed to determine, also, if the procedure will enhance the diagnostician's effectiveness in identification of visual-perceptual problems. In addition, the scoring method of the Canter Background Interference Procedure was standardized on adults and adolescents age 15 years and over (Canter, 1976). In reviewing the research conducted with children, Canter found that the Difference score was established by 12 years of age and that the

Canter Background Interference Procedure (hereafter referred to as the BIP) was sensitive to identifying children with cerebral dysfunction as reflected by the greater deterioration of the organic brain damaged group on the Bender under BIP conditions, as compared to the performance of nonbrain damaged group on the Bender under BIP conditions. However, he cautioned the use of the BIP with young children, due to the maturation processes found in their performance. There seems to be a need to account for the maturational differences in the scoring method of the BIP in order to make it a more efficacious instrument for use with young children.

The Canter Background Interference Procedure does not provide for a scoring system which takes into account age level developmental factors found in children. The problem of the study is to combine the Canter BIP interference sheet with the Koppitz System to explore the tenability of this combination as a more efficacious method of identifying children with learning disabilities than by using the BIP or the Koppitz System, independently. The objective is to determine which approach would be more sensitive and efficient for identifying children with visual perceptual learning disabilities. The study was designed to compare three methods of diagnosing visual-perceptual learning disabilities: (1) the original Canter Background Interference Procedure (2) the standard Koppitz System, and (3) the Koppitz System of scoring applied to the background interference response.

CHAPTER II

REVIEW OF LITERATURE

Canter Background Interference Procedure

Canter (1966) in his study of the efficiency of the BIP in diagnosing brain damaged psychiatric patients measured the visuomotor impairment of 30 brain-damaged psychiatric patients; 22 psychotic nonorganic patients; and 34 nonpsychotic, nonorganic psychiatric patients. He compared the performance decrements of the three groups on the test by using the standard paper and the BIP sheet. He scored the performances on both procedures by the Pascal-Suttell (1951) method and found that the BIP resulted in a significant performance decrement for the organic psychiatric patients, but not for the non-organic psychiatric patients. The results on the standard Bender Test procedure failed to reveal any differences in performance between the two groups of psychiatric patients, but with the BIP the results revealed a significant difference between the two groups. He again used the BIP in screening a new group of 65 psychiatric patients for brain-damage and the results of his finding implied that the BIP was a highly sensitive measurement for evaluating the effects of brain damage.

Bae (1967) found that the Bender Test with the BIP was sensitive in distinguishing the organic mental retardates from nonorganic mental retardates. Three groups were used in the study: organic mental retardates; nonorganic, cultural-familial mental retardates; and emotionally-disturbed, non-organic, mental retardates. The organic-mental retardates obtained a Deviation score that was significantly higher than the other two groups, with the other two groups showing no significant difference between the standard procedure and the BIP. The deviation on the BIP resulted only on the organic disorder, and not on emotional disturbance.

Canter (1968) modified the Pascal-Suttell scoring system for use with the BIP. The results indicated the modified system to be a sensitive indicator for organic brain disorder when two samples of psychiatric subjects were examined with 36 to 38 percent consisting of organic brain disorders. There was a high degree of correspondence between the independent medical-neurological criteria and the modified scoring system. This finding was consistent with two independent scorers on two samples of psychiatric subjects. The modified method was more limiting in its subjectivity, which made it a better and more suitable research instrument for administering and scoring by technicians lacking in clinical training.

Song and Song (1969) did a study of the effectiveness of the BIP in identifying the organic mentally retarded patients. Their study consisted of three groups: organic

mentally retarded patients; emotionally disturbed patients; non-organic mentally retarded patients. The low test performance under BIP resulted from the organic disorder and not from emotional disturbance. This again supported the efficiency of the BIP in discriminating the organic patients.

Canter and Straumanis (1969) studied the effects of the BIP in identifying organicity in senile elderly persons. They found that the healthy elderly persons performed normally on the BIP. There was a decrement in the performance on the BIP of the senile group, who had been diagnosed as having a chronic brain syndrome associated with arteriosclerosis. The authors also found that the BIP would "provide a correction for the mild to moderate decline in visuomotor ability for the normal aged persons without misidentifying such individuals as having an organic brain disorder" (p. 697).

Previous studies (Adams, 1966, 1968: Yulis, 1968) found that BIP D-scores were statistically independent of I.Q. Song (1969) found that intelligence was not significant to I.Q. at the .05 level in his study with mentally retarded patients. In the same study, he also found a non-significant correlation coefficient using 272 school children. Yulis (1969), in his study of the BIP in relation to intelligence, administered the BIP and the Shipley Institute of Living Scale to 50 subjects. The findings reflected the Bender error scores as showing a significant correlation with I.Q., where

the BIP, Difference scores were statistically independent from I.Q.

Yulis (1970), being interested in the motivational interpretation of the BIP, studied the effects of drive on performance of subjects on the BIP. He demonstrated a linear relationship between the increased drive level and the decrement in performance on organic subjects. On normal subjects, the Difference score on the BIP fit the U-shaped distribution as a function of drive. The consistency between the BIP effect and drive effect resulted as expected.

Canter (1971) was interested in the performance of long term continuous hospitalized schizophrenic patients. He wanted to explore the severity of their chronic illness as reflected by residual deficits on psychological testing. He compared the performance of the relatively short and long term hospitalized schizophrenics on the BIP with the nonschizophrenic and organic patients. The organic group showed a strong BIP effect while there was no significant decremental BIP effect on the chronically ill hospitalized schizophrenics, both long term and short term. However, 30 to 50 per cent of the schizophrenics performance improved under BIP conditions. This finding suggested mild arousal properties on the BIP on non-organic patients. This was also implicated by Yulis (1970).

Adams (1971), in having made an earlier "attempt to determine what aspects of the Canter-BIP task account for the diagnostic differences" (p. 1260) was interested in pursuing

further; what alerting properties were present in the BIP which made it sensitive to brain damage (p. 1260). He accomplished this by running a comparison of two forms of the Canter-BIP. The task-central (standard BIP) form in comparison to the task-peripheral forms which had background lines running peripheral to the drawing area. His results supported those of earlier studies (Canter, 1963, 1966, 1968, 1971; Song, 1969; Yulis, 1970) which revealed that brain damaged patients performance on the BIP form deteriorated significantly more than the performance of nonbrain damaged patients. He also found this to be true on the task-peripheral form of this study. Adams suggested that it may not mean that the brain damaged patients drawing over the curved lines was what made it essential in determining brain damage. In addition, the study found that peripheral lines also caused a distraction for brain-damaged patients. Adams cited Strauss and Lehtinen's (1947) earlier reports where brain damaged patients seemed to be distracted by "peripheral-extraneous stimuli" as well as the centrally located stimuli.

Horine and Fulkerson (1973) studied the effects of attentional distraction among nonparanoid and paranoid schizophrenics. In their findings, the paranoids performed equally well under both conditions while nonparanoids performed significantly poorer on the BIP performance. In this research, the process for nonparanoid schizophrenics performance resembled the brain damaged patients.

Pardue (1975) demonstrated the effectiveness of the BIP in the discrimination of organic brain damage. She applied the interference sheet to both the Hain's scoring system and the Pascal-Suttell scoring system for the Bender Test. Significant results were found with the interference procedure applied to both scoring systems in identifying brain damage, where they failed to yield significance on the standard administration on a blank sheet of paper.

Holland and Wadsworth (1975) applied the BIP to the Minnesota Percepto-Diagnostic Test in a study of 20 brain-damaged and 20 processed schizophrenic patients. The Minnesota Percepto-Diagnostic Test under the BIP discriminated between the two groups independently of I.Q. The Minnesota Percepto-Diagnostic Test under standard administration did not accomplish this task, neither did the difference between the Minnesota Percepto-Diagnostic and the Minnesota Percepto-Diagnostic with the BIP.

Sisking (1976) administered a combination of selected designs under the BIP interference sheet to 31 adult inpatients in order to determine whether there was a discriminating difference between the standard procedure of administering the tests and the BIP interference sheet. They found that 48 percent of the protocols discriminated between the first and second reproductions.

Adams (1968), in seeing a need for correct and accurate diagnosis of organicity in children, applied the BIP to

unselected elementary school children. He wanted to determine if children could complete the BIP tasks, and he found that they were able to do so adequately. His findings also revealed a slight maturational trend but a lack of relationship to test-intelligence. He then studied the diagnostic efficacy of the BIP with children. The findings revealed that the BIP does accurately predict the diagnostic groups, but when compared with the population base rates, the accuracy of the diagnosis was only slightly improved on the basis of the test. This study also compared the child's performance results on the BIP to that of a paper with a blank drawing area surrounded by a border of lines. There was an interval of several days between the administration of the two tests. Results revealed no carry-over effect. The Bender Test error score differentiated between the two groups of brain damaged and nonbrain damaged on both procedures, where the Difference score and the Number Positive score differed significantly between the two test forms. The findings did reveal that there was no significant correlations between the BIP Difference score and the Chronological Age, Mental Age, and IQ in either of the diagnostic groups used or on either test form used.

Adams and Canter (1969) investigated the performance characteristics of normal school children on the BIP Bender. Two hundred and seventy-two, 6 to 14 year-old subjects from rural and small city schools were administered the Weschler Intelligence Scale for Children Coding subscale and the BIP.

Test scores changed with age and revealed that by age 13, performance on the BIP was established. Bender Error scores revealed significant differences between intelligence levels. However, the BIP Difference score was unaffected by intelligence difference. These results revealed that need of a modified scoring procedure for younger children which would in turn make the BIP more useful for evaluation of younger children.

Adams (1970) investigated the performance of brain damaged mentally retarded children and non-brain damaged mentally retarded children on the Canter-BIP. He also investigated the aspects of the Canter-BIP task which would account for the diagnostic differences of the brain-damaged. He used the usual BIP form which is of intersecting distracting lines central to the task, and a form that used distraction lines peripheral to the drawing area. The mentally retarded groups had been identified as organic or non-organic on the basis of neurological examinations. Both groups had 30 mentally retarded subjects. There were 18 subjects with overt brain damage. The chronological ages ranged from 6 years, 8 months to 16 years, 6 months, with a mean of 10 years, 4 months. The only significant difference resulting between the two groups was on the Bender Error score. There was no significant difference between the two groups on the Difference score nor the Number Positive. This meant that the usual Bender did reliably differentiate between the brain-damaged and nonbrain-damaged mentally retarded groups, while their performance on

the Bender under the BIP technique did not reliably differentiate the groups. There was a 63.3 percent accuracy of the BIP, which was significant. However, there was a loss of 6.7 percent accuracy when compared to the 70 percent accuracy achieved by the Bender Test alone. Adams suggested that the children's age range and ability test "was below the optimal for adequately evaluating the major hypothesis" (p. 62).

Hayden, Talmadge, Hall and Schiff (1970) conducted research with emotionally disturbed children with two purposes in mind: (1) to determine if the BIP was as sensitive to identifying brain damage in children as in adults and (2) to determine if the BIP was a more sensitive device than the standard Bender using the developmental scoring procedure of Koppitz (1963) in differentiating the organic from the non-organic emotionally disturbed children. The neurologically impaired emotionally disturbed group consisted of 17 children, ranging in ages from 8 years, 4 months to 12 years, 4 months, with a mean age of 10 years, 7 months. There were 31 children in the non-impaired emotionally disturbed group ranging from 7 years, 8 months to 13 years, 2 months with a mean age of 10 years, 7 months. Both groups of children fell within the normal range of intelligence as measured by the Wechsler Intelligence Scale for Children. They found that the Bender as scored by the Koppitz scoring system was inefficient in significantly differentiating children with severe emotional

problems from those with neurological impairment. The BIP, when compared to the Bender Test using the Koppitz scoring system, was more sensitive to both neurological status and chronological age differences. The results indicated that the BIP procedure was a more sensitive method in diagnosing minimal brain damage in emotionally disturbed children.

Kenny (1971) administered the BIP to three groups of children that consisted of one brain-damaged group, a normal control group, and an emotionally disturbed group. There were 70 subjects each in the first two groups with 40 in the last group. The children were stratified at the 8,9,10,11 and 12 year-olds levels. BIP scores for the brain damaged group yielded significantly higher scores. BIP Difference scores yielded no significant differences between the scores of the emotionally disturbed children and the normal children, while the scores of the brain-damaged group yielded significantly higher scores at the .01 level. Results of his study also showed that the emotionally disturbed children's performance on the BIP improved over their previous reproduction on standard paper. All of the brain-damaged children had a higher test score on the BIP than on the standard procedure.

Sabatino and Ysseldyke (1972), in their concern over the relationship between a child's ability to learn to read and his performance on measures of visual perception, studied the effects of extraneous background interference stimulus on the perceptual performance of non-readers and readers. Their

subjects ranged in age 6 through 12 years with 143 nonreading learning disabled children and 199 reading learning disabled children, all scoring at 90 or above on the Wechsler Intelligence Scale for Children. The children were presented the standard Bender figures, first to reproduce by memory, then by the standard copy method. They were then administered the Bender figures on cards with extraneous background of alternating lines and rolls of dots crossing at an angle on the cards, with the Bender figures embedded in the center of the card. Then, they were presented the Bender figures with the background with a photographic negative of the standard Bender cards, which reversed the design giving a white stimulus on a black background. Tests were scored according to Koppitz (1963) scoring system. Results revealed there was no significant difference between the performance of the readers and the non-readers on the standard Bender copy, nor their Bender memory performance. However, in both extraneous background stimulus presentations, a significant different at the .05 level between groups was observed, with a significant decrease in the performance of the non-reader. These results indicated that the standard Bender procedure did not discriminate between the groups of non-reader learning disabled children and the learning disabled readers. However, by adding an interfering extraneous background stimulus to the designs, it discriminated between the groups of readers and non-readers. In using already established Bender designs and adding an interfering extraneous

background to the card added greater impetus to the efficacy of the Bender designs in their accuracy of prediction of a non-reader child.

Adams and Lieb (1973) compared the performance of negro and caucasian Headstart children on the Draw-A-Man Test, Draw-A-Woman Test, Bender Motor Gestalt Test and the Canter Background Interference Procedure for the Bender Gastalt Test. The children consisted of 39 negro males with a mean age of 69.1 months, 35 negro females with a mean age of 68.2 months, 35 caucasian males with a mean age of 68.9 months and 22 caucasian females with a mean age of 67.6 months. Results revealed a lack of ethnic group differences at the .01 level of significance, thereby, reflecting that the capacity to perform a graphomotor task in the context of irrelevant stimuli did not differ as a function of ethnic group. Performance scores resulted in freedom of sex, intelligence levels, emotional status and maturational effects.

Adams, Kenney and Carter (1973) studied the efficacy of the Canter BIP in identifying children with cerebral dysfunction. They compared three groups of children ranging from 8 to 12 years of age. There were 66 children with cerebral dysfunction, 39 with emotional disturbance and a control group of 63 normal children. The cerebral dysfunction children performed more poorly than the other two groups on the standard Bender. Their scores on the BIP not only deteriorated more than the other two groups on the standard Bender,

but their scores on the BIP deteriorated more than the other two groups, also. The performance of the control group and the emotionally disturbed group did not deteriorate on the BIP. Results suggested that the BIP was a sensitive instrument in identifying cerebral dysfunction in children.

Adams, Hayden and Canter (1974) compared the Canter BIP performance of 40 hyperkinetic children with 38 normal children in the control group. The hyperkinetic group were classified by ratings of their teachers as hyperactive, distractible, impulsive, unpredictable, and explosive on a six-point scale ranging from 'very frequent' to 'very rare or never'. The teachers were also to take into account the children's behavior in relation to his chronological age. The two groups differed on the Bender-Gestalt Error score, which indicated a reliable relationship between IQ and the Error score, but after partialling out the IQ score, the two groups did not differ on the Bender Test Error score. The regression effect for the Canter BIP Difference score and the Number Positive was not significant, which indicated no reliable relationship between IQ on either of these two variables. There was a difference between the two groups on the Difference score with the kinetic group scoring higher, thus, reflecting their deterioration of performance on the interference background. The Number Positive did not differ for the two groups. The analysis indicated that only the Difference score showed a small reliable relationship between

the Canter BIP effect and hyperkinesis of 68% at the .01 level of significance. The researchers cautioned against the use of the BIP in identifying children since the two groups were "more similar than different in their performance on the Canter-BIP" (p. 114).

Adams, Kenny, Peterson and Canter (1975), in an effort to make the Canter-BIP more accurate in the diagnosis and differentiating of children, revised the scoring system of the Canter BIP to take into account the age effects of children. They compared two groups of children, ranging in age from 8 to 12 years with IQ's of at least 80. The cerebral dysfunction group consisted of 66 children. The noncerebral children consisted of 39 emotionally disturbed and 63 normal control subjects. Errors were scored on the BIP only if there was deterioration on that specific design on the BIP procedure as compared to the standard procedure. The items retained were the ones in which at least twice the number of cerebral dysfunction subjects made the error as compared with half the number of noncerebral dysfunction. Weights were then assigned according to the frequency of the error made by the cerebral dysfunction group over the non-cerebral dysfunction group. Out of 83 items on both procedures, 29 on the standard Bender Test and 42 on the BIP condition reached the criteria. The best discrimination of the groups was the sum of the weighted errors on these items. An over all hit rate of 86% resulted, which was only 2% over a previous hit rate of 84% as previously

found by Adams, Kenny and Canter (1973). However, when the data were analyzed separately by age groups, it was found that the newly selected items yielded a 92% hit rate for 8 to 10 year olds, but only 76% for 11 to 12 year olds. When the latter group was reassessed using Canter's original scoring for adults, the overall hit rate was 94%. Therefore, the new criteria seemed more appropriate for children 8 to 10 years of age, with the standard criteria for adults being more appropriate for 11 and 12 year olds. The results of the finding did improve the Canter BIP's ability to discriminate between noncerebral dysfunction and cerebral dysfunction children when use was made of an item analysis in regard to age differences across the 5 year range and across the diagnostic group.

Koppitz Developmental Bender Scoring System

Koppitz (1975) reported the Bender Test as a valuable aid in diagnosing minimal brain dysfunction in elementary school children as long as it was used as a part of a battery in combination with other tests and background information. She warned against making a diagnosis of minimal brain dysfunction strictly on the basis of a single Bender Test record. A child whose difficulty was in integrating perceptual-motor performance could be identified by his developmental lag on the Bender developmental score, but the etiology of the minimal brain dysfunction could not be determined. Koppitz went on to state that the child with "a

marked discrepancy between IQ and Bender Test scores usually has specific learning difficulties" (Koppitz, 1975, p. 70).

Brenner and Gillman (1968) found the Bender, as scored by the Koppitz system, made a distinctive discrimination between children who had visuo-motor disorders with educational problems, and a matched group of normal subjects. They also found that failure on the Bender Test was associated with underachievement at school.

Patel and Bharucha (1972), in their study of the identifying visuo-motor defects in cerebral palsied children, found that the errors steadily decreased with increasing age in both the cerebral-palsied group and the normal group of children. The cerebral palsied group had a higher number of errors, and their number of errors decreased at a slower rate.

Snyder and Snyder (1974) studied the maturational changes in visual-motor perception of 541 children grades 2 through 5, representing each age level from 7 to 11 years of age. They made an item analysis on the Koppitz Bender scoring error items and found that many problems in visual perceptual tests for 6 year olds had been alleviated considerably by age 7. In their study, they identified error items which tended to discriminate over age and those items which did not discriminate beyond certain ages. Sexual comparison was non-significant.

Koppitz (1975) cited numerous studies in her ten year review of the research that had been conducted on the normative data of the Koppitz procedure age level. The collected information revealed that gifted children tended to perform above the norms, while children from deprived areas functioned below the average level, as well as those children with limited ability or specific learning problems. Based on this information then, it was important that norms be established for that particular setting or to have appropriate norms for that particular segment of the population. In this instance, the child's performance could be more immature than what was considered the norm for his age level, but it could be appropriate for his age level in that particular social group. This would not be considered a serious problem in the visual-motor area.

The findings of the normative data by grade levels revealed that the magnitude and range of the Bender Test scores decreased significantly between the kindergarten and second grade. The mean scores decreased significantly between the kindergarten and second grade. The range of mean scores diminished gradually, and stabilized at the fourth grade. In her collected data for the past ten years, Bender's works reflected that each grade level had a range of mean Bender Test scores reflective of the children's ages and socioeconomic and cultural background. This was consistent with Koppitz findings in regard to the earlier stated grade levels.

CHAPTER III

METHOD

Sample

The pool of children for the present investigation were six through ten years of age. From this pool, 31 children were identified by their teachers and classified by educational diagnosticians or psychologists as those with visual perceptual learning disabilities and who were receiving remedial help were selected to serve as the experimental group in this study. A stratified random selection procedure was used to select 36 children from the same pool who were functioning in a regular classroom setting and who were not receiving remedial or tutorial help to serve as the control group. Within each group the children between the ages of six and one-half through ten and one-half years represented grades one through five. The experimental group selected was comprised of 23 males and 8 females where the control group selected was comprised of 19 males and 17 females. Distributions of subjects in the samples for each group are shown in Tables 1 and 2 by chronological age, sex, grades and race, respectively.

TABLE 1

Composite Description of Visual-Perceptual-Motor Disabled Subjects by Diagnostic Groups, Chronological Age, Sex, Grade, Race

Chronological Age									
6	6½	7	7½	8	8½	9	9½	10	10½
0	2	3	1	6	8	3	3	3	2

Sex	
Males	Females
23	8

Grade				
1st	2nd	3rd	4th	5th
10	6	11	4	0

Race		
Black	White	Mexican American
5	6	20

TABLE 2

Composite Description of Normal Subjects by Diagnostic Groups, Chronological Age, Sex, Grade, Race

Chronological Age									
6	6½	7	7½	8	8½	9	9½	10	10½
0	2	5	5	2	5	11	1	3	2

Sex	
Males	Females
19	17

Grade				
1st	2nd	3rd	4th	5th
10	5	16	3	2

Race		
Black	White	Mexican American
1	9	26

Instrumentation

The Bender Visual Motor Gestalt Test is a test commonly used with children in the diagnosis of visual-perceptual dysfunction. The test consists of nine geometric designs, which are comprised of dots, lines, angles, and curves that are combined in various relationships. The individual sees, reorganizes, and reproduces the designs as he perceives them. It is used widely by clinical psychologists in a battery of tests as a screening device for indications of organic brain pathology (Billingslea, 1963). Many experimenters have used the Bender as a part of their research undertakings (Billingslea, 1963; Tolor and Schulber, 1963; Koppitz, 1975). In addition, various scoring systems for the test have been developed, e.g., the Billingslea (1948), Hain (1964), Hutt (1953), Keogh and Smith (1961), Mogin (1966), Quast (1961), Rimmer and Weiss (1972), Koppitz (1963), Pascal and Suttell (1951), and Canter (1976). It is also widely used in school systems for the screening of children with learning problems and "as a developmental test of visual-motor perception for school beginners (Koppitz, 1975, p. 1)."

Billingslea (1963) found the Koppitz System to be useful for scoring the Bender with children. It provided a system for evaluation of the developmental function of visual-motor perception for children 5 years 0 months up to 10 years 11 months at six-month intervals.

It was a modified version of the Pascal-Suttell scoring system for adults. Koppitz book (1963) included statistical data that provided a picture statistically of children's visual perceptual growth at 6 month intervals between the ages previously described. According to Koppitz (1975), by 10 years of age, the Bender Test designs can be correctly copied without difficulty by most normal children. Koppitz additionally commented that the child's level of maturity in visual-motor perception was reflected in the Bender Test records, as well as possible impairment or malfunction in visual-motor integration. In regard to the possible impairment or malfunction in visual-motor integration, Koppitz (1975) studies have found that some children may show difficulties with motor coordination and some with poor visual perception, but that the majority have difficulty with the higher level integrative function of perceptual motor integration.

The Koppitz System was designed to discriminate between children with visual motor educational problems and the child who did not have visual motor educational problems. Koppitz (1975) described some children as having "soft" signs and "organic" indicators that were the same or similar to the behavior or learning characteristics of those children with neurological impairment as diagnosed by a medical physician. However, if the same children were examined for hard signs of organic brain injury by a physician, they would probably not

be diagnosed as neurologically impaired. The children that fell into that category were described as having "minimal brain dysfunction" (MBD). MBD children exhibited symptoms that suggested brain dysfunction, yet did not result from "a demonstrable brain lesion or from brain trauma" (p. 71). In addition, Koppitz said brain injury implied the presence of a brain lesion, while MBD did not. Koppitz stated that the brain injury "can result from prenatal or birth trauma, from accidents or illnesses, from genetic factors, from severe early emotional or physical deprivation and neglect, or from other known or unknown causes" (p. 72). In her 1963 book, Koppitz described the Bender Test as a test for diagnosing brain injury. However, more recently (1975), she used the Bender Test to evaluate its relationship to minimal brain dysfunction in children.

The Koppitz System was a modified version of the Pascal-Suttell adult scoring system (Koppitz, 1963). Kawaguchi (1970) compared the Koppitz and Pascal-Suttell scoring system on the records of 477 children, 266 boys and 211 girls from 5 to 17 years of age. The results revealed a marked decrease on the scores of both scoring methods between 5 and 6 years of age, which suggested that there was rapid development in the visual-motor functioning in these years. The Koppitz System reached a plateau at 17 years of age. Cellure and Butterfield (1966) research also supported the correlation of the Koppitz System and Pascal-Suttell System, in their study of the mentally retarded patients.

In 1963, Canter introduced his Canter Background Interference Procedure for application of a scoring system for using the Bender Gestalt Test. He was seeking a method capable of identifying a form of deficiency in performance on graphomotor tests. The BIP required the subject to first reproduce the Bender in the standard method on a blank sheet of paper. After a 10 minute interval, he was then requested to reproduce the designs on an interference sheet. This sheet consists of numerous curvy intersecting, randomly placed lines which resembles a jigsaw puzzle. A copy is shown in Appendix D with letter of permission to use the interference sheet shown in Appendix C. He (Canter, 1966) stated that the strength of the BIP was that it used the results of comparison of the subjects own performance under ordinary conditions as the basis for comparison rather than reference to an ideal or precise model for the motor reproduction of figures. Each subject has resulting scores consisting of the Error score of the standard Bender administration, the Difference score which resulted from subtracting the regular Bender Error score from the Error score of the Canter BIP, and the Number Positive, which was the number of designs worse by two or more points on the Canter-BIP. In order for the subject to perform equally well on both procedures, he must ignore the background lines on the interference

procedure. Canter (1966) described the BIP as being more sensitive than the blank paper when used to diagnose organicity. The following researchers have described the BIP as effective in diagnosing organic brain impairment: Canter, 1963, 1966, 1968, 1971; Song, 1969; Yulis, 1970; Adams, 1971. The BIP reportedly will discriminate general decrements in motor performance from organic brain dysfunctioning (Canter, 1966, 1968, 1971, 1976). It used a modified version of the Pascal-Suttell scoring system which has been standardized for adults (Canter, 1976). Adams and Canter (1969) recommended that the Canter BIP not be administered to children under 13 years of age because the strong system in the BIP was not designed to assess the developmental variabilities present in children. Past research results with children were capable of discriminating differences in children's functioning. However, the results were not significant. The insignificant results were attributed to developmental and maturational factors in the visual perceptual-motor development of children.

It seemed appropriate to combine the Koppitz System of scoring that was designed for use with children and systematically accounted for developmental differences with the BIP interference sheet. The BIP did not provide for a scoring system that took into account the developmental factors found in children. The Koppitz System was combined with the BIP interference sheet to provide a system of scoring that was

systematically developed with children and would provide a new method of evaluating childrens' visual-perceptual problems. The subsidiary problem was the importance of taking development factors into consideration when evaluating children's visual-perceptual-motor development performance.

Procedure

Each child was administered the Bender Visual Motor Gestalt Test as delineated in the Canter Background Interference Procedure manual. On the Background Interference Procedure, the subject was presented the Bender cards twice. He was first given a blank sheet of paper on which he was to reproduce the designs as described in the manual. Each card was presented on a holder of a specially designed clipboard with the paper clipped to the board. After he had completed the nine designs, there was a ten minute interval between the administration of the Bender by the standard procedure and the administration of the Bender of the interference procedures. The interpolated tasks during the ten minute interval were some disassembled pictures of an object which the subject was asked to verbally identify. Then, he was given the BIP paper. The interference procedure that had been placed on paper was intersecting curved, wavy lines all over the page, thus giving the appearance of a jigsaw puzzle. The Bender cards were reintroduced with instructions found in the manual. The BIP page was attached to a blank sheet of paper with a carbon copy behind it. This gave the added advantage

for the examiner, especially when the lines of the copied design coincided with the curved printed lines (Canter, 1966) and also when one copied Bender figure was superimposed over another design. The test was first scored on the blank sheet with the Canter scoring method and the Koppitz scoring method. Then the test was scored on the interference sheet with the Canter BIP scoring method, followed by the Koppitz scoring method. Each design was scored by both methods before moving on to the next design. The interference sheet was scored in the same style. The completed testing procedure itself took between 20 to 30 minutes on one occasion.

Method of Analysis

The data were analyzed by using the t-test to compare the experimental group and the control group with the Canter BIP scoring system and the Koppitz scoring system on the background interference sheet. A comparison was also made between the experimental group and the control group with the Canter BIP scoring system and the Koppitz scoring system using the standard sheet.

The product-moment correlation was obtained between the Canter BIP performance and the Koppitz performance on the experimental group with the BIP sheet and with the regular sheet. Similarly, correlations between the performance scores were obtained for the control group.

The Hypotheses

In comparing three methods of diagnosing visual-perceptual learning disabilities using the Bender Gestalt Test submitted to the Canter procedure independently, the Koppitz procedure independently, and the combined technique using the Canter BIP interference sheet with the Koppitz scoring system, the following hypotheses were tested:

1. H_o = There are no statistically significant differences in mean score performance between the experimental and control groups on the BIP and standard variables as scored by the Canter method and Koppitz method, respectively.

2. H_o = There are no statistically significant correlations between the Canter method and Koppitz method of scoring on the BIP and standard variables for the experimental and control groups, respectively.

CHAPTER IV

RESULTS

The Difference Scores, Number Positive, and Design Overlap Difference were tabulated for each child showing his gender, age, grade, and race within the experimental group and control group. These original data for each individual are presented in Tables 6 and 7 in Appendix A. Raw scores for the BIP and standard with means and standard deviations are presented in Appendix B.

Analysis of the difference in mean scores with the Canter BIP scoring system between the experimental group and control group was conducted by using the t-tests for independent data. There was a statistically significant difference, t (65) = 7.91, $p < .001$, with the experimental group showing more errors. When the comparison of means was made between the experimental and control groups where the Koppitz on standard scoring system of the Bender Gestalt Test was used, the experimental group also revealed a signficantly higher Error score, t (65) = 5.86, $p < .001$.

Another set of analyses was conducted in order to test group differences where the standard recording sheet was used.

For the Canter BIP scoring system there was a statistically significant difference with the experimental group yielding more errors than the control group, t (65) = 6.41, $p < .001$. With the Koppitz scoring system a significant difference was also found in favor of the experimental group, t (65) = 4.04, $p < .001$. The summary of t-tests are presented in Tables 3 and 4 for the background interference sheet and the standard sheet, respectively.

The null hypotheses of no difference in number of errors made under each scoring system with the background interference sheet and the standard sheet were rejected. In all comparisons more errors were revealed by the experimental group.

The relationship between the Canter method and Koppitz method of scoring on the BIP and standard variables for the experimental and control groups was tested by using the Pearson Product-Moment correlation. The correlation between the number of errors scored by the Canter method and Koppitz method on the background interference sheets for the control group was $r = .74$, $p < .05$, and for the experimental group, $r = .88$, $p < .05$. Large correlations were also present with the standard sheets where both the experimental and control groups yielded correlations of $r = .88$, $p < .05$. The correlations are presented in Table 5. The hypotheses of no correlation was rejected since the results obtained by the different scoring systems were significantly related.

TABLE 3

Summary of t-tests comparing Mean Scores of the Experimental and Control Groups when Employing the Canter Procedure and Koppitz Procedure Using the Background Interference Sheet

	Canter		Koppitz	
	Experimental	Control	Experimental	Control
	n=31	n=36	n=31	n=36
$\bar{X}$	73.81	26.42	7.35	2.72
S.D.	31.27	12.43	4.08	1.80
$\bar{X}_1-\bar{X}_2$	47.39		4.63	
$S.E._{Diff.}$	5.99		0.79	
t	7.91[a]		5.86[a]	

[a] $p < .001$.

TABLE 4

Summary of t-tests Comparing Mean Scores of the Experimental and Control Groups when Employing the Canter Procedure and Koppitz Procedure Using the Standard Sheet

	Canter		Koppitz	
	Experimental	Control	Experimental	Control
	n=31	n=36	n=31	n=36
$\bar{X}$	53.94	23.11	5.77	2.78
S.D.	25.15	9.85	3.76	1.87
$\bar{X}_1-\bar{X}_2$	30.83		2.99	
$S.E._{Diff.}$	4.81		.74	
t	6.41[a]		4.04[a]	

[a] $p < .001$

TABLE 5

Correlations Between the Canter and Koppitz for the Experimental and Control Groups under BIP Conditions and Standard Conditions

	Experimental	Control
Background Interference Sheet Conditions	.88[a]	.74[a]
Standard Sheet Conditions	.88[a]	.88[a]

[a] $p < .05$

The experimental group showed more errors, a higher mean, on the interference procedure than the standard procedure. The control group showed nearly the same amount of errors, approximately similar means, on the interference procedure as on the standard procedure. The scores were affected rather uniformly as shown by the correlation between the Canter and Koppitz for the experimental group with the background interference sheet and the experimental group with the standard mode of presentation. The strength of the relationship was the same, it was affected uniformly even though the number of errors were increased under the interference condition over the standard conditions, with the experimental group.

CHAPTER V

SUMMARY, CONCLUSIONS, DISCUSSION, AND RECOMMENDATIONS

Summary

This investigation was initiated to determine the potential of the Canter Background Interference Procedure (BIP) using the Koppitz Bender Developmental Scoring System as a diagnostic psychological device with children who would be identified as learning disabled with visual-perceptual or visual-motor learning problems. An attempt was also made to determine if this procedure would enhance the diagnostic effectiveness of identification of visual-perceptual problems. Although the Canter Background Interference Procedure was standardized on adults and adolescents age 15 years and over, research studies indicated that the BIP was sensitive to organicity in children. Cautions were voiced in its use due to the fact that maturational factors found in young children had not been accounted for on the Canter BIP scoring system. There existed a need for a scoring system to take into account the maturational factors of children as to make it a more efficacious instrument to use with them.

The present study was designed to compare three methods of diagnosing visual-perceptual learning disabilities: (1) the original Canter Background Interference Procedure (BIP), (2) the standard Koppitz System, and (3) the Koppitz System of scoring applied to the background interference condition. The purpose of the study was to apply a scoring system to the interference condition which took into account age-level developmental factors found in children. This was accomplished by combining the Canter BIP interference sheet with the Koppitz scoring system to determine if it was a more efficacious method of identifying children with learning disabilities than the BIP or the Koppitz System independently.

A total of 67 children were tested. The control group consisted of 36 children who were considered normal, characterized by the fact that they were functioning in a regular classroom setting and were not receiving remedial or tutorial help of any nature. The experimental group consisted of 31 children who were identified and classified by educational diagnosticians or psychologists as children who had visual perceptual learning disabilities and were receiving remedial help. Each child was tested using the scoring method of the Canter BIP and the Koppitz System on both the standard administration of the Bender on a blank sheet of paper, and on the interference sheet.

The Bender Visual Motor Gestalt Test is used in the diagnosis of visual-perceptual dysfunction. It consists of nine geometric designs comprised of dots, lines, angles, and curves that are combined in various relationships. The individual sees, reorganizes, and reproduces the designs as he perceives them.

The Koppitz Bender Developmental Test Scoring System is a scoring system which has been developed for the Bender. It has been devised to take into account the maturational process of visual-perceptual development in young children from 5 through 10 years of age.

With the Canter Background Interference Procedure the individual reproduces the designs first under the standard blank sheet condition, then after a 10 minute interval, on a sheet with background interference. The background interference consists of a multitude of intersecting curvy lines thus representing a jigsaw puzzle. Each design is scored for the presence of deviations under both modes of administration.

The child's Canter BIP's Difference score was determined by the total number of errors on the standard procedure subtracted from that on the BIP condition, preserving the sign. The score may range from negative to positive value, with the positive Difference score representing the larger total of deviation scores for the BIP mode than for the standard mode. This was identified as a "positive BIP effect." The greater the number of errors on the BIP over the standard,

the greater the impairment. The Number Positive represented the number of the test designs in which there was a significantly positive BIP effect. This was where the deviation score for each design had at least two deviations more on the BIP mode than on the standard mode. The Design Overlap Difference represented the number of design score differences between the two modes on those designs that overlap one another.

The first hypothesis in the present investigation stated that there was no statistically significant differences in performance between the experimental and control groups on the BIP and standard variables as scored by the Canter method and Koppitz method, respectively. The data revealed that there was a statistically significant difference where the experimental group, i.e., children with visual-perceptual handicaps, made more errors in both procedures than the control, or normal group made.

The mean number of errors was greater for the experimental group under the interference sheet condition on both the Canter and Koppitz method of scoring. There was a greater mean difference for the experimental group between the standard procedure and the interference procedure, with the mean on the interference procedure being noticeably greater. For the control group, the mean was approximately equal in terms of performance on the standard sheet and on the interference sheet. This suggested that the children with visual perceptual problems tended to make more mistakes under the interference

conditions than they did under the standard conditions, but this was not evident for children with normal visual perception. This indicated that the interference sheet under the Canter and Koppitz scoring system was more efficacious in identifying those children with visual perceptual difficulties than the standard scoring sheet.

The second hypothesis stated that there was no statistically significant correlations between the Canter method and Koppitz method of scoring on the BIP and standard variables for the experimental and control group, respectively. The null hypothesis of no relationships was rejected. There were highly significant correlations between the BIP scoring method and the Koppitz scoring method for both groups.

Conclusions

On the basis of these findings, it was concluded that the Canter Background Interference Procedure sheet with the Koppitz scoring system applied was an effective and more powerful method for identifying children with visual perceptual learning disabilities. The method was more efficacious in identifying those children with visual perceptual difficulties than the method under standard conditions using the blank sheet of paper. Consequently, further work utilizing this approach to the study of identification seems warranted.

Discussion

This investigation was concerned with the Canter BIP as an identifier of visual perceptual dysfunction in children. Previous research showed that the Canter had significantly differentiated the brain damaged patients from other psychiatric conditions and from normal subjects. The brain damaged individuals tended to make more errors on the interference sheet than on the standard sheet, whereas, the normal individuals and those individuals with a psychiatric disorder, but no brain damage, performed the same on both procedure, or improved on the interference effect. However, the Canter BIP had only been standardized on individuals 13 years and above and a scoring system taking into account the maturational and developmental factors of young children had not been established. The interference procedure allowed for less compensation of the disability than the standard sheet. The intersecting wavy lines made it more difficult for the learning disabled child to organize. The Koppitz System applied to the background interference sheet was easier to score than the Canter BIP scoring system, and did not consume as much time. The disadvantage would be that it is more time consuming to apply only the Koppitz standard method with the plain sheet only.

Recommendations for Future Research

Adams, Kenny, Peterson and Canter (1975) weighted certain items on the BIP scoring system to maximize the efficiency of discriminating children with cerebral dysfunction from those with no cerebral dysfunction. Results from this study indicate that attempts to improve discrimination capabilities of the Canter BIP test were successful after making adjustments for differences in the hit rate for different ages. With this new procedure they found the hit rate for 8 to 10 year olds to be 92%. The investigator proposes that a group of visually perceptual handicapped students and a group of normal subjects be evaluated using the weighted items from the above mentioned study and using the interference sheet with the Koppitz scoring method applied, the standard blank sheet procedure using the Koppitz scoring method, and correlating the results for 8, 9, 10 year olds. Six and 7 year olds were not used in the Adams, Kenny, Peterson and Canter (1975) study. Perhaps, a replication of their study using 6 and 7 year old subjects would be appropriate.

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APPENDIX A

ORIGINAL DATA BY INDIVIDUAL

TABLE 6

Individual Data

Experimental Group

Identification Number	Sex	Age	Grade	Race	Difference Score	No. Pos.	DOD
42	M	97 8-1-1	1st	M.A.	22	6	0
43	M	88 7-4-6	1st	M.A.	56	7	0
47	M	102 8-5-26	1st	M.A.	3	3	4
34	M	81 6-9-2	1st	M.A.	31	5	2
36	M	103 8-7-5	3rd	M.A.	-1	2	0
37	M	82 6-10-2	1st	White	10	3	1
38	F	86 7-2-4	1st	M.A.	49	6	0
41	F	93 7-9-10	1st	M.A.	15	5	0
14	M	115 9-7-4	4th	M.A.	17	6	0
16	F	120 9-11-24	3rd	M.A.	34	4	0
21	M	99 8-3-0	2nd	M.A.	-2	5	0
23	M	99 8-3-10	2nd	M.A.	23	2	3
29	M	97 8-0-23	2nd	M.A.	3	4	1
30	M	103 8-6-21	2nd	M.A.	8	4	0
31	M	104 8-7-15	2nd	M.A.	12	3	0

Table 6, Continued

Individual Data

Experimental Group							
I.D.	Sex	Age	Grade	Race	Difference Score	No. Pos.	DOD
33	M	127 10-6-75	3rd	M.A.	68	6	0
27	F	107 8-11-3	1st	M.A.	29	6	-1
5	M	104 8-8-13	3rd	Black	20	4	0
6	M	118 9-10-13	3rd	White	10	3	-1
7	M	96 8-0-4	1st	Black	20	3	-1
8	F	108 9	3rd	White	-13	3	0
9	M	96 8	2nd	Black	46	7	0
10	M	125 10-5	4th	White	20	3	0
13	F	84 9-7-7	4th	M.A.	24	3	1
1	M	105 8-8-30	3rd	M.A.	5	2	0
1	M	105 8-8-29	3rd	Black	22	3	0
2	F	108 9-4-13	3rd	M.A.	11	6	1
12	M	84 6-11-24	1st	White	8	4	0
3	F	111 9-3-12	3rd	Black	42	5	0
4	M	122 10-1-27	4th	White	7	3	0
15	M	121 10-0-28	3rd	M.A.	17	2	0

TABLE 7

Individual Data

Control Group

I.D.	Sex	Age	Grade	Race	Difference Score	No. Pos.	DOD
1	F	113 9-4-28	3rd	White	2	1	0
3	F	104 8-8-0	3rd	M.A.	13	4	0
5	M	105 8-9-11	3rd	M.A.	2	2	0
6	M	108 8-11-23	3rd	M.A.	-2	4	0
7	M	107 8-11-11	3rd	M.A.	-9	1	0
8	F	107 8-10-23	3rd	M.A.	5	2	0
9	F	107 10-11-10	5th	M.A.	9	3	0
10	F	113 9-5-7	3rd	M.A.	13	5	0
11	F	128 10-8-4	5th	M.A.	1	2	0
18	M	98 8-2-14	2nd	M.A.	21	4	0
17	M	108 9-4-29	3rd	M.A.	11	3	0
15	F	113 9-5-3	3rd	M.A.	6	3	0
12	M	124 10-3-29	4th	M.A.	-9	0	+2
19	F	91 7-7-6	2nd	M.A.	11	3	0
25	M	88 7-3-27	1st	M.A.	8	4	0

Table 7, Continued

Individual Data

Control Group							
I.D.	Sex	Age	Grade	Race	Difference Score	No. Pos.	DOD
24	F	96 8-3-21	2nd	M.A.	-1	1	1
22	M	103 8-6-28	2nd	M.A.	-3	1	0
20	F	115 9-6-17	3rd	M.A.	-11	1	0
56	M	125 10-5-14	4th	White	10	6	0
55	M	110 9-2-22	3rd	White	0	2	0
54	F	114 9-5-18	3rd	White	2	2	0
53	M	108 9-3-3	3rd	White	2	1	0
52	M	91 7-7-12	1st	Black	5	3	0
51	F	94 7-10-0	2nd	White	-3	2	0
50	F	114 9-5-24	3rd	White	-3	0	0
49	M	125 10-5-11	4th	White	3	1	0
48	M	113 9-4-16	3rd	White	13	3	0
46	M	90 7-5-22	1st	M.A.	0	2	0
45	M	87 7-3-14	1st	M.A.	10	4	0
44	F	88 7-4-81	1st	M.A.	7	5	0
40	M	87 7-2-15	1st	M.A.	-1	2	0
39	M	80 6-7-28	1st	M.A.	18	5	0

Table 7, Continued

Individual Data

Control Group							
I.D.	Sex	Age	Grade	Race	Difference Score	No. Pos.	DOD
35	F	88 7-4-1	1st	M.A.	-3	2	0
32	M	112 9-4-7	3rd	M.A.	1	3	0
28	F	80 6-8-2	1st	M.A.	-3	3	0
26	F	90 7-6-1	1st	M.A.	12	5	1

APPENDIX B

RAW DATA FROM ALL SUBJECTS

TABLE 8

Raw Scores for Experimental Group

	BIP		Standard	
	Canter	Koppitz	Canter	Koppitz
Subjects				
1	33	0	28	3
11	65	8	43	7
2	72	11	61	7
12	112	12	104	13
3	111	13	69	8
4	29	1	22	1
15	67	5	50	5
5	87	11	67	11
6	34	4	24	1
7	81	10	61	7
8	52	6	65	9
9	126	12	80	9
10	55	3	35	3
13	37	2	13	0
14	43	3	26	1
16	58	4	24	0
21	53	9	55	4
23	55	4	32	7
27	77	7	48	7
29	79	11	76	10
30	87	7	79	4
31	65	6	53	5
33	99	10	31	2
34	141	15	110	11
36	14	1	15	2
37	78	5	68	6
38	145	15	96	11
41	87	11	72	6
42	79	6	57	5
43	99	7	43	3
47	68	9	65	7
$\bar{X}$	73.81	7.35	53.94	5.77
S.D.	31.27	4.08	25.15	3.76

TABLE 9

Raw Scores for Control Group

	BIP		Standard	
	Canter	Koppitz	Canter	Koppitz
Subjects				
1	11	2	7	2
3	33	5	20	3
5	20	2	18	2
6	28	5	30	5
7	15	1	24	4
8	27	1	22	2
9	20	2	11	2
10	25	4	12	2
11	15	1	14	1
12	9	0	18	0
15	16	1	10	0
17	45	3	34	3
18	59	4	38	5
19	30	1	19	2
20	30	3	41	5
22	8	0	11	1
24	52	7	53	6
25	51	7	43	8
26	35	5	23	1
28	33	5	36	4
32	19	3	18	2
35	20	1	23	3
39	26	2	8	0
40	21	1	22	4
44	36	4	49	4
45	41	5	31	3
46	19	4	19	3
48	27	3	14	1
49	29	2	26	1
50	17	3	20	4
51	19	2	22	1
52	45	3	40	6
53	12	0	10	0
54	14	2	12	3
55	23	2	23	4
56	21	2	11	2
$\bar{X}$	26.42	2.72	23.11	2.78
S.D.	12.43	1.80	9.85	1.87

APPENDIX C

LETTER OF PERMISSION

COUNSELOR RECORDINGS AND TESTS
Box 6184 • Acklen Station
Nashville, Tennessee 37212

5/18/79

Jo Ann Burns
P. O. Box 310
Eldorado, Oklahoma 73537

Dear Ms. Burn:s

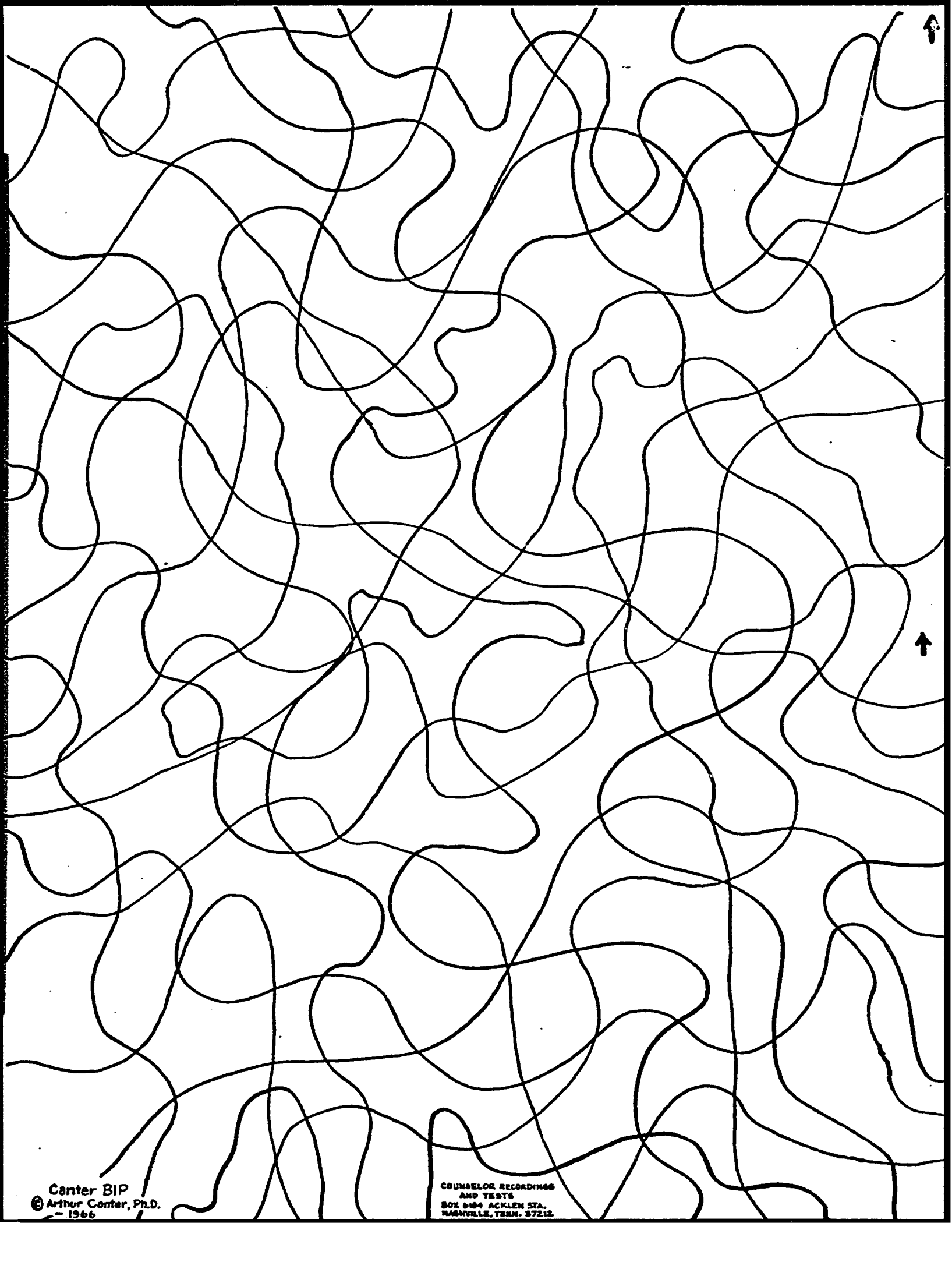
We are hereby granting our permission for you to use the BIP in the appendix of your dissertation as requested in your letter.

Thank you,

Rosetta Mosley
Exec. Sec.

APPENDIX D

CANTER BACKGROUND INTERFERENCE PROCEDURE SHEET


Canter BIP
© Arthur Canter, Ph.D.
– 1966
COUNSELOR RECORDINGS
AND TESTS
BOX 6184 ACKLEN STA.
NASHVILLE, TENN. 37212

Name _____

Date _____

SCORE SHEET--CANTER BIP BENDER TEST

Name _____ Age _____ Sex _____

Date _____

Hospital _____ Group _____

SUMMARY OF SCORES

Total Deviation Score BIP Mode _____ Base Level _____

Total Deviation Score Standard Mode _____

No. Positive _____ DOD _____ BIP D-Score _____ Class _____

Deviation Item	STD	BIP
DESIGN A (Max. Dev. = 20)	___	___
1. Overlap/Separ.-2 or 4	___	___
2. Square Rotat.-5	___	___
3. Design Rotat.-8	___	___
4. Workover-2	___	___
5. Disproportion-3	___	___
6. Distortion-5 or 10	___	___
7. Extra Lines-1 ea.	___	___
totals	___/	___

Deviation Item	STD	BIP
DESIGN 1 (Max. Dev. = 15)	___	___
1. Misalign.-2 or 4	___	___
2. Variability-2	___	___
3. All circles/dashes-4	___	___
4. Number elements-2	___	___
5. Perseveration-5	___	___
6. Workover-2	___	___
7. Rotation-8	___	___
8. Distortion-10	___	___
totals	___/	___

Deviation Item	STD	BIP
DESIGN 2 (Max. Dev. = 20)	___	___
1. Design Misalign.-2 or 4	___	___
2. Variability-2	___	___
3. All dots/dashes-4	___	___
4. Column misalign.-3	___	___
5. Number columns-2	___	___
6. Perseveration-5	___	___
7. Circ. miss/extra-3 or 5	___	___
8. Workover-2	___	___
9. Rotation-8	___	___
10. Distortion-10	___	___
totals	___/	___

Deviation Item	STD	BIP
DESIGN 3 (Max. Dev. = 20)	___	___
1. Misalignment-3	___	___
2. Blunting-3	___	___
3. Variability-2	___	___
4. All circles/dashes-4	___	___
5. Number-2	___	___
6. Row miss/extra-5	___	___
7. Extran. elements-2	___	___
8. Workover-2	___	___
9. Rotation-8	___	___
10. Distortion-10	___	___
totals	___/	___

Deviation Item	STD	BIP
DESIGN 4 (Max. Dev. = 20)	___	___
1. Contour-3	___	___
2. Overlap/Separ.-3 or 5	___	___
3. Curve Rotation-3	___	___
4. Design Rotation-8	___	___
5. Workover-2	___	___
6. Extra Lines-1 ea.	___	___
7. Disproportion-3	___	___
8. Curve not centered-2	___	___
9. Distortion-10	___	___
totals	___/	___

Deviation Item	STD	BIP
DESIGN 5 (Max. Dev. = 20)	___	___
1. Variability-2	___	___
2. All circles/dashes-4	___	___
3. Second Attempt-3	___	___
4. Workover-2	___	___
5. Extension Rotated-3	___	___
6. Rotation-8	___	___
7. Extension missing-4	___	___
8. Guide Lines-3	___	___
9. Number-2 or 4	___	___
10. Distortion-10	___	___
totals	___/	___

Deviation Item	STD	BIP
DESIGN 6 (Max. Dev. = 15)	___	___
1. Angles-3	___	___
2. Point of crossing-2	___	___
3. Number of Curves-3	___	___
4. Extra Lines-1 ea.	___	___
5. Curve Missing-8	___	___
6. Distortion-5 or 10	___	___
7. Workover-2	___	___
8. Rotation-8	___	___
9. Disproportion-3	___	___
totals	___/	___

Deviation Item	STD	BIP
DESIGN 7 (Max. Dev. = 28)	___	___
1. Lines not joined-4	___	___
2. Extra Angles-3 or 6	___	___
3. Extra Lines-1 ea.	___	___
4. Angles Missing-3 or 6	___	___
5. Configural Distort.-5 or 10	___	___
6. Overlap Distort.-3 or 6	___	___
7. Disproportion-3	___	___
8. Workover-2	___	___
9. Rotation-6 or 8	___	___
10. Design Missing-8	___	___
totals	___/	___

Deviation Item	STD	BIP
DESIGN 8 (Max. Dev. = 22)	___	___
1. Lines not joined-4	___	___
2. Extra Angles-3 or 6	___	___
3. Angles Missing-3 or 6	___	___
4. Extra Lines-1 ea.	___	___
5. Disproportion-3	___	___
6. Distortion-5 or 10	___	___
7. Ctr. Misalign.-3	___	___
8. Part Missing-5	___	___
9. Rotation-8	___	___
10. Workover-2	___	___
totals	___/	___

Scorer _____

Design Overlap Score ___/___

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