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AN ABSTRACT OF THE THESIS OF Julia Frances Hall for the Master of Science in Psychology presented August 13, 1970.

Title: The Effect of Perceptual-Motor Training on Maladaptive Behaviors of Emotionally Disturbed Children.

APPROVED BY MEMBERS OF THE THESIS COMMITTEE:

Ronald E. Smith, Chairman

Gerald Murch

Morris Weitman

Twenty emotionally disturbed children between the ages of six and twelve from three agencies providing special treatment for behavioral or emotional problems were the subjects for this study. The subjects were divided into two major diagnostic categories, withdrawn and acting out, and then matched in pairs by age and diagnosis. One half of each pair was randomly assigned to the experimental condition and the remaining halves were assigned to the control condition. Both the experimental and control groups contained five withdrawn and five acting out subjects. Four experimenters were used, and each experimenter worked with two or four experimental children and their matched control subjects.

The Purdue Perceptual-Motor Survey was administered to all the subjects prior to the experiment and behavior rating of maladaptive behaviors was obtained on each child from three adults who worked closely with the child. Using the methods outlined by Kephart and Radler in "Success Through Play", the experimental subjects received

perceptual-motor training for one-half hour three times a week for nine weeks. The control subjects received individual adult attention for the same amount of time as the training in the form of physical or quiet activities and games.

At the end of the nine weeks the subjects were tested with the Purdue Perceptual-Motor Survey again and new behavior ratings also were obtained. The behavior scale was analyzed as a total score and then two subscores were obtained for anti-social and asocial behaviors. Analysis revealed that: 1) The experimental subjects' perceptual-motor scores increased the most, especially among the withdrawn subjects; 2) The training had little effect on the maladaptive behaviors of the acting out subjects. The experimental acting out subjects improved behaviorally, but not significantly more than the control acting out subjects; 3) The training had a significant effect on the maladaptive behaviors of withdrawn children. The total behavior scores and the asocial behavior scores of the experimental withdrawn children improved; their anti-social scores changed very little.

The subjects came from three agencies with different treatment philosophies. One agency was a public school with special classrooms for emotionally disturbed children which exclusively used behavior modification techniques. Another agency was a residential treatment center which was designed for a milieu therapy, where the children are removed from the home. The third agency was a semi-residential treatment center that used a combination of milieu therapy and behavior modification techniques, where the children return home for weekends. There were equal numbers of acting out, withdrawn, experimental and control subjects from any single agency. An analysis of the amount of behavioral improvement within each agency was performed which revealed that there was significantly more improvement among the subjects from the semi-residential treatment agency.

It was concluded from this study that; perceptual-motor training increases the perceptual-motor abilities of emotionally disturbed children, especially those diagnosed as withdrawn, childhood schizophrenic and autistic; perceptual-motor training aids in reducing mala-

daptive behaviors in disturbed children diagnosed as withdrawn, childhood schizophrenic and autistic; perceptual-motor training may most effectively be used for emotionally disturbed children in conjunction with other forms of treatment.

THE EFFECT OF PERCEPTUAL-MOTOR TRAINING ON MALADAPTIVE
BEHAVIORS OF EMOTIONALLY DISTURBED CHILDREN

by

JULIA FRANCES HALL

A thesis submitted in partial fulfillment of the
requirements for the degree of

MASTER'S OF SCIENCE
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PSYCHOLOGY

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1970

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August 13, 1970

DEDICATION

To my maternal grandmother, Laura E. Lewis, for many years of encouragement and financial aid, which has made this possible.

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CHAPTER I

INTRODUCTION AND THEORETICAL BACKGROUND

The purpose of this study is to determine whether or not perceptual-motor training has an effect on the maladaptive behaviors of emotionally disturbed children. The largest amount of research on perceptual-motor training has been focused solely on mentally retarded children. Some of this research (Doman, 1960; McCormick, 1968), has shown improved reading and writing skills in the mentally retarded. A number of schools and social service agencies have generalized this success with the retarded to include children with other types of problems. They have adopted perceptual-motor training methods as treatment for children with learning or behavioral problems. This study was designed to determine whether or not perceptual-motor training is a worthwhile treatment to use with children with behavioral problems.

The perceptual-motor training methods chosen for this study were those developed by Radler and Kephart in their book, Success Through Play, (1960). Kephart's methods were chosen because they are the methods most commonly used in clinics, schools and social service agencies today. Some of the locations in which Kephart's methods have been accepted include: Winterhaven, Florida; Kalamazoo, Michigan; Davenport, Iowa; and Portland, Oregon.*

*Very recently there has been an increase in the use of perceptual-motor training methods to prevent the development of many learning and behavioral problems before the child gets into the classroom. In 1966, Portland initiated a preventative program for kindergarten students. The title of the program was: "Individualized Perceptual-Motor Study". (Schnobrich, 1967).

It is likely that Kephart's methods are more commonly used because they are easy to use. These methods may be used for behavioral problems because in his theory of perceptual-motor development Kephart has related deficient development to social adjustment problems. Kephart feels that many children cannot adequately learn the social skills and adjustments rapidly enough to meet the expectations of their environment without careful assistance. He states that:

The skills of social adjustment, however, depend upon the more basic skills which allow the child to adjust to concrete objects and things. He must see the same things and it must elicit the same type of response before there is a basis for social contact with another individual. (1960).

Kephart's theory of perceptual-motor development is similar to Piaget's in that he uses developmental stages. Kephart views perceptual-motor development as comprising six sequential stages in which the order of the stages was more important than the age at which the stage was reached.

Six general stages are recognized in sequential order:
 1) A Gross-Motor Stage; 2) A Motor-Perceptual Stage;
 3) A Perceptual-Motor Stage; 4) A Perceptual Stage;
 5) A Perceptual-Conceptual Stage; 6) A Conceptual Stage.
 They are heirarchical, building upon themselves in a related series, although it is recognized that there is some overlapping. Perceptual-motor learning is incomplete if the child's gross-motor learning has been distorted. Likewise, conceptual learning is hindered if areas of gross-motor and perceptual-motor learning have been omitted. (Ebersole, Kephart & Ebersole, 1968, p. 65).

Kephart (1968) has emphasized early motor learning in all of his research. He places considerable emphasis on early motor learning and on the development of learning patterns, rather than the learning of specific motor skills. He states that these early responses are important in the process of learning and development as they become the foundation upon which subsequent learning must be built. He indicates that it is to be expected therefore, that the early response generalizations exhibited by the child stem from motor responses. Kephart believes that because of this early learning, the

motor system has developed a certain body of information before the perceptual system begins its development.

Kephart states that specific movements develop out of a generalized pattern of differentiation known as the cephal-caudal and proximodistal trends. This means that the head and trunk regions develop before the lower limbs and that the large muscle groups nearer the center of the body develop before those nearer the extremities. He says that a child must learn to differentiate between his right and left sides and be able to control both, either simultaneously or separately and that the primary method for this is that of being able to balance. Kephart states that 'body image' or kinesthetic awareness of where one is in space and the relationship of himself to other objects must be developed before the concepts of horizontal, vertical, and depth can be developed. He says that visual stimuli are vital in achieving awareness and understanding of these concepts.

Kephart believes that if a child does not go through the developmental stages in the order that he has outlined them, that he may experience some learning and social adjustment failures. These failures could only be effectively negated by corrective perceptual-motor training.

There is little research available using perceptual-motor training with emotionally disturbed children. There is less research relating perceptual-motor training to changes in maladaptive behaviors in emotionally disturbed children. There are a few studies which have investigated the perceptual-motor development of these children.

The studies which examined the perceptual-motor development of emotionally disturbed children found these children to demonstrate inadequate functioning in perceptual-motor skills, (Llorens, 1964; Berkowitz, 1961; Grass, 1968). These studies used a variety of perceptual-motor tests, but no reference was made to a possible relationship between inadequate perceptual-motor skills and maladaptive behaviors.

A few studies have been done in which perceptual-motor training was used with emotionally disturbed children. One of these studies was not interested in changes in maladaptive behaviors, but exclusively in

changes in reading skills (Kahn, 1968). Another study (Palmer, 1968) did measure changes in maladaptive behaviors, but found no significant change as a result of the training.

There is a paucity of research in which perceptual-motor training was used with children with behavior problems. There is virtually no research that supports Kephart's theories of perceptual-motor development. There is little research also to support the strong adherence to the use of perceptual-motor training with children with behavioral or emotional problems. There is a demand for more research in this area since the adoption of Kephart's methods by schools and treatment agencies. This study was designed to help fill the void in this area by providing information about the effect of perceptual-motor training on maladaptive behaviors of emotionally disturbed children.

CHAPTER II

I. SAMPLING AND ASSIGNMENT

Three agencies dealing with emotionally disturbed children in the Portland metropolitan area contained the population from which the sample of twenty emotionally disturbed children was chosen for the study. One agency was a public school with two classrooms of emotionally disturbed children. They used behavior modification techniques for dealing with the childrens' learning and behavioral problems. Another agency was a semi-residential treatment center which uses a combination of behavior modification techniques and milieu therapy. A system of small classes on campus is used for school. The children live on the campus during the week and go home for the weekends. All of the childrens' families receive some counseling at the center. The third agency was a residential center which uses a total milieu therapy where some of the children return home for an occasional visit and some of the families receive counseling at the center. Teachers come to the agency and work with one or two of these children at a time. The children were chosen for the study on the basis that they were at least six years old and no more than twelve years old and that they were not presently enrolled in a perceptual-motor training program.

The subjects were matched in pairs according to their ages and clinical diagnoses. One half of each pair was randomly chosen to be a part of the experimental group by the toss of a coin. The other halves of the pairs were placed in the control group. In order to obtain more meaningful results in analysis the subjects were categorized into two major diagnostic groups, withdrawn and acting out. The withdrawn group included children with thought disorders such as childhood schizophrenia and autism as well as children diagnosed only as withdrawn. The acting out group included children with a diagnosis of 'anxiety reaction to childhood' and all types of acting out problems.

After the children had been assigned to either the experimental or the control group and to either the withdrawn or acting out group there were five withdrawn and five acting out children in both experimental and control groups. Half of the children from each agency had been placed in the experimental group and the other half placed in the control group.

The experimental subjects were listed alphabetically and then numbered consecutively. Experimenter I was assigned subjects 1, 2, 3, and 4 and their matched pairs in the control group. Experimenter II was assigned to subjects 5 and 6 and their matched pairs. Experimenters III and IV were assigned to subjects 7, 8, 9, and 10 consecutively and their matched pairs in the control group. Each experimenter was assigned half experimental subjects and half control subjects in order to better insure that any significant difference between the experimental and control groups on behavior or perceptual-motor ability change was due to the treatment rather than the experimenter.

II. TESTING AND RATING PROCEDURES

All of the subjects were administered the Purdue Perceptual-Motor Survey designed by Roach and Kephart (Appendix A). Roach and Kephart estimated the reliability of this measure with a coefficient of stability which was .94. Each of the test items are scored according to Kephart's system. Each child obtained a score from 1 to 4 on each of the test items. A 4 indicates a competent performance and a 1 generally indicates that the child cannot perform the task. Each child obtained a total raw score which had a possible range of 22 to 88 (Appendix C).

Each subject had a behavior rating scale filled out on him by three adults who worked closely with him (Appendix E). The raters were teachers, teacher aides and child care workers. The raters were unaware of which children would receive training and which would not receive training.

Reliability Of The Behavior Rating Scale

The intra-rater reliability was tested at a fourth agency, (Parry Center For Children), for emotionally disturbed children in the Portland metropolitan area. A coefficient of stability was used to estimate the intra-rater reliability. Three child care workers were asked to rate four children on the behavior scale and five days later they were asked to rate the same four children again. The test-retest reliability test using the Pearson r was used to obtain the coefficient and was found to be significant at .01 for all of the correlations.

TABLE I

INTRA-RATER RELIABILITY

r	
Rater I	
Child 1	.886
Child 2	.529
Child 3	.552
Child 4	.857
Rater II	
Child 1	.808
Child 2	.639
Child 3	.864
Child 4	.628
Rater III	
Child 1	.822
Child 2	.683
Child 3	.937
Child 4	.856

The behaviors were rated according to how much the adult had noticed the presence of each behavior in the child. If the child displayed the behavior very often or more than once a day that behavior obtained a rating of 5. If the behavior had never been noticed, the behavior rating was 1. There were thirty maladaptive behaviors described in the scale. Each child obtained a total raw score on the scale which could range from 30 to 150 for each rater. These scores of the three raters were averaged to obtain an average total behavior score. Each child also received an anti-social subscore (Appendix F) obtained from five of the behaviors described and an asocial subscore (Appendix G) obtained from another five behavior items. The subscores were developed in order to make a scale more sensitive to behavioral changes among withdrawn children by differentiating the behaviors that are typical of withdrawn children (asocial behavioral) from those which are atypical (anti-social behaviors).

Validity Of The Behavior Sub-scales

The face validity of the subtests in the behavioral scale was established by having two persons, other than the primary experimenter who were familiar with disturbed children categorize all of the behaviors in the behavior scale into either anti-social behaviors or asocial behaviors. Two child care workers who were not to be involved in the study were chosen for this task. There was total agreement among the two workers and the primary experimenter on all the items chosen for the two subtests.

III. TRAINING PROCEDURES FOR EXPERIMENTAL SUBJECTS

The experimental subjects received perceptual-motor training as defined by Kephart and Radler in their book, Success Through Play, (1960), for one half hour, three times a week for nine weeks. The length of the study, nine weeks, was chosen so that if the method is effective, it can then be used in conjunction with a nine week grading period in a school program.

Each experimental child received training in each of the six main areas during each week. His accomplishment of each step in the following tasks is recorded on a progress chart (Appendix H). When he can competently perform a task on a regular basis, the date of accomplishment is recorded. A record is also kept of how much time is spent on each activity every day (Appendix I).

Angels-In-The-Snow

The child lies flat on his back on the floor with his feet together and his arms to his sides. First he is asked to move his arms until his hands meet above his head, keeping his elbows straight. He is encouraged to push his heels against the floor as he moves his legs and to press his hands against the floor as he moves his arms. He is also encouraged to click his heels as his feet come together and to slap his sides with his hands as he brings them back down. Initially the child can be helped by moving an arm or leg for him until he can complete the movement on his own. Once the child has learned these movements, the trainer may have him combine leg and arm movements. His heels should click at the same time that his hands slap his legs. The next step is to have the child move only his right leg, only his left leg, etc. If the child has difficulty holding the other limb still, the trainer may hold the other limb for him, until he can accomplish the task by himself. The child may have aid in identification of a limb by touch until he is able to identify the part by pointing alone. After the child has mastered single limb control, he is asked to move his right leg and right arm together

and then his left leg and left arm. When this is accomplished, cross-lateral movements are requested, such as left leg-right arm, and vice versa. When the afore mentioned tasks have been mastered, the child is asked to do the tasks in rhythm counting. When this is accomplished, the child is asked to repeat the same tasks while on his stomach with a pillow placed under his abdomen.

Walking Board

The child is first asked to start at one end of the board and walk slowly to the other end. Initially the trainer may aid the child by holding his hand. It is essential that the child walk slowly and that each foot be placed squarely on the board so that toe and heel make contact on each step. After the child has learned to walk the board forward, he learns to walk it backwards. Initially the child is allowed to look back to see where he is going but must learn to master the task without looking. Next the child learns to walk the board sideways. He begins by standing on the left hand end of the board and beginning with his preferred foot, steps out, shifts his weight, and moves his other foot until his feet are together. This sequence is repeated until he has crossed the board. Then he returns to the starting point with the sequence of actions reversed, leading with the other (non-preferred) foot. When the child has accomplished these three tasks and balance is maintained, he is taught to turn on the board. He is asked to walk forward across the board, and without stepping off, turn and walk sideways back. When he has accomplished this half turn, he is asked to walk forward across and return walking forward, making a full turn. Finally he is asked to walk backward across the board, make a full turn, and to return walking backwards.

Balance Board

(See Appendix D) The child starts with the five inch balance board and when he can balance without difficulty, he practices balancing on the four inch board. When this is mastered, he practices balancing on the three inch board. When the child has accomplished this task, he is asked to bounce a ball while balancing. The child begins with

a large (basketball) ball and decreases to a small (tennis) ball. He bounces the ball with both hands, then only the preferred hand, and then the other hand. While balancing on the board, the child is then requested to play catch with the trainer. When this is accomplished, the child is asked to perform his Marsden ball tasks (see page 12) while maintaining his balance on the three inch board.

Drawing Games

First the child is asked to trace with his fingers a drawing of a circle that the trainer has put on the chalkboard. When this is easily performed, the child is asked to draw a circle. The trainer may guide his hand to aid in closure. The circle must be drawn across the midline and starting at the top, proceed counter-clockwise if his right hand is preferred, or clockwise if the left hand is preferred. Next the child must be able to reproduce a straight vertical line, beginning by copying a line by the trainer. When the vertical line can be drawn without aid, the child may progress to horizontal lines in the same manner as the vertical. The horizontal line must cross the midline of the body. Next the diagonal line is introduced by asking the child to copy a triangle and then a diamond. When the straight line tasks have been mastered, the child is asked to participate in a game of following dots. The trainer places two dots on the chalkboard and the child draws a straight line from one to the other. When this is accomplished without overshooting the dots, more dots are added, one at a time at random. The child is asked to move from one dot to the next without lifting his chalk. When the child has successfully achieved this, the dots may be placed to make meaningful designs.

Pegboard

First the child is asked to copy a straight vertical row of pegs, then a straight horizontal row, and then a diagonal row. Next the trainer outlines a simple figure such as a square, triangle,

etc. and the child is asked to make one like it on his board. He may look at the form during the entire time that he is constructing his copy. Initially the child may be aided by a cardboard template in the shape of the form presented as a guide. When the child can construct simple forms, more complex forms such as a house or boat are introduced. Also specific color patterns are introduced on the simple forms and later the more complex forms.

Marsden Ball

The child stands arms length from the ball with the pivot line of the string directly in front of him. The trainer pulls the ball to one side and releases it, letting it swing across in front of the child. The child is asked to reach out and touch the ball as it passes in front of him. He is not allowed to obstruct the path of the ball. At first the child must begin by holding his hand by his shoulder and thrust out to touch the ball, then he begins at a point by his eyes, and then from the hip. He must thrust in one steady movement and keep his head still, facing forward, but follow the ball with his eyes. This task begins with a small arc and increases to a larger arc of swing. Once he can do this, the child is instructed to thrust only when the trainer says 'now'. When the child has mastered this task as the ball swings laterally, he is asked to perform the same task as the ball swings forward and back. On this task the child touches the ball from underneath. He should hit the ball squarely from underneath. When this task has been accomplished, the child may be given a short bat with which to bunt the ball. For this task, the child is asked to reach out and meet the ball, rather than waiting for the ball to hit the bat. When all Marsden ball tasks have been mastered, they may be attempted from the balance boards.

The tasks involved in the training are meant to improve coordination, balance, and left and right differentiation. Kephart feels that no single task can be used singularly for this improvement, it is necessary to use all of the tasks.

IV. PROCEDURES FOR CONTROL SUBJECTS

The control subjects received individual attention for one half hour, three times a week for nine weeks. The time spent with the control group included physical activities, (physical games and general playground play), and quiet activities (checkers, puzzles, etc.). All of the experimenters attempted to put equal emphasis on both the physical and quiet activities as often as possible. An activity record was kept for each child recording what type of activity was participated in during each session (Appendix J).

V. RE-TESTING AND RATING

At the end of the nine weeks of individual attention or training all of the subjects were administered the Purdue Perceptual-Motor Survey again to determine the amount of increase in perceptual-motor ability. One subject from the withdrawn control group was released from care at one of the agencies and was not available for testing. The adults who rated the subjects' behavior at the beginning of the study were again asked to fill out the behavior rating scale on each child. Behavior ratings were obtained on all twenty subjects in the study.

VI. HYPOTHESES

Based on research using perceptual-motor training cited earlier, it was predicted that subjects in the experimental group would show more improvement in perceptual-motor abilities than subjects in the control group. Research cited in Chapter I demonstrated that one effect of perceptual-motor training with retarded children was that their social adjustment improved. On the basis of that effect, it was predicted that the maladaptive behaviors of the experimental subjects would decrease more than the maladaptive behaviors of the control subjects. It was predicted that the withdrawn subjects would improve more in perceptual-motor abilities than acting out subjects

because the withdrawn subjects were far below their age level in perceptual-motor abilities and seemed to need the training, whereas, the acting out subjects were, on the average, at age level. It was also predicted that the withdrawn subjects who received the training would improve more behaviorally than acting out subjects who received the training.

It was felt that the training would help the withdrawn subjects to be more aware of themselves in relationship to their environment by forcing them to attend to the movement and control of their limbs. If there is more awareness among these subjects as a result of the training, they may spend less time hallucinating. Since asocial behaviors, rather than anti-social are predominate among withdrawn children and the withdrawn children have been predicted to improve the most, it was also predicted that the asocial behaviors on the average would show greater change over time than would the anti-social behaviors.

CHAPTER III

RESULTS

I. RELIABILITY OF THE BEHAVIOR RATING SCALE

The inter-rater reliability of the behavior scale was determined from the scores of three raters' ratings of eight children who participated in the study. Raters I and II were teachers and rater III was a teacher's aide. The raters were given no other instructions than those present on the form of the behavior rating scale (Appendix E). The scores of Rater I were correlated with those of Rater II to yield a coefficient of .846. Rater I scores were correlated with Rater III scores yielding a coefficient of .500 and scores of Rater II correlated with those of Rater III gave a coefficient of .583. A t-test was conducted showing only one of the coefficients to be significant at .05. The other two coefficients were significant at .10. The results of these tests are shown in Table II.

TABLE II
INTER-RATER RELIABILITY

	r	t
Raters I and II	.846	2.449*
Raters I and III	.500	1.413
Raters II and III	.583	1.758

* $p < .05$

Since each child's behavior score was the mean of his three ratings by the raters, the reliability of using the average of the three raters was figured. Using the Spearman-Brown prediction formula a coefficient of .867 was determined. This formula is similar to the Spearman-Brown Prophecy formula in that reliability for the measure increases as the number of raters increases.

II. ANALYSES

An analysis of variance for a three factor design with repeated measures was used to determine the effectiveness of the treatment in improving perceptual-motor abilities and behavior.

Analysis of Perceptual-Motor Change

An analysis of variance was computed on the perceptual-motor scores and significant differences were found between groups and over time. The summary of the analysis shown in Table III demonstrated that

TABLE III
SUMMARY OF ANALYSIS OF VARIANCE OF
PERCEPTUAL-MOTOR ABILITIES

SOURCE	SS	df	MS	F
<u>Between Subjects</u>	<u>7,489.128</u>	<u>37</u>		
A (Treatment)	868.147	1	868.147	5.072*
B (Diagnosis)	1,289.504	1	1,298.504	8.514**
AB	182.371	1	182.371	1.204
Between Subj. Error	5,149.400	34	155.580	
<u>Within Subjects</u>	<u>2,029.576</u>	<u>38</u>		
C (pre and post test)	1,078.496	1	1,078.496	124.470**
AC	373.503	1	373.503	43.106**
BC	15.920	1	15.920	1.837
ABC	267.057	1	267.057	30.714**
Within Subj. Error	294.600	34	8.663	
<u>Total</u>	<u>9,518.698</u>	<u>75</u>		

*p < .05

**p < .01

there were significant differences between the treatment groups and the diagnostic groups. The treatment difference was significant at .05. The difference between the two diagnostic groups was significant at .01. The analysis showed that the perceptual-motor abilities of the subjects increased over time, which was also significant at .01. There was significant interaction between treatment and change in perceptual-motor abilities over time. An F test was performed on this and found to be significant at .01, as seen in Figure 1. There

Figure 1. Treatment effects over time

Figure 2. Treatment and diagnostic effects over time

was significant interaction between the treatment, diagnostic category and perceptual-motor change over time as seen in Figure 2. It was also found to be significant at .01.

The experimental subjects who were in the withdrawn diagnostic category made significantly more improvement in perceptual-motor abilities than any other group. This is easily seen from the figures in Table IV. The withdrawn subjects scored lower than the acting out subjects on the perceptual-motor test prior to the training; however, following training the withdrawn experimental subjects scored higher than the acting out control subjects.

TABLE IV

MEAN SCORES FOR PERCEPTUAL-MOTOR SURVEY

	Pre	Post	Total
EXPERIMENTAL			
Withdrawn	45.0	67.0	112.0
Acting out	55.6	71.0	126.6
CONTROL			
Withdrawn	41.0*	43.0*	84.0*
Acting out	56.4	59.8	116.2
TOTAL	198.0	240.8	438.8

*figured from 4 scores.

Analysis of Behavioral Change

The analysis of variance on the total behavioral scores show a significant change in behavior over time. The amount of behavior change was significant at .01. A summary of the analysis is shown in Table V. The analysis also pointed out that the amount of behavior change was closely related to the condition (experimental or control), in which the subjects had been placed. This relationship which was significant at .01, is demonstrated in Figure 3.

TABLE V
SUMMARY OF ANALYSIS OF VARIANCE OF
TOTAL BEHAVIOR SCORES

SOURCE	SS	df	MS	F
<u>Between Subjects</u>	<u>6,100.00</u>	<u>19</u>		
A (Treatment)	67.599	1	67.599	.02
B (Diagnosis)	102.399	1	102.399	.20
AB	52.899	1	52.899	.144
Between Subj. Error	5,877.600	16	367.350	
<u>Within Subjects</u>	<u>637.00</u>	<u>20</u>		
C (pre and post test)	270.399	1	270.399	26.129**
AC	168.100	1	168.100	16.1247**
BC	12.099	1	12.099	1.1616
ABC	19.599	1	19.599	1.88
Within Subj. Error	166.800	16	10.425	
<u>Total</u>	<u>6,737.500</u>	<u>39</u>		

**
 $p < .01$

$$F(C_1) = 11.88^{**}$$

$$F(C_2) = < 1$$

A₁ = Experimental treatment

A₂ = Control treatment

**
 $p < .01$

Figure 3. Treatment effects over time

The experimental subjects who were in the withdrawn diagnostic category made more improvement behaviorally than any of the other groups. This is apparent from the figures in Table VI. The withdrawn subjects were generally seen by the raters as more maladaptive than the acting out subjects prior to the treatment, and about the same as the acting out subjects after treatment.

TABLE VI
MEAN SCORES FOR THE BEHAVIOR RATING SCALE

	Pre	Post	Total
EXPERIMENTAL			
Withdrawn	77.0	65.2	142.2
Acting out	75.4	68.6	144.0
CONTROL			
Withdrawn	66.6	65.8	132.4
Acting out	72.4	71.0	143.4
TOTAL	291.4	270.6	561.0

Graph's (Figures 4 and 5) were made to compare the change in perceptual-motor abilities with change in behavior for all four of the groups. Nearly all of the subjects improved in perceptual-motor abilities. Most of the subjects improved in behavior also, but to a smaller degree. The perceptual-motor training appeared generally to effect behavior change which was to decrease maladaptive behaviors in the children, especially the withdrawn children.

Analysis of Anti-Social Behavior Change

An analysis of the anti-social behavior subscores showed a significant difference between the diagnostic groups, as was predicted. This difference was significant at .01. The summary of this analysis is shown in Table VII. Figure 6 shows the relationship of the diagnostic categories to the change in anti-social behaviors over time. This relationship was significant at .05.

Figure 4. A comparison of withdrawn experimental and control groups on perceptual-motor and behavioral improvement.

Figure 5. A comparison of acting out experimental and control groups on perceptual-motor and behavioral improvement.

TABLE VII
SUMMARY OF ANALYSIS OF VARIANCE OF
ANTI-SOCIAL BEHAVIOR SCORES

SOURCE	SS	df	MS	F
<u>Between Subjects</u>	<u>4,569.275</u>	<u>19</u>		
A (Treatment)	55.225	1	55.225	.5667
B (Diagnosis)	2,491.225	1	2,491.225	30.1364**
AB	11.025	1	11.025	.1129
Between Subj. Error	1,561.800	16	97.6125	
<u>Within Subjects</u>	<u>414.500</u>	<u>20</u>		
C (pre and post test)	38.025	1	38.025	2.399
AC	15.625	1	15.625	.988
BC	93.025	1	93.025	5.846*
ABC	13.225	1	13.225	.8311
Within Subj. Error	254.600	16	15.9125	
<u>Total</u>	<u>4,823.875</u>	<u>39</u>		

** $p < .05$

** $p < .01$

Figure 6. Diagnostic category and anti-social behavior changes

Anti-Social Behavior Scores

Figure 7. A comparison of withdrawn experimental and control groups on perceptual-motor and anti-social behavior change.

Figure 8. A comparison of acting out experimental and control groups on perceptual-motor and anti-social behavior change.

As the acting out subjects improved behaviorally, their anti-social scores decreased, and as the withdrawn subjects improved their anti-social scores tended to increase. This relationship can be seen in Figures 7 and 8. As the perceptual-motor abilities increased the anti-social scores of the acting out subjects decreased. As the perceptual-motor abilities increased for withdrawn subjects, there was very little change overall in anti-social behavior.

It was interesting to note that the treatment didn't seem to effect very much improvement in anti-social behaviors except for the experimental acting out group. The withdrawn children who were in the control group displayed more improvement here than did the experimental withdrawn. This relationship can be seen in Table VIII.

TABLE VIII
MEAN SCORES OF THE ANTI-SOCIAL BEHAVIOR SUBTEST

	Pre	Post	Total
EXPERIMENTAL			
Withdrawn	26.4	27.4	53.8
Acting out	48.8	41.4	90.2
CONTROL			
Withdrawn	25.0	26.2	51.2
Acting out	43.0	40.4	83.4
TOTAL	143.2	135.4	278.6

Analysis of Asocial Behavior Change

An analysis of asocial behavior change revealed many significant differences. There was a difference between the diagnostic groups significant at .01. There was a significant change in asocial behaviors over time and this was also significant at .01. The summary of the analysis in Table IX indicates several interaction effects. The treatment condition affected the amount of improvement in asocial behavior. This relationship can be seen in Figure 9; it was significant at .01. The diagnostic category had a greater effect

TABLE IX
SUMMARY OF ANALYSIS OF VARIANCE OF
ASOCIAL BEHAVIOR SCORES

SOURCE	SS	df	MS	F
<u>Between Subjects</u>	<u>3,918.40</u>	<u>19</u>		
A. (Treatment)	28.90	1	28.90	1
B (Diagnosis)	1,716.10	1	1,716.10	13.996**
AB	211.60	1	211.60	1.725
Between Subj. Error	1,961.80	16	122.6123	
<u>Within Subjects</u>	<u>494.00</u>	<u>20</u>		
C (pre and post test)	168.10	1	168.10	21.178**
AC	67.60	1	67.60	8.516*
BC	78.40	1	78.40	9.877**
ABC	52.90	1	52.90	6.664*
Within Subj. Error	127.00	16	7.9375	
<u>Total</u>	<u>4,412.40</u>	<u>39</u>		

* $p < .05$

** $p < .01$

$$F(C_1) = 7.07^*$$

$$F(C_2) = 1$$

A_1 = Experimental treatment

A_2 = Control treatment

Figure 9. Treatment and asocial behavior change.

on asocial behavior change than treatment. As is shown in Figure 10, this relationship was significant at .01. This effect was to be expected because the withdrawn subjects would have larger asocial scores than the acting out subjects. For the first time in all of

Figure 10. Diagnosis and asocial behavior change.

the analyses, a combined effect of treatment and diagnosis is evident. There was a definite relationship between the treatment condition, diagnostic category and the amount of improvement in asocial behaviors over time. This relationship significant at .05, is illustrated in Figure 11. Table X shows that the withdrawn children in the experimental group improved significantly, but there was little change in the other three groups.

TABLE X

MEAN SCORES OF THE ASOCIAL BEHAVIOR SUBTEST

	Pre	Post	Total
EXPERIMENTAL			
Withdrawn	51.4	39.6	91.0
Acting out	28.6	27.0	55.6
CONTROL			
Withdrawn	40.2	38.2	78.4
Acting out	31.2	30.2	61.4
TOTAL	151.4	135.0	286.4

Figure 11. A comparison of withdrawn experimental and control groups on perceptual-motor and asocial behavior change.

There was a significant difference between the withdrawn experimental and the withdrawn control subjects in asocial behavior change. Whereas, there was little difference between the acting out experimental and the acting out control subjects. The asocial behavior appeared to change as an effect of the perceptual-motor training for withdrawn children. This relationship can be seen in Figure 11. The training had little effect on the asocial behaviors of acting out children. This relationship is evident as seen in Figure 12.

Analysis of Behavioral Improvement Between Agencies

An analysis of variance was computed on behavior change between agencies. An analysis of this type was felt to be necessary because the three agencies involved in the study represented three different types of treatment philosophy. A summary of this analysis is presented in Table XI. A significant difference was found between

TABLE XI

SUMMARY OF ANALYSIS OF VARIANCE OF BEHAVIOR CHANGE BETWEEN AGENCIES

SOURCE	SS	df	MS	F
<u>Between Subjects</u>	<u>6,599.72</u>	<u>59</u>		
A (Treatment)	207.24	1	207.240	2.756
B (Agency)	1,949.34	2	974.670	12.963**
AB	382.89	2	191.445	2.546
Between Subj. Error	4,060.25	54	75.190	
<u>Within Subjects</u>	<u>675.78</u>	<u>60</u>		
C (pre and post tests)	348.99	1	348.990	213.207**
AC	164.07	1	164.070	100.226**
BC	52.92	2	26.460	16.163**
ABC	21.30	2	10.650	6.505*
Within Subj. Error	88.50	54	1.637	
<u>Total</u>	<u>7,275.50</u>	<u>119</u>		

*p < .05

**p < .01

Figure 12. A comparison of acting out experimental and control groups on perceptual-motor and asocial behavior change.

agencies on behavior scores. This was significant at .01. There was a significant change in behavior scores over time, significant at .01. All of the subjects improved from the treatment received at the three different agencies. The treatment of the experiment had a significant effect on the behavior scores and similar to the effect shown in the analysis of variance for the total behavior scores, it was significant at .01. This relationship is presented in Figure 13.

Figure 13. Treatment and behavior change over time

The relationship between agency and behavior scores over time was found to be significant at .01. This relationship, which is demonstrated in Figure 14, indicates that improvement in behavior varied

Figure 14. Agency and behavior change over time

between the agencies. The behavior scores were effected over time by treatment and agency combinations. This relationship, illustrated in Figure 14, indicates that improvement in behavior varied between agencies and experimental conditions. The behavior scores were effected over time by treatment and agency combinations. This relationship, illustrated in Figure 15, was significant at .05. Table XII also points out this relationship effectively. The subjects who were in

Figure 15. Treatment, agency and behavior change over time

TABLE XII

MEAN SCORES FOR THE BEHAVIOR SCORES OF AGENCIES

	Pre	Post	Total
EXPERIMENTAL			
Public school	73.00	68.50	141.50
Residential	80.50	70.25	150.75
Semi-residential	74.00*	57.00*	131.00*
CONTROL			
Public school	70.00	69.00	139.00
Residential	77.25*	76.75	154.00
Semi-residential	53.00*	50.25*	103.25*
TOTAL	427.75	391.75	819.50

*Figured from 2 scores.

the experimental condition and the semi-residential treatment agency showed the greatest amount of improvement. The next largest improvement came from experimental subjects in the residential treatment agency, but the least amount of improvement was among control subjects in the residential treatment agency.

A graph, (Figure 16), was made comparing perceptual-motor ability and behavioral change between the agencies. The figure demonstrates the difference between the agencies on behavioral improvement. Differences in perceptual-motor abilities shows up only between experimental and control subjects with some difference between withdrawn and acting out subjects, especially prior to the treatment.

Figure 16. A comparison of agencies on perceptual-motor and behavioral improvement.

CHAPTER IV

SUMMARY, DISCUSSION, AND CONCLUSIONS

I. SUMMARY

Twenty emotionally disturbed children between the ages of six and twelve from three agencies providing special treatment for behavioral or emotional problems were the subjects for this study. The subjects were divided into two major diagnostic categories, withdrawn and acting out, and then matched in pairs by age and diagnosis. One half of each pair was randomly assigned to the experimental condition and the remaining halves were assigned to the control condition. Both the experimental and control groups contained five withdrawn and five acting out subjects. Four experimenters were used, and each experimenter worked with two or four experimental children and their matched control subjects.

The Purdue Perceptual-Motor Survey was administered to all the subjects prior to the experiment and behavior ratings of maladaptive behaviors were obtained on each child from three adults who worked closely with the child. Using the methods outlined by Kephart and Radler in Success Through Play, (1960), the experimental subjects received perceptual-motor training for one half hour three times a week for nine weeks. The control subjects received individual adult attention for the same amount of time in the form of activities and games.

At the end of the nine weeks the subjects were tested with the Purdue Perceptual-Motor Survey and new behavior ratings were obtained. The behavior scale was analyzed as a total score and then two subscores were obtained for anti-social and asocial behaviors. The anti-social and asocial subtests contained five behavioral items each and were designed to give a more sensitive measure of maladaptive behavior, especially for withdrawn subjects. Prior treatment

experiences with withdrawn children have established that these children often display an increase in aggressive or anti-social behaviors as their withdrawn or asocial behaviors decrease. Analysis revealed that: 1) The experimental subjects' perceptual-motor scores increased more than the control subjects' perceptual-motor scores, especially among withdrawn subjects; 2) The training had little effect on the maladaptive behaviors of the acting out subjects. The experimental acting out subjects improved behaviorally, but not significantly more than the control acting out subjects; 3) The training had a significant effect on the maladaptive behaviors of the withdrawn children. The total behavior scores and the asocial behavior scores of the experimental withdrawn children improved significantly, and their anti-social behavior scores showed little change.

The subjects of the study came from three agencies with different treatment philosophies. The experimenter felt it would be of interest to determine behavioral improvement differences between agencies. It was felt that this might suggest that a particular type of treatment would be more effective to use in conjunction with perceptual-motor training.

One agency was a public school with special classrooms for emotionally disturbed children which exclusively used behavior modification techniques. Another agency was a residential treatment center which was designed for a milieu therapy, in which the children are totally removed from the home. The third agency was a semi-residential treatment center which used a combination of milieu therapy and behavior modification techniques. The children of this agency return home for weekends. There were equal numbers of acting out, withdrawn, experimental and control subjects within any single agency. An analysis of the amount of behavioral improvement within each agency revealed that there was significantly more improvement among the subjects from the semi-residential treatment agency.

II. DISCUSSION

There were many limitations to this study and further study is indicated. A similar type of study needs to be performed where the behavior raters are trained. The raters for this study were not trained for observing behaviors and rating their frequency. Although there were specific instructions as to the frequency of a behavior on the rating scale, there were several discrepancies on a specific behavior of a particular child. In nearly every case, however, this problem was compensated for by using the average of three raters. Usually the differences were small enough so that the average rating was a good representative of the frequency.

The training procedures and the perceptual-motor abilities test used in this study were both developed by Kephart. Several of the items used in the training were also a part of the test. If the study should be replicated another test, (one not designed by Kephart), should be used.

There was inadequate representation of emotional and behavioral problems of children in this study. Some types of emotional problems, such as school phobia, were not present in the study. Perhaps a random sample larger than twenty would include more of a variety of emotional and behavioral problems.

This study did not find deficiencies in perceptual-motor development among these children as other studies have found. The acting out children were found to be close to age level on all of the test items except ocular control. The withdrawn subjects were, however, deficient in many of the areas. All of the children appeared to have difficulty with ocular control. It was interesting to note that the training had little or no effect on their ocular difficulties.

Previous research indicated that perceptual-motor training had no effect on maladaptive behaviors of emotionally disturbed children. This study found that the training had a significant effect on the maladaptive behaviors of children with certain types of emotional problems. Children who were withdrawn, childhood schizophrenic, and

autistic displayed a significant amount of behavioral improvement as a result of the training. It would be of interest to test these children again in six months to see if the effect was a long range one.

As the training progressed the experimenters and raters indicated that they noticed an increase in the attention span of the withdrawn subjects who were in the experimental condition. They also noted a decrease in the amount of time spent hallucinating among the autistic and schizophrenic children. It appeared to the experimenters that perhaps these children were more able to identify the differences between themselves, others and objects in their environment.

The subjects from the semi-residential agency improved more behaviorally than subjects from the other two agencies. This improvement may be accounted for by the use of more than one type of treatment, (milieu therapy and behavior modification), and by the agency's close work with each child's parents. This agency required that the parents of the children admitted for treatment cooperate with the social workers and receive counseling and direction from them. The other two agencies did not require this of the parents, in fact, one agency had several children who were wards of the court.

III. CONCLUSIONS

Perceptual-motor training improves perceptual-motor abilities in emotionally disturbed children. The withdrawn subjects scored lower in perceptual-motor abilities than the acting out subjects prior to the training. The withdrawn subjects who received the training improved more in perceptual-motor abilities as a group than any of the other groups. The results of this study indicate that perceptual-motor training is an effective method of increasing perceptual-motor abilities among disturbed children, especially withdrawn children.

Most of the subjects involved in the study improved behaviorally during the course of the study. The acting out subjects who received the training improved a small amount more than those subjects who did not receive the training. The withdrawn subjects who received the

training, however, improved to a significant degree. These subjects, diagnosed as withdrawn, childhood schizophrenic and autistic, displayed a tremendous decrease in maladaptive behaviors from before training to after training behavior ratings. For all withdrawn subjects who received the training their asocial scores decreased to a significant degree. This effect was not present among the withdrawn subjects who did not receive the training.

The findings of this study suggest that perceptual-motor training can be used effectively as partial treatment for withdrawn, childhood schizophrenic and autistic children. Children with behavioral problems, which are aggressive or destructive in nature, might benefit as well from a regular physical education program in conjunction with treatment for their behavior disorders.

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APPENDICES

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APPENDIX A

PURDUE PERCEPTUAL-MOTOR SURVEY*

Name _____ Date of Birth _____

Agency _____ Sex _____ Grade _____

Diagnosis _____

Examiner _____ Date of Examination _____

	Score				
	4	3	2	1	
Walking Board Forward Backward Sidewise					Balance and Posture
Jumping Identification of Body Parts Imitation of Movement Obstacle Course Kraus-Weber Angels-in-the-Snow					Body Image and Differentia- tion
Chalkboard Circle Double Circle Lateral Line Vertical Line Rhythmic Writing Rhythm Reproduction Orientation					Perceptual-Motor Match
Ocular Pursuits Both Eyes Right Eye Left Eye Push-Up					Ocular Control
Visual Achievement Forms Form Organization					Form Percep- tion

*Purdue University
Lafayette, Indiana

BALANCE AND POSTURAL FLEXIBILITY

1. WALKING BOARD

Forward

Steps off board

Comments:

Pauses frequently

Uses one side of body more
consistently than other

Avoids Balance:

Runs

Long steps

Feet crosswise of board

Maintains inflexible posture

Score _____

Backward

Steps off board

Comments:

Pauses frequently

Uses one side of body more
consistently than other

Avoids Balance:

Runs

Long steps

Feet crosswise of board

Twists body to see where he
is going

Must look at feet

Maintains inflexible posture

Score _____

SidewiseUnable to shift weight from one
foot to the other

Comments:

Confusing or hesitation in
shifting weight

Crosses one foot over the other

Steps off board

Performs more easily in one
direction than the other:

Right lead

Left lead

Score _____

2. JUMPING

Both Feet

Cannot keep both feet together

Uses one side of body only

"Ties" one side of body to the
other

One Foot

Postural shift not smooth

Comments:

Cannot keep opposite foot off
the floor -

Performance better on one
foot than other:

Right

Left

Skip

Movement not free

Comments:

Hesitates after each step to
determine which side to use

Hop

Cannot remain in one spot while
performing

Comments:

Cannot shift easily from side
to side

Movements jerky and lack rhythm:

All patterns

Asymmetrical patterns only

Score _____

BODY IMAGE AND DIFFERENTIATION

3. IDENTIFICATION OF BODY PARTS

Show hesitancy in one or more responses

Comments:

Does not touch both members of paired parts

Must "feel around" to find parts

Makes more than one error in identification

Score _____

4. IMITATION OF MOVEMENT

Does not mirror the patterns

Comments:

Not consistent (sometimes mirror, sometimes parallel)

Shows hesitation or lack of certainty

Makes abortive movements

Moves wrong limb

Recognizes errors after some delay

Does not recognize errors spontaneously

Score _____

5. OBSTACLE COURSE

Going Over

Over-estimates (steps too high)

Comments:

Catches foot on bar

Cannot correct on one repetition

Going Over

Knocks bar off

Comments:

Bends too low to clear bar

Cannot correct on one repetition.

Going Between

Does not turn body

Comments:

Score _____

6. KRAUS-WEBER

Cannot raise chest and hold

Comments:

Cannot raise legs and hold

Score _____

7. ANGELS-IN-THE-SNOW

Must look from one limb to the other to identify

Comments:

Cannot identify by visual data alone

Requires tactual information to identify limbs

Taps or moves limb on floor to identify

Abortive movements to get started

Hesitation at beginning of movement

Movements are hesitant and jerky

Overflow into other limbs than those called for

Movements do not reach maximum extension

Requests repetition of instructions

Cannot correct response on one repetition

Score _____

PERCEPTUAL-MOTOR MATCH

8. CHALKBOARD

Circle

Does not reach proper size

Comments:

Direction incorrect for hand used

Drawing not directly in front of child

Does not cross midline

Shape of circle not accurate

Must stop to "think out" next move during performance

Wrist is stiff and difficult to control

Still shows difficulty after 3 or 4 attempts

Double Circle

Does not reach proper size

Comments:

First attempts are small and far apart

Circles overlap

One circle larger than the other

One more accurate than the other

Circles drawn one on top of the other

Direction incorrect

Hands parallel

Opposite but wrong direction

Circles flat toward inside

Inaccuracies which are not parallel
in both circles

Visual attention directed to
one hand

Movement of two arms not
synchronized

Score _____

Lateral Lines

"Walks" across the board

Comments:

Draws left half with left hand,
right half with right hand

Pivots body to avoid crossing
midline

Difficulty when hand is on
opposite side of midline

False starts

Pauses and confusion

Inaccuracies

Score _____

Vertical Lines

Lines bow

Comments:

Markedly

Slightly

Visual attention to one hand
only

One hand ceases to function
during performance

Hands move alternately, not
simultaneously

Score _____

9. RHYTHMIC WRITING

Motifs

1.

3.

2.

4.

5. *nnnnnnnn* 7.6. *bbbbbb* 8.*pppppp**pbpbpb*

Hesitant and jerky

Movement cramped and inflexible

Rhythm not constant

Directional reversals or
confusion

Order reversals or confusion

Line of motifs slants

Characters in motifs slant

Inaccurate reproduction

Scores:

Size does not remain constant
throughout performance

Rhythm _____

Characters become smaller as
performance is sustained

Reproduction _____

Excessive movement of hips
or trunk

Orientation _____

OCULAR CONTROL

10. OCULAR PURSUITS

Moves head instead of eyes

Comments:

Eye movements are jerky
Throughout
At extremes only

Movement jerk at midline

Eyes do not work together

One eye remains stationary as
other movesOne eye leads the other
markedlyOvershoots or undershoots
during pursuit

Looses visual contact with
target during movement

Scores:

Then contact is lost, cannot
regain easily

Both eyes _____

One eye "wanders off" the
target

Throughout
At extremes only

Right eye _____

Changes eyes at midline

Left eye _____

Convergence

Impossible at 4 inches
Sluggish
Uneven

Convergence _____

FORM PERCEPTION

11. VISUAL ACHIEVEMENT FORMS

Form

Changes orientation of paper
to alter direction of movement

Comments:

Segments drawings

Internal lines of divided
rectangle segmented

"Ears" on forms

Drawing markedly larger or
smaller than copy

Score _____

Organization

No discernible organization

Comments:

Organization on page is:

Left to right
Vertical
Circular

Score _____

APPENDIX B

ADMINISTRATION PROCEDURES FOR THE PURDUE PERCEPTUAL-MOTOR SURVEY

Test I -- Walking Board

The examiner says to the child, "Get up on the board and walk to the other end." When the child has reached the far end of the board, the examiner says, "Now walk it backward." When he has crossed the board again, the examiner says, "Now walk it sideways." When he has walked the board sideways in one direction, the examiner says, "Now come back sideways."

Test II -- Jumping

The examiner says, "Place both feet together and jump one step forward." Next he instructs the child to "Stand on your right foot with your left foot off the floor and jump one step forward without putting your left foot down." Then he says, "Now stand on your left foot with your right foot off the floor and jump forward without putting your right foot down." The examiner then asks the child to skip across the room. The examiner next says to the child, "I want you to hop once on the right foot, then once on the left, once on the right, then left, and so on." If the child stops, the examiner says, "Keep going." If the child pauses between each hop, he says, "Can you go faster?" If he moves forward, the examiner says, "Stay in one place and keep hopping." Next the examiner says, "Now hop twice on your right foot, twice on your left foot, and keep going." Next the examiner says, "Now hop twice with your left foot and once with your right and keep going."

Test III -- Identification of Body Parts

The examiner says, "Touch your shoulders. Touch your hips."

Touch your head. Touch your ankles. Touch your ears. Touch your feet. Touch your eyes. Touch your elbows. Touch your mouth."

Test IV -- Imitation of Movements

The examiner says to the child, "I am going to move my arms and I want you to move your arms just like I do. Are you ready?"

The examiner demonstrates the following positions:

Test V -- Obstacle Course

The examiner takes a broom handle, placing it level with the child's knee height, says to the child, "Step over the stick." Placing the broom handle about two inches below the child's shoulder height, the examiner says, "Duck under the stick." Then the examiner puts the end of the broom handle just far enough away from the wall so the child can get between the end of it and the wall if he turns his body sideways. The examiner then says, "Go between the wall and the stick without touching either."

Test VI -- Kraus Weber

The examiner has the child lie face down on a rug or mat and tells him to place his hands behind his head and clasp his hands together. The examiner holds the child's feet and says, "Raise your head, shoulders, and chest off the floor while I count to ten." Then the examiner says to the child, "Put your hands beneath your face. Raise your legs off the floor without bending your knees while I count to ten." The examiner holds the child's chest down by placing a hand between his shoulder blades.

Test VII -- Angels in the Snow

The examiner asks the child to lie on his back on a rug or mat with his legs together and his arms at his sides. He says to the child, "move just this arm," pointing to the right arm. "Now move your arm back to your side." Then he says, "Move just this arm", pointing to the left arm. "Now move it back to your side. "Move just this leg", pointing to the right leg. "Now back together. Move just this leg", pointing to the left leg. "Now back together. Move both arms. Now back. Move both legs. Now back. Move this arm and this leg", the examiner now points to the left arm and left leg. "Now back. Move this arm and this leg", as the examiner points to the right arm and right leg. "Now back. Move this arm and this leg", the examiner is pointing to the right arm and left leg. "Now back. Move this arm and this leg", as he points to the left arm and right leg. "Now back".

Test VIII -- Chalkboard

The examiner gives the child a piece of chalk and says, "Draw a circle." Next the examiner says, "Take a piece of chalk in each hand and draw two circles at the same time." Then the examiner asks the child to turn away so he will not see the examiner place two "x's" about 24 to 30 inches apart on the chalkboard. The examiner says to the child, "Draw a line from one "x" to the other." Then the examiner places two "x's" on the chalkboard in such a manner that the child must extend his hand in order to reach them. The examiner says, "Take a piece of chalk in each hand and draw two straight lines from the "x's" to the bottom of the chalkboard at the same time."

Test IX -- Rhythmic Writing

The examiner places the first of eight motifs just above the child's eye level on the chalkboard and says, "Copy this design." The same procedure is followed for each of the other motifs.

Test X -- Ocular Pursuits

The examiner holds a pencil with the eraser pointing towards the child's face, about eighteen to twenty-four inches away. He says, "Now watch the eraser wherever it goes." The examiner moved the pencil along the arc of a circle with a radius of about eighteen or twenty inches, having its center at a point between the child's eyes. He moves the pencil approximately eighteen inches to the right and then back. Then approximately eighteen inches to the left and back. He then moves it up and down for approximately eighteen inches, and then in each of the two diagonals (upper left, lower right and upper right, lower left). The examiner then covers the child's right eye with a piece of cardboard and repeats the procedure. The examiner then covers the child's left eye with the cardboard and repeats the procedure. The examiner then removes the cover and says, "Look at me." Then holding the pencil directly in front of the child and at the eye level of the child says, "Now look at the eraser." The examiner moves the eraser toward the child's nose.

Test XI -- Visual Achievement Forms

The examiner gives the child a pencil and piece of blank paper. The examiner presents design number 1 and says, "Copy this." The examiner repeats the procedure for all seven designs.

APPENDIX C

SCORING PROCEDURES FOR THE PURDUE PERCEPTUAL-MOTOR SURVEY

Each of the test items in the Purdue Perceptual-Motor Survey were scored according to Kephart's system of evaluation.

Walking Board

Forward: If the child walks easily and maintains dynamic body balance throughout, he receives a score of 4. If the child has occasional difficulty but is able to regain balance each time, he receives a score of 3. If the child steps off the board more than once or if he pauses frequently, he receives a score of 2. If the child cannot perform or if more than one-fourth of his performance is out of balance, he receives a score of 1. **Backward:** If the child walks easily and maintains balance throughout without looking behind him, he receives a score of 4. If the child has occasional difficulty but is able to regain balance each time, he receives a score of 3. If the child steps off the board more than twice, if he pauses frequently, or if he cannot perform without looking behind him, he receives a score of 2. If the child cannot perform, if he must feel with his toe, or if more than one half of his performance is out of balance, he receives a score of 1. **Sideways:** If the child walks easily in either direction, he receives a score of 4. If the child has occasional difficulty but is able to regain balance each time, he receives a score of 3. If the child steps off the board more than two times in one direction or if he pauses frequently and has difficulty regaining balance, he receives a score of 2. If the child cannot perform, if his performance is markedly better in one direction than the other, or if his performance is markedly out of balance, he receives a score of 1.

Jumping

If the child performs all tasks easily, he receives a score of 4. If the child can alternate sides symmetrically (all tasks), he receives a score of 3. If the child can hop on either foot at will (the first five tasks), he receives a score of 2. If the child can only perform symmetrically (fewer than five tasks performed adequately), he receives a score of 1.

Identification of Body Parts

If the child performs adequately throughout, he receives a score of 4. If he shows only slight hesitancy or confusion, he receives a score of 3. If the child shows hesitancy in more than one or two of the commands or if he points to only one of the paired parts, he receives a score of 2. If the child is unable to identify one or more of the parts called for, if he shows marked hesitancy (except elbows), or if he 'feels around' to find the part, he receives a score of 1.

Imitation of Movements

If the child performs promptly, consistently, and surely on all patterns and only if he parallels the pattern so that his movements are an exact duplicate of the examiner's, he receives a score of 4. If the child performs promptly, consistently, and surely, but mirrors the examiner's movements, he receives a score of 3. If the child shows hesitation or a lack of certainty, he receives a score of 2. If the child makes more than one error or if there is abortive movement in several patterns, the child receives a score of 1.

Obstacle Course

The child's performance is evaluated on the basis of his performance on all three tasks.

4. If his performance is adequate throughout.
3. If he makes only a slight error which he corrects easily.
2. If he is able to correct himself on one repetition.

1. If he over-estimates or under-estimates noticeably (more than two or two and one-half inches) and cannot correct this on one repetition.

Kraus-Weber

If the child passes both tests, he receives a score of 4. If the child fails the second test, he receives a score of 3. If he fails the first test, he receives a score of 2. If the child fails both tests, he receives a score of 1.

Angels in the Snow

If the child performs adequately throughout all the tasks, he receives a score of 4. If the child shows only slight hesitancy in some of the patterns or if he shows restricted movement or overflow which is corrected in one repetition, he receives a score of 3. If the child shows marked hesitancy in beginning the movements or if the extent of the movement becomes restricted in any of the patterns and he cannot correct this with one repetition of the instructions for that pattern, he receives a score of 2. If the child cannot perform one or more of the tasks, if there is overflow to limbs not required in the pattern and he cannot correct this overflow in one repetition of the instructions, if he requires tactual information in addition to visual information in any of the tasks, or if he must 'bang' the limb on the floor to identify it, he receives a score of 1.

Chalkboard

Circle: If the circle is drawn in proper size, direction, position and shape (one added instruction is allowed to achieve size and position), the child receives a score of 4. If the child, after two or three trials, achieves a circle nearly correct in size, position, and shape with only minor errors in shape, he receives a score of 3. If the child continues to show marked difficulty in performance although, with effort, he is able to produce an acceptable drawing or if the direction of the drawing is incorrect for the child's pre-

ferred hand, he receives a score of 2. If the child is unable to produce a circle of proper size, location, or shape, if he is unable to cross the midline and continues to avoid the problem, if he shows marked confusion in direction during the drawing, or if the drawing continues to be distorted, especially flatness on one side or on the bottom, he receives a score of 1. Double circles: If the performance is smooth and certain with no more than one additional direction to achieve size and position, the child receives a score of 4. If two or three trials are necessary to achieve the desired production or if the performance continues to be halting and stiff. The child receives a score of 3. If extreme difficulty is experienced in any part of the performance, if the direction of the drawing is incorrect, or if the performance does not become acceptable within two or three trials, the child receives a score of 2. If the child is unable to perform the task, if he cannot achieve drawings of acceptable size, shape and position, if he attends only to one hand, or if he draws circles which are distorted (flat) toward the center, he receives a score of 1. Lateral lines: If the performance is adequate, the child receives a score of 4. If there is slight hesitancy and slight inaccuracy, the child receives a score of 3. If there is marked hesitancy or marked inaccuracy, the child receives a score of 2. If the child cannot perform the task or if his initial attempts are by walking across or using two hands, the child receives a score of 1. Vertical lines: If the performance is adequate and both lines are straight and parallel, the child receives a score of 4. If the child performs adequately but only after hesitation and consideration of the movements involved, he receives a score of 3. If the lines 'bow' slightly, but attention is directed to both hands, the child receives a score of 2. If the lines 'bow' markedly, all attention is directed to the preferred hand, or if the child cannot perform, he receives a score of 1.

Rhythmic Writing

Rhythm: If the performance is smooth, certain, and consistent with no more than one additional trial to achieve size and position, the child receives a score of 4. If three or four trials are

necessary to achieve the desired rhythmic performance, the child receives a score of 3. If extreme difficulty is experienced in any part of the performance, the child receives a score of 2. If the child is unable to perform the task, he receives a score of 1. Reproductions: If the performance approximates the same size and letter constancy of the motif presented, the child receives a score of 4. If the performance shows decided tendency to make motifs larger or smaller than the sample motif, the child receives a score of 3. If the performance reveals reversals and omissions of components in the motifs, the child receives a score of 2. If the child is unable to perform the task, he receives a score of 1. Orientation: If the performance is adequate in terms of direction and position, and follows a straight line course from one side of the body to the other, the child receives a score of 4. If the performance is slightly slanted as the motifs are executed (either up or down), the child receives a score of 3. If the performance demonstrates that the child is incapable of reproducing the motifs on an approximately horizontal line, he receives a score of 2. If the child is incapable of performing the task, he receives a score of 1.

Ocular Pursuits

Tasks 1, 2, and 3: If the eyes move smoothly, evenly, and follow the movements, the child receives a score of 4. If the eyes move basically smoothly, with only slight jerkiness or hesitation, the child receives a score of 3. If the movements are uneven or jerky, the child receives a score of 2. If the child is basically unable to follow the target, loses the target, cannot follow the target without moving his head, or if parallelism between the two eyes is not established, the child receives a score of 1. Task 4: If there is smooth, even movement, the child receives a score of 4. If the movement is basically smooth, with only slight delay or inaccuracy, the child receives a score of 3. If the movement is jerky and unsure or if grasp and release are slow or inaccurate, the child receives a score of 2. If the eyes break apart or do not converge, the child receives a score of 1.

Visual Achievement Forms

Form: If the performance is adequate throughout, the child receives a score of 4. If there are minor distortions, particularly in the diamonds, the child receives a score of 3. If there is any segmenting in any of the drawings, the child receives a score of 2. If there are 'dog ears' on the diamonds, gross segmenting, or if the child cannot produce a recognizable form in one or more of the drawings, he receives a score of 1. Organization: If the drawings are organized from left to right or top to bottom and the size is adequate, the child receives a score of 4. If other organization is complete or if more than four of the forms are organized on the page, the child receives a score of 3. If the size is markedly too small or too large or if less than five of the drawings are organized on the page, the child receives a score of 2. If no organization is apparent in the drawings, the child receives a score of 1.

APPENDIX D

EQUIPMENT FOR THE PURDUE PERCEPTUAL-MOTOR SURVEY

All equipment used in both the testing and training program is built according to Kephart's specifications.

Angels in the Snow

A small throw rug is used for the child to lie upon while performing the prescribed tasks.

Walking Board

An eight foot long section of 2 x 4 is placed between two brackets which are diagrammed below. Testing is done on the four inch side of the 2 x 4.

Balance Boards

A square platform, 16 x 16 inches is used for each balance board. Underneath the platform and centrally located is a small post, three inches high, attached to the board by a screw. Three sizes of balance posts are used: 5 x 5, 4 x 4, 3 x 3 inches.

Drawing Games

A chalkboard, three feet by four feet or larger, is used. It should be without design. Also needed are several pieces of chalk and an eraser.

Pegboard Games

Two pieces of pegboard not smaller than 16 x 20 inches and having at least 100 holes are used. Also used in place of pegs are the recommended 100 golf tees in equal amounts of each of five colors.

Marsden Ball

A soft rubber ball about the size of a tennis ball is suspended by fishing line from the ceiling via an eyelet screw or similar means. The fishing line is attached by threading it through the ball and attaching a snap or button so that it will not draw back through.

Obstacle Course

A broom handle or similar object is used which is approximately three feet long.

Ocular Pursuits

A pencil with a visible eraser is used.

Visual Achievement Forms

A piece of blank paper, approximately the size of typing paper (8½" x 11"), a pencil, and the seven visual achievement forms drawn on 4" x 6" blank notecards were used.

Rythmic Writing

A chalk board, chalk, an eraser, and the eight motifs drawn on paper 4" x 11" were used.

APPENDIX E

HALL'S BEHAVIOR RATING SCALE

Name of child _____ Date _____

Position held at agency _____

The statements below describe various maladaptive behaviors found in emotionally disturbed children. The statements are meant to describe behaviors. For example, if a statement describes aggression, rate it according to aggressive behavior, regardless of the degree of aggressive feelings. Please rate each statement with an "X" in the appropriate square after the statement. The squares are numbered from 1 to 5 and represent the degree to which you have noticed the described behavior. If you do not observe the child at night, mark those statements pertaining to night time behavior with an "0" in the (1) square after the statement. Please rate every statement. The basis for making a judgment are given below:

- (1) You have noticed not noticed this behavior at all.
- (2) You have noticed the behavior to a slight degree (it has occurred occasionally).
- (3) You have noticed the behavior to a moderate degree (common behavior, occurs more than once a week).
- (4) You have noticed the behavior to a considerable degree (occurs every day).
- (5) You have noticed the behavior to a very large degree (occurs more than once a day).

1. Hyperactive and restless
2. Very withdrawn.
3. Is upset by changes in routine
4. Cries often and easily
5. Appears confused by punishment or correction
6. Destroys the belongings of others
7. Prefers to be by himself (plays by himself)
8. Easily distracted

	(1)	(2)	(3)	(4)	(5)
1. Hyperactive and restless					
2. Very withdrawn.					
3. Is upset by changes in routine					
4. Cries often and easily					
5. Appears confused by punishment or correction					
6. Destroys the belongings of others					
7. Prefers to be by himself (plays by himself)					
8. Easily distracted					

	(1)	(2)	(3)	(4)	(5)
9. Appears confused in following directions					
10. Has erratic, flighty or scattered behavior					
11. Demands a great deal of attention					
12. Is aggressive toward other children					
13. Has explosive and unpredictable behavior					
14. Has difficulty reasoning things out					
15. Daydreams often					
16. Wets the bed					
17. Wets pants during the day					
18. Soils pants during the day					
19. Is awakened at night with nightmares					
20. Behavior seems to go in cycles					
21. Appears confused by structured activity (school)					
22. Expresses unrealistic fears					
23. Is aggressive toward adults					
24. Gives illogical responses to questions					
25. Cannot seem to control himself					
26. Appears to hallucinate					
27. Destroys his own belongings					
28. Appears not to be in 'this world'					
29. Is generally uncooperative and stubborn					
30. Seems generally unhappy					

APPENDIX F

HALL'S ANTI-SOCIAL SUBSCALE

	(1)	(2)	(3)	(4)	(5)
Destroys the belongs of others					
Is aggressive toward other children					
Has explosive and unpredictable behavior					
Is aggressive toward adults					
Destroys his own belongings					

APPENDIX G

HALL'S ASOCIAL SUBSCALE

	(1)	(2)	(3)	(4)	(5)
Very withdrawn					
Prefers to be by himself (play by himself)					
Daydreams often					
Appears to hallucinate					
Appears not to be in 'this world'					

APPENDIX H

PROGRESS CHART (EXPERIMENTAL)

Name _____ Age _____

Balance Board _____ Date Accomplished _____

5"	
4"	
3"	
Marsden Ball	

Walking Board

Forward	
Backward	
Sidewise	
$\frac{1}{2}$ Turn	
Full Turn	
Balance	

Marsden Ball

1 Hand	
Alternate	
Bottom	
Bat	
Balance Board	

Chalkboard

V Line	
H Line	
Circle	
1 Dot	
Dots	

Angels

Arms & Legs	
1 Limb	
Both Right & Left	
Cross Laterality	
Count	
Stomach	

Pegboard

Date Accomplished _____

Lines	
Square	
Triangle	
Rectangle	
Complex	

APPENDIX I

ACTIVITY RECORD (EXPERIMENTAL)

Name _____ Age _____

Date	Description of Activity
11/1/78	1. 1000 ft. of 1/2" dia. pipe was installed in the ground. The pipe was installed in the ground by using a hand auger. The pipe was installed in the ground by using a hand auger.

[illegible]

APPENDIX J

ACTIVITY RECORD (CONTROL)

Name _____ Age _____

[illegible]

PHYS. QUIET

DESCRIPTION OF ACTIVITY

[illegible]

APPENDIX K

PURDUE PERCEPTUAL-MOTOR SURVEY SUMMARY SHEETS

Name _____ Date of Birth _____

Agency _____ Sex _____

Diagnosis _____ Test Dates _____

	Pre-test	Post-test	Difference
Walking Board Forward Backward Sideways			
Jumping Identification of Body Parts Imitation of Movements Obstacle Course Kraus-Weber Angels-in-the-Snow			
Chalkboard Circle Double Circle Lateral Line Verticle Line			
Rhythmic Writing Rhythm Reproduction Orientation			
Ocular Pursuits Both Eyes Right Eye Left Eye Convergence			
Visual Achievement Forms Form Organization			
TOTALS			

BEHAVIOR RATING SCALE SUMMARY SHEET

Name _____ Birth Date _____

Agency _____ Sex _____

Diagnosis _____ Rating Dates _____

	Before	After	Difference
Hyperactive and restless			
Upset by changes in routine			
Cries often and easily			
Confused by correction			
Easily distracted			
Confused in following directions			
Erratic, flighty, scattered behavior			
Demands a great deal of attention			
Difficulty reasoning things out			
Wets bed			
Wets pants during the day			
Soils pants during the day			
Is awakened with nightmares			
Behavior seems to go in cycles			
Confused by structured activity			
Expresses unrealistic fears			
Illogical responses to questions			
Cannot seem to control himself			
Generally uncooperative and stubborn			
Seems generally unhappy			
Very withdrawn			
Prefers to be by himself			
Daydreams often			
Appears to hallucinate			
Appears not to in 'this world'			
Asocial Sub-Total			
Destroys the belongings of others			
Is aggressive toward other children			
Explosive and unpredictable behavior			
Is aggressive toward adults			
Destroys his own belongings			
Anti-Social Sub-Total			
GRAND TOTALS			

APPENDIX L

RAW DATA

TABLE XIII

RAW SCORES

		P. M. A.		Tot. Behav.		Anti-		Asoc.	
	Subj.	Pre	Post	Pre	Post	Pre	Post	Pre	Post
<u>EXPERIMENTAL</u>									
Withdrawn	1	32	60	240	209	22	22	58	51
	2	55	68	204	186	24	22	51	44
	3	40	71	300	247	40	38	62	46
	4	32	52	219	193	24	34	48	32
	5	65	84	194	145	22	21	38	25
Acting out	6	47	71	282	262	61	51	37	34
	7	57	64	164	145	37	30	26	20
	8	67	75	196	195	47	43	18	20
	9	55	72	241	231	48	48	32	33
	10	52	73	250	197	51	35	30	28
<u>CONTROL</u>									
Withdrawn	11	--	--	216	227	33	35	31	37
	12	37	38	228	221	27	21	44	45
	13	34	31	202	196	21	25	42	38
	14	27	37	206	208	25	28	49	41
	15	66	66	148	135	19	22	35	30
Acting out	16	61	59	241	240	53	44	37	34
	17	66	73	187	178	47	42	24	22
	18	64	66	210	201	44	40	25	25
	19	27	33	280	279	43	45	43	43
	20	64	68	172	168	28	31	27	27

Figure 17. A comparison of withdrawn subjects on perceptual-motor survey.

Figure 18. A comparison of acting out subjects on the perceptual-motor survey.

Figure 19. A comparison of withdrawn subjects on the behavior rating scale.

Figure 20. A comparison of acting out subjects on the behavior rating scale.

Figure 21. A comparison of withdrawn subjects on the asocial behavior subtest.

• Figure 22. A comparison of acting out subjects on the anti-social subtest.

APPENDIX M

WAVERLY NEWSLETTER ARTICLE

Miss Julia Hall working with a boy on Perceptual-Motor training.

PERCEPTUAL-MOTOR TRAINING

During the last nine weeks we have been helping Julia Hall with her research study for her masters thesis. Miss Hall received her Bachelors of Science in psychology from the University of Oregon in 1968. She worked with emotionally disturbed children at Parry Center and has plans to complete her Masters of Science in psychology from Portland State University this summer.

The purpose of Miss Hall's study is to determine whether a Perceptual-Motor Training program as designed by D. H. Radler and Newell C. Kephart in their book Success Through Play will effect a decrease in the amount of maladaptive behaviors exhibited by emotionally disturbed children. She hopes to discover whether these training techniques will be valuable in the treatment of these children. It is also her hope to be able to discover with what type of behavior this training is most effective.

Miss Hall is working with twenty children between the ages of six and twelve from three agencies in the Portland Metropolitan area. Eight of Waverly's children are participating in her study.

Waverly has used Perceptual-Motor training in the form of walking boards, lacing boards, and puzzles quite successfully for the last three years with our retarded children. We are all interested in the result of Miss Hall's study as a possible new resource for helping the emotionally disturbed child.

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