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A cognitive behavioral treatment for impulsive aggressive behavior in emotionally disturbed children

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A Cognitive Behavioral Treatment for Impulsive Aggressive Behavior in Emotionally Disturbed Children

A Thesis submitted to the Graduate faculty of the University of Richmond in Candidacy for the degree of Master of Arts in Psychology

By

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Acceptance

This thesis has been accepted in partial fulfillment of the requirements for the degree of Master of Arts in Psychology in the Graduate School of the University of Richmond.

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Chairman _____

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The author dedicates this work to his mother and father.

ABSTRACT

Twenty subjects were selected from a clinic population of emotionally disturbed children. The subjects were matched on the basis of classroom impulsivity (Impulsive Classroom Behavior Scale Scores) and age and assigned to either a treatment or control group. Both groups were further assessed by the Matching Familiar Figures Test and frequency counts of impulsive aggressive behaviors in several settings. The treatment group received six sessions of verbal self-instructions via modeling with a response cost contingent upon errors during training and three sessions of training in social problem solving. The control group received no specific treatment. Positive effects from treatment were revealed in significantly increased Matching Familiar Figure Test latency scores and improved teacher ratings of classroom behaviors. There was no reduction in the Matching Familiar Figure Test error scores nor were there significant changes in the behavior frequency count data. Treatment effects were not evident at follow-up. Methodological deficiencies arose which prohibit accurate interpretation of portions of the data.

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> The dramatic differences in the quality of problem solving among children of the same age or among children of different ages have been attributed to two categories of constructs--motivational variables and/or adequacy of conceptual skills. In effect differences in quality of cognitive products have been explained by assuming either that one child cared more about his performance, or that one child had more knowledge relevant to the task (Kagan, 1966, p. 17).

This simplistic view of cognitive processes has fallen under increasingly critical scrutiny following a series of research works by Jerome Kagan (Kagan, Rosman, Albert, Day and Phillips, 1964; Kagan, Pearson and Welch, 1966 ab; Kagan, 1966; Kagan and Kogan, 1970; and Kagan, Messer and Stanley, 1975). Kagan conceptualized and quantified several basic characteristics which contribute to developing an individualized cognitive strategy for problem solving. This paper will concern itself with the research related to a dimension of cognitive style known as reflection-impulsivity (Kagan, Rosman, Albert, Day and Phillips, 1964).

Reflection-impulsivity refers to a dichotomy of the response styles which individual's exhibit under specific

testing conditions. When a child is asked to select one object from a number of favored playthings he is operating under the condition of high response uncertainty (Messer, 1976). There is no obvious, readily determinable response. That is, the selection of a response from among the possible alternatives is maximally difficult. Under the high response uncertainty condition subjects will resort to either of two responses styles: reflective or impulsive. Those subjects who characteristically respond in a more deliberate fashion and with more accuracy are labeled reflective. Impulsive subjects respond more quickly and commit more errors relative to their reflective counterparts. From the example cited, the reflective child will delay his selection of a plaything pending his evaluation of the alternatives. The impulsive child will make his selection more quickly and with higher probability of error. The classification of subjects has become an increasingly complex process which will be described in more detail.

"The Matching Familiar Figures (MFF) test has become accepted as the primary index of reflection-impulsivity and by now has been employed as a criterion of reflection-impulsivity in a wide variety of investigations" (Block, Block and Harrington, 1975, p. 611). The MFF test is

a match to sample test which has appropriate forms for preschool age, school age and adult subjects. A sample figure is presented simultaneously with six to eight facsimiles which differ in varying degrees from the sample. The subject is asked to select the single figure which matches the sample item. The items employed are familiar figures (e.g., boat, plane, telephone, scissors). There are generally twelve items presented individually. The latency to the first response and the number of first response errors are recorded for each subject. A median split procedure is used to classify subjects into either reflective or impulsive categories. A subject who scores above the median (sample based) in response time and below the median (sample based) on errors is classified reflective. Impulsive subjects score above the median on errors and below the median on response time. Two additional subject classifications are created by logical extension of these constructs. Subjects who score below the mean on response time and below the mean on errors (fast-accurate) and subjects who score above the mean on errors and above the mean on latency (slow-inaccurate) comprise about 1/3 of most sample populations and are studied less often (Messer, 1976). Following the definitive studies by Kagan et al.

(1964), the research on reflection impulsivity may be divided into two broadly defined areas: (a) Studies which attempt to dileneate one, or more, of the components of reflective or impulsive behaviors (Messer, 1976) and (b) studies in which attempts are made to modify cognitive style (Kendall and Finch, 1976).

Both subjective and objective assessment show that the tendency to be impulsive is indicative of other behavioral differences (Messer, 1976). Impulsive subjects made more errors on tasks of visual discrimination (Kagan, 1965), inductive reasoning (Kagan, Pearson and Welch, 1966), and serial learning (Kagan, 1966). Impulsives also show less persistence than reflectives toward completion of difficult tasks (Kendall, Deardorff, Finch, Anderson and Sitarz, 1976). Montgomery and Finch (1975) found that impulsives and external locus of control while reflectives had internal locus of control.

In school Messer (1970) found that subjects who failed a grade had comparable verbal abilities but were impulsive relative to promoted students. Finch, Pezzuti, Nelson, Montgomery and Kemp (1974) found that, regardless of similar achievement levels and age, reflectives were placed two grade levels above impulsive students.

Investigations have been made into the development of a therapeutic technique for modification of this cognitive-behavior dimension. Research has consisted of the development of either behavioral strategies (Nelson, Finch and Hooke, 1976), cognitive strategies (Meichenbaum and Goodman, 1971), or varied combinations of the two (Kendall and Finch, 1976).

Some strategies which have been employed in the modification of impulsive behaviors are: modification of visual scanning strategy (Zelniker, Ault, Jeffrey and Parsons, 1972); redundancy and variability training (Shi-Sung Wen, 1974); forced latency delay (Kagan, Pearson and Welch, 1966); modification of motivational levels (Nelson, Finch and Hooke, 1975); modeling reflective behaviors (Yando and Kagan, 1968) and verbal self instructions (Meichenbaum and Goodman, 1971). Success has been found in the modification of either latency or error criteria. Significant changes have not reliably been produced on both measures.

Research has been directed toward developing a treatment strategy in which modeling, motivational and verbal self instruction modes might be integrated into a cognitive-behavioral program with clinical applicability.

Kendall and Finch (1976) culminated a series of experiments in a cognitive-behavioral treatment for impulsive behavior. The subject was a 9-year-old outpatient of the Virginia Treatment Center for Children (VTCC). Prior to treatment the boy's behavior was described as "aggressive, fiesty, quick, quarrelsome, immature and active" (Kendall and Finch, 1976, p. 4). He had recently been demoted from fourth to third grade. During his intake interview he moved about rapidly, changing the direction and purpose of his behavior without apparent cause. He altered the rules of the games he played and jumped between games without completing them.

Initial testing on the MFF test resulted in a mean latency of 4.59 seconds with 9 errors. "This set of scores based on extensive experience with both normal and emotionally disturbed children, would clearly place the patient within the impulsive category" (Kendall and Finch, 1976, p. 5).

Treatment consisted of six, 30-minute sessions. During sessions 1-3 a new target behavior was introduced each session and treatment implemented. Sessions 4-6 were used to assess generalization. The three target behaviors, also labeled switches, were defined as:

(a) When a new topic (of conversation), (b) a new game, or (c) a new game rule was initiated by the patient prior to the completion of an existing topic, game, or rule. Baseline data on the frequency of occurrence of the target behaviors was recorded during seven, 10-minute segments of two pre-treatment sessions.

The treatment sessions included the use of a combined verbal self-instruction and response cost procedure.

The verbal self-instructions were taught in several states as in Meichenbaum and Goodman (1971).

> First the therapist modeled performance of the task (Mazes, Wechsler, 1949) and talked aloud to himself while the patient observed; then the patient performed the task instructing himself aloud; next the therapist performed the task whispering to himself; and lastly the patient performed the task with the instruction to talk to himself (covert self-instructions). The instructions centered on defining the problem, the appropriate approach to the problem, focusing attention, and coping statements (Kendall and Finch, 1976, p. 6).

Intentional errors were routinely included and assistance was given when the subject encountered difficulty self

instructing. A cue card with the words: STOP, LISTEN, LOOK, AND THINK BEFORE I ANSWER in written and symbolic form was also used to stimulate reflective style.

Following the training in self-instruction, the response cost contingency was initiated. During treatment sessions the patient was given five dimes which he could lose contingent with the occurrence of a behavioral switch. Examples were given and each penalization was thoroughly explained to the subject. The setting, materials and the therapist were varied from session to session to maximize the possibility of generalization.

The results of the treatment program are evidenced in the significant reduction in the frequency of target behaviors immediately following the initiation of the treatment for each behavior. Switches in topics of conversation were reduced from a mean of 4.25 to .5 per 10-minute interval. Switches in games were reduced from a mean of 4.33 to .12. Similarly switches in game rules were reduced from 3.31 to .33 per interval following treatment.

> Post-treatment administration of the MFF test yielded a mean latency of 18.73 and 5 errors. This performance, when compared with both his initial test latency of 4.59 and 9 errors, and

> previous experience, is not considered impulsive and represents a "reflective" cognitive style (Kendall and Finch, 1976, p. 8).

Treatment generalized to all three conditions examined. Subjective teacher evaluation of classroom behavior also showed improvement. An additional administration of the MFF and the verbal self instruction and responses cost procedure was conducted at six-month followup. MFF performance remained reflective with a mean latency of 24.7 and only 4 errors (Kendall and Finch, 1976, p. 9). There were no behavioral switches during the follow-up session.

While this case-study was suggestive of the utility of the cognitive-behavioral treatment, the clinical utility of such a treatment procedure needed to be demonstrated further using a clinic population in a group comparison study (Kendall and Finch, 1977, p. 2).

Kendall and Finch (1977) undertook such a group comparison study. Twenty impulsive subjects were selected from the patient population at VTCC. The criteria for impulsives was an error rate of 7 or above and a mean latency of 8.5 seconds or less. Ten subjects each were assigned to a treatment group, and a control group.

The MFF test, three rating scales, and two self-report measures were employed as dependent measures. The Impulsivity Scale (IS) and the Impulse Categorization Control Instrument (ICCI) (Matushiba, 1964) were employed as self evaluative devices. The two rating scales were the Impulsive Classroom Behaviors Scale (ICBS) (Weinrich, 1975) and the Locus of Conflict Scale (LOC) (Armentrout, 1971).

Six sets of training materials were employed, one for each of six therapy sessions. The materials were directed toward improving: conceptual thinking, attention to detail, recognition of identities, sequential recognition, visual closure, and visual motor production.

During intial assessment all subjects were administered the MFF, IS, and ICCI. Classroom teachers completed the ICBS. Teachers and nursing personnel rated subjects on the LOC.

All subjects were exposed to the training materials during six, 20-minute sessions over a period of four weeks. The treatment group received additional training in verbal self-instruction and a response cost procedure contingent upon their errors during training. The verbal self-instruction training was identical to the Kendall and Finch

(1976) case study. In the response cost contingency ten token chips were substituted for the dimes. Chips were lost for the occurrence of errors on the training materials. Remaining chips could be used to purchase candy, gum, etc., at the end of the sessions. Each penalization was accompanied by an explanation. The control group received rewards on a non-contingent basis at the end of each training session.

Post-treatment evaluation was done at four weeks. Follow-up was collected at 12 weeks.

Significant results were revealed in changes in the MFF and ICBS. All other treatment effects were non-significant. Significant effects were found between the treatment and control group for latency and errors at post-treatment and follow-up. Additionally, the difference within the treatment group from initial assessment to post-testing was significant for both errors and latency. On the ICBS the rating change for the treatment group from initial testing to post-treatment was significant. Simple *t* tests also unveiled that the control group had become significantly more impulsive.

The results of Kendall and Finch (1976, 1977) suggest the clinical applicability of a cognitive-behavioral treatment for impulsive behavior. The

results, however, are clouded by several methodological weaknesses.

The Kendall and Finch (1976) case study is subject to all of the weaknesses in that design. Though the multiple baseline design employed adds some credibility to the results, powerful factors were uncontrolled. The role of the therapist as an element of change was not controlled, nor quantified, and may have been significant. The author's comment:

> It was felt that due to the relationship which developed, the therapist was a reinforcer for other positive behavior changes as well. The therapist observed an apparent increase in the patient's self-reinforcing statements and his ability to self-pace. It is unknown whether the relationship aided the treatment or the cognitive-behavioral treatment was a fostering agent for the relationship, but it did appear that the social reinforcement of the relationship was important (Kendall and Finch, 1976, p. 12).

The authors suggested that the inclusion of a generalization assessment would be worthwhile in single subject studies (Kendall and Finch, 1976). It should be worthwhile, too, to assure that such an assessment is

derived in an objective, unbiased procedure. Kendall and Finch (1976) provided no assurances toward this end.

The group comparison study (Kendall and Finch, 1977) offered a more powerful test of the cognitive behavioral treatment for impulsive behaviors, but methodological deficiencies remained. The results of the ICBS were clouded by the fact that there was a significant difference between the two groups at the initial evaluation. Further, the ICBS is a subjective measure as are the remainder of the dependent measures (MFF excepted). Their lack of sensitivity as measures of behavioral change may have accounted, to some degree, for the predominance of non-significant results (Kendall and Finch, 1977). Additionally as the authors hypothesize:

> In theorizing about the effectiveness of the cognitive behavioral treatment one must not ignore the training materials. Indeed, in the present study where generalization to the classroom was attained, the books were of the psychoeducational variety. On the other hand, if the treatment sessions were cognitive training and response cost dealing with interpersonal situations, attaining generalization to life

> situations would have been more likely. Thus, while it is not impossible to conclude that the cognitive-behavioral treatment did not generalize to the units, it is unlikely that the training tasks are relevant in regard to the type of generalization which was attained (Kendall and Finch, 1977, p. 16).

The present study will attempt to replicate and expand on certain aspects of the Kendall and Finch (1976, 1977) studies. Specifically, this study will be a group comparison of a cognitive-behavioral treatment of impulsive behaviors. The treatment will include psychoeducational materials, a response cost contingency and a program for interpersonal relationships.

Materials from Camp and Bash (1975) will be employed in an effort to enhance the probability of measurable changes being produced in specific living area behaviors. As suggested by Kendall and Finch (1977) the training materials will be more relevant to the type of generalization which is desired. Camp and Bash (1975) developed a cognitive training program to improve self-control in highly aggressive 6 to 8-year-old boys. The program employs psychoeducational materials and verbal rehersal of cognitive activities in both cognitive and interpersonal

problems. Camp and Bash (1975) found that "Teachers noted both trained and untrained aggressive subjects as improving in aggressive behaviors but they rated the experimental group as showing improvement on a significantly larger number of prosocial behaviors" (Camp and Bash, 1975, p. 12).

The expansion of the treatment program and the modification of the assessment devices employed are directed toward two goals: (a) To increase the probability that behavior changes will occur in the specified areas, and (b) to more accurately measure the behavioral changes which are produced. It was hypothesized that:

1. The cognitive-behavioral treatment program would produce significant change in the cognitive style of the treatment group, as reflected by changes in the ICBS, MFF latency and MFF error scores, while the control group would remain relatively stable.

2. The cognitive-behavioral treatment program would produce significant decrease in the frequency of impulsive aggressive behaviors in the treatment group, while the control group would remain relatively stable.

Method

Subjects

There were 20 subjects selected from the inpatient population of VTCC. The VTCC is a university affiliated children's psychiatric hospital located in Richmond, Virginia. Ten subjects were assigned to a treatment group and 10 to a control group. The groups were matched according to classroom impulsivity (ICBS ratings) and age to insure their pre-treatment equivalance. Clinical diagnoses for all subjects are presented in Appendix 1. Subjects were recruited for participation in the experiment by the principal investigator. The following introduction was used in seeking subject participation:

> I would like you to take part in a project that I am doing for school. It involves taking some tests and performing some tasks. These are not tasks which you can pass or fail. They will merely tell me more about the way people think. No one else will know the results of your test. You may be given the chance later to do additional tasks and earn some rewards. I will have a small reward for you when we finish today.

Treatment of all subjects was in accordance with the ethical standards of the American Psychological Association as established in the APA Ethical Principles in the Conduct of Research with Human Participants, 1973. Voluntary consent forms were obtained from all subjects (Appendix 2). Parental consent was also obtained.

Materials

Dependent measures. The MFF test is a 12 item match to sample task. Subjects were told:

> I am going to show you a picture of something you know and then some pictures that look like it. You will have to point to the picture on this bottom page (point) that is just like the one on this top page (point). Let's do some for practice (Kagan, 1965).

Subjects were directed through two practice items and then were told:

> Now we are going to do some that are a little bit harder. You will see a picture on top and six pictures on the bottom. Find the one that is just like the one on top and point to it (Kagan, 1965).

The experimenter recorded latency to the first response and first response errors.

The ICBS is a nine item teacher rating scale. Each item contains a five point scale on which classroom behaviors (breaks rules, attention span, control of temper) are rated. Teacher ratings of impulsive classroom behaviors (ICBS) have been found to be highly reliable. Some validational information was provided in Kendall and Finch (1976) in that the ICBS was found to be a sensitive measure of the effects of treatment. Kendall and Finch (1976) suggest that along with the brevity and simplicity of format of the ICBS, their study provided supportive reliability and validity data which should be considered in selecting a measure of classroom behavior. Teachers were told to rate the subject's classroom behavior, choosing the description best suited to that subject.

Training materials. The training materials were selected from Finch and Kendall (1976) and from Camp and Bash (1975) Think Aloud Program.

From Finch and Kendall (1976) six sets of training materials were selected. Set 1 is a conceptual thinking task. It is a series of 48 plates, four pictures per plate, three of which are conceptually similar. The instruction to the subject was to find the one that does not belong with the others. Set 2 is an attention

to visual detail task. It consists of four visual stimuli, two of which are identical. There are 42 plates. Subjects were instructed to find the pictures that match. Set 3 is a recognition of conceptual similarities task. There are 192 plates, each plate consisting of two pictures. Subjects were instructed to identify the pictures as the same or different. Set 4 is a concept formation task. It consists of geometric figures presented in patterned sequence. There are 68 sequences. The subjects were instructed to select from an array of alternatives the one which would complete the sequence. Set 5 is a visual closure task. It consists of 50 plates. Each plate has an incomplete line drawing superimposed on a square configuration of evenly spaced dots. Subjects were instructed to complete the drawing so that it is the same on both sides. Set 6 is a visual-motor reproduction task. Set 6 consists of 56 plates. On each plate a design is produced on a square configuration of evenly spaced dots. The subjects were instructed to reproduce the design on a blank dot configuration. Subjects were allowed to work on training materials for 10 minutes per set, one set per day for six consecutive school days.

Additional training materials were reproduced from the Think Aloud Manual (Camp and Bash, 1975). Social exercises 8-19 were employed.

Social problems 8-11 are designed to elicit multiple solutions for social problems. The solutions were received without evaluation by experimenter and labeled ideas. Subjects were encouraged to think "of lots of different ideas" (Camp and Bash, 1975, p. 77). Responses were categorized by type: ask, tell, give, trade, trick, hurt, share, wait and the experimenter presented appropriate social cue cards. The social problems were presented verbally. Social Problem 8--Boy wants girl to let him feed the hamsters. Social Problem 9--Girl wants to sit on mother's lap, baby is sitting there now. Social Problem 10--Girl wants to use scissors that boy is using. Social Problem 11--Boy on the playground calls you a name.

Social Problems 12-15 are designed to extend the impact of the Solutions Set (8-11) so that subjects will learn of possible consequences to the proposed solutions to social problems. Social Problem 12--Mickey wants to play with Lucy and child, so he pushes Lucy. Social Problem 13--Boy wants sister/brother to look at his toy truck, but she/he is watching television. Social

Problem 14--Boy wants baby to stop crying. Social Problem 15--Your friend chases you in the hall, but running in the hall is against the rules.

Social Problems 16-19 continue encouraging subjects to produce solutions and successively of solutions to their social problems. Social Problem 16--In gym you get the old bean bag for the bean toss. Social Problem 17--Boy tries to cut in line in front of you at the drinking fountain. Social Problem 18--Girl grabs your friend's paper, he tells you to get it back. Social Problem 19--Friend is talking when teacher gives directions for math paper. For each of the three sets of four social problems a standard dialogue (see Procedure section) is provided. Subjects were required to prove four solutions for each social problem. One set was presented per day on each of three consecutive school days.

Procedure

Intervention. There were two groups: a treatment group and a control group. All subjects met with the experimenter individually for an identical number of sessions, either treatment or control modes. All subjects met with the experimenter for 12 sessions of equal duration. Except for the treatment program all subjects received identical task related instructions and feedback.

All subjects were assessed by the MFF test, the ICBS, and hostile aggressive behavior frequency counts.

Behavior frequency counts were made on hostile aggressive behaviors in three settings. Five sessions of 30 minute duration were observed in classrooms, living units and gym periods. Hostile aggressive behaviors were defined as any behavior physical or verbal, by a subject which threatened, or caused, harm to another patient. Verbal assaults included vulgarisms and name calling, as well as specifically stated threats. Physical assaults, threatening gestures, or attempted assaults as well as successful attacks were recorded.

All rater/observers were blind with respect to group placement of the subjects. All rater/observers were naive with respect to the purpose of the study.

Treatment group. In addition to the exposure to the training materials, the treatment group underwent additional training through : (a) verbal self-instruction, (b) response cost contingency, (c) Think Aloud Program (Camp and Bash, 1975).

The verbal self-instructions were provided in reference to each set of training materials in a specific sequence. The instruction in verbal self-instruction also included a planned error and a correction. The

experimenter first performed the task aloud, verbalizing about relevant aspects of the stimuli. The subject modeled the experimenter's behavior, with guidance if necessary. The experimenter next performed the task talking in a whisper. The subject was instructed to do likewise. Finally the experimenter performed the task in silence, followed by the subject (Kendall and Finch, 1976). The following are examples of the instructional procedure employed with the visual association task (Task 1, Kendall and Finch, 1976).

> Let's see now, what am I supposed to do? I'm supposed to find the one that doesn't belong with the others. I see four pictures here so I better look at each one carefully. Okay, the first one is a clock, so is the second one. This one is a grandfather clock, but this one is a cup and saucer. So, I've got three clocks and one cup and saucer. It's the cup and saucer that doesn't belong (Kendall and Finch, 1976, p. 8).

The planned error was programmed as follows:

> Here we have four animals. They're all animals . . . wait . . . this one isn't a dog, it's a lion. There, now I can correct myself before I make an error. The lion is the

> one that doesn't belong (Kendall and Finch, 1976, p. 8).

Instructions were repeated at each training session with appropriate modifications for changes in the task presented.

A response-cost contingency was employed in each of the 6 training sessions using the psychoeducational materials (Kendall and Finch, 1976). Ten token chips were presented to the subject at the beginning of each training session. Subjects were told that the chips in their possession at the end of the session could be exchanged for rewards. More valuable/desirable rewards were obtainable for larger numbers of chips. Subjects were told that for each error they would be penalized one chip. Following each error, the penalization took place and the reason for it specified.

The Think Aloud materials from Camp and Bash (1975) were administered in 3 consecutive sessions following completion of the 6 initial sessions. One social problem set was presented each session. With each social problem set a standard dialogue was provided. The dialogue was used to stimulate and direct the verbal exchange between the experimenter and the subject relative to the social problem. A typical dialogue is provided below:

Teacher: We have a new kind of problem today. This boy wants the girl to let him feed the hamsters. What does he want her to do?

Children: _____

Teacher: My problem is to think of something he can do so he can get a chance to feed the hamsters. I'll write down all the things I think of for the boy to do so he gets a chance.

(Camp and Bash, 1975, p. 76)

Additionally in that same dialogue:

Teacher: Now it's your turn to think of lots of different things the boy could say to get a chance to feed the hamster.

(Camp and Bash, 1975, p. 77)

All subjects were presented training/control materials in identical sequence.

Control group. The control group was also exposed to the psychoeducational training materials (Kendall and Finch, 1976). The control group did not, however, receive training in verbal self-instructions, nor did they work under a response cost contingency. Controls received rewards at the end of each session, noncontingent on

performance. For the sessions in which the experimental group subjects received the Think Aloud procedures, the controls were asked to read parts of children's books that were chosen as to be unrelated to aggression.

Post-treatment assessment. Following completion of treatment/control sessions subjects were re-administered the MFF test, teachers rated subjects on the ICBS and behavior frequency counts were repeated. Subjects were told that all subjects were taking the MFF test several times to provide additional information to the experimenter. Subjects were told the re-administration was not due to poor performance at the initial testing, or on other subsequent training materials.

Follow-up. Follow-up data was collected in methodology identical to the previous sessions. Appendix 11 provides a flow chart of the treatment assessment sequence.

Data analysis. The data obtained was treated in two different ways: Statistical analysis of grouped data and visual presentation and inspection of individual data. A two-way analysis of variance with repeated measures on one factor was used to analyze the grouped data. The data pattern of each subject is presented. The percentage of subjects who show improvement is presented.

Results

Reliabilities

MFF. The reliability of MFF performance was computed using control subject data across the first two assessment periods. The test-retest correlation for the error scores was non-significant (r_{xy} = .08, $p > .05$). The test-retest correlation for the latency scores was significant (r_{xy} = .72, $p < .05$). These findings contrast with the Kendall and Finch (1976) data in which reliability data for both errors and latency were significant. Correlations were .78 and .92 for errors and latency respectively. The lack of significant reliability among the error scores is discussed in relation to interpretation of the data at a later point.

ICBS. The reliabillity of the ICBS was computed using control subject data across the first two assessment periods. The test-retest correlation for the ICBS was significant (r_{xy} = .92, $p < .05$). This finding compares favorably with the lower, but statistically significant, correlation coefficient (r_{xy} = .68, $p < .05$) resultant from an earlier study employing the ICBS (Weinrich, 1975).

Behavior frequency counts. The observations made on control subjects during the pre-treatment and post-treatment observation periods correlated significantly

(r_{xy} = .63, $p < .05$). However, there were procedural deficiencies in the behavior frequency count methodology which are discussed in relation to the adequacy of the study.

Group Comparisons

The means and standard deviations for the dependent measures, sorted by group are presented in Table 1.

Insert Table 1 about here

To assess change in the dependent measures for subjects in the treatment and control groups across three periods, separate two-way analyses of variance were performed on each set of data.

ICBS. The 2x3 analysis of variance resulted in a non-significant groups effect ($F(1,16) = .20$, $p > .05$), a non-significant periods effect ($F(2,26) = .02$, $p > .05$) and a significant groups by period interaction ($F(2,26) = 3.58$, $p < .05$). These results are presented in Table 2 and Figure 1.

Insert Table 2 and Figure 1 about here

MFF. Separate analyses of variance were conducted on the latency and error measures of the MFF. The

Table 1

Means and Standard Deviations of the Dependent Measures for the Treatment and Control Groups

	Treatment			Control		
Period	Pre-treatment N = 9	Post-treatment N = 9	Follow-up N = 8	Pre-treatment N = 9	Post-treatment N = 9	Follow-up N = 4
MFF						
Latency						
$\bar{X}$	5.78	9.49	7.20	6.07	5.76	7.97
SD	2.48	2.34	1.93	2.09	3.62	3.16
Errors						
$\bar{X}$	7.89	6.33	5.87	7.44	8.44	6.75
SD	1.96	1.65	1.46	2.35	2.45	1.89
ICBS						
$\bar{X}$	30.00	28.44	28.5	29.78	32.33	28.50
SD	9.26	8.00	8.52	5.78	6.50	8.22
Behavior Frequency Count						
School Total						
$\bar{X}$	7.11	7.00	-	12.22	8.56	-
SD	7.74	8.29	-	7.67	8.63	-
Unit Total						
$\bar{X}$	5.00	1.44	-	7.67	5.11	-
SD	6.48	3.13	-	6.54	7.41	-
Gym Total						
$\bar{X}$	6.89	5.00	-	6.78	5.44	-
SD	7.24	6.38	-	4.38	3.57	-
Total						
$\bar{X}$	18.67	13.00	-	26.67	19.33	-
SD	18.66	12.82	-	16.35	13.60	-

Table 2

Analysis of Variance of Impulsive Classroom Behavior Scale (ICBS) Scores

Source of Variance	df	MS	F
Between			
Group	1	30.16	.20
Error between	16	147.01	
Within			
ICBS	2	1.29	.02
Group x ICBS	2	24.28	3.58*
Error within	26	6.78	

*$p < .05$

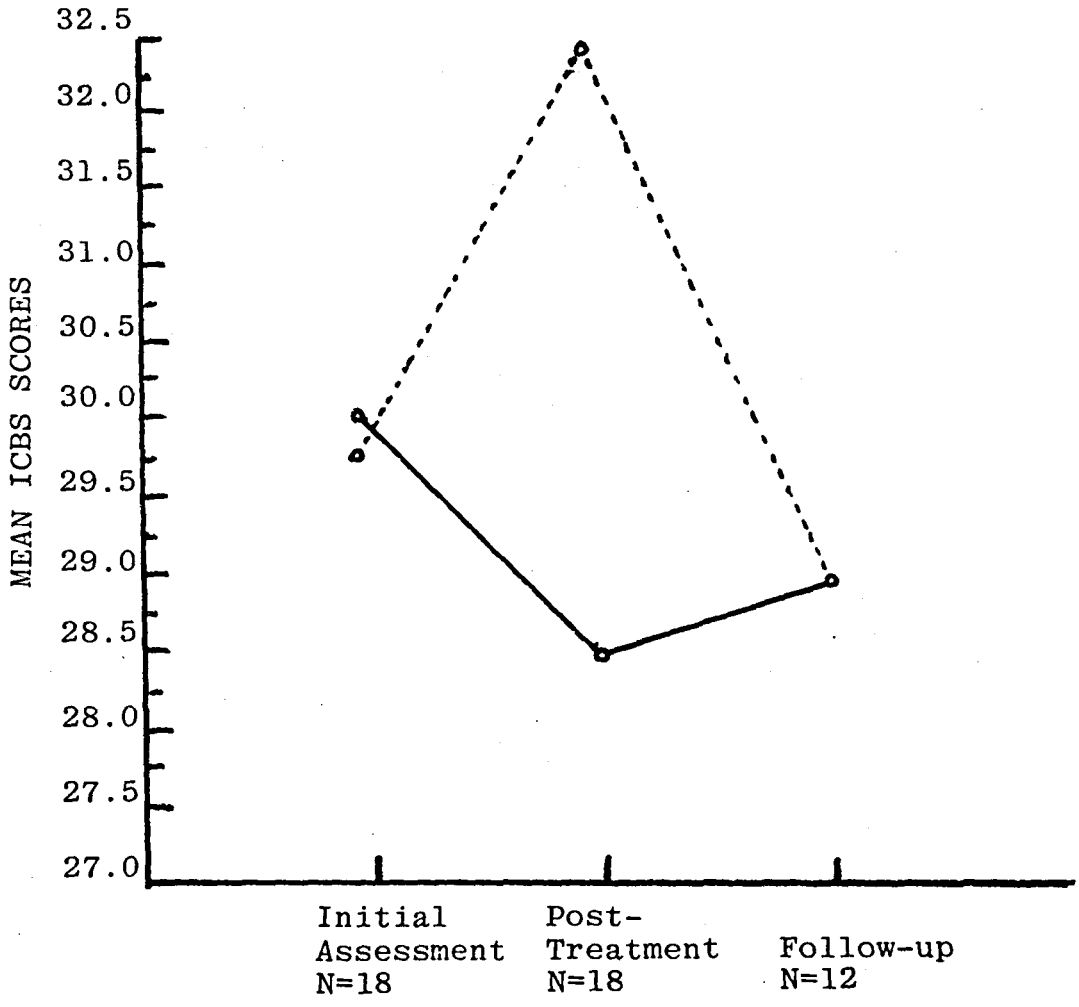

Figure 1. Mean impulsive classroom behavior scale (ICBS) scores

latency analysis resulted in non-significant groups effect ($F(1,16) = 1.66$, $p > .05$), non-significant periods effect ($F(2,26) = 2.75$, $p > .05$) and significant groups by periods interaction ($F(2,26) = 3.99$, $p < .05$). These results are represented in Table 3 and Figure 2.

Insert Table 3 and Figure 2 about here

The analysis of error scores resulted in non-significant groups effect ($F(1,16) = 2.25$, $p > .05$), non-significant periods effects ($F(2,26) = 1.13$, $p > .05$) and non-significant groups by periods interaction ($F(2,26) = 2.13$, $p > .05$). These results are presented in Table 4 and Figure 3.

Insert Table 4 and Figure 3 about here

Behavior frequency counts. There were significant periods effects for the total verbal aggressive behaviors and for the total aggressive behaviors observed. The remainder of the analyses of behavior frequency counts resulted in non-significant effects for all measures. The results are presented in Tables 5-16.

Insert Tables 5-16 about here

Table 3

Analysis of Variance of Matching Familiar Figures Test Latency Scores

Source of Variance	df	MS	F
Between			
Group	1	17.55	1.66
Error between	16	10.53	
Within			
MFF Latency	2	13.78	2.75
Group x MFF Latency	2	19.99	3.99*
Error within	26	5.01	

*$p < .05$

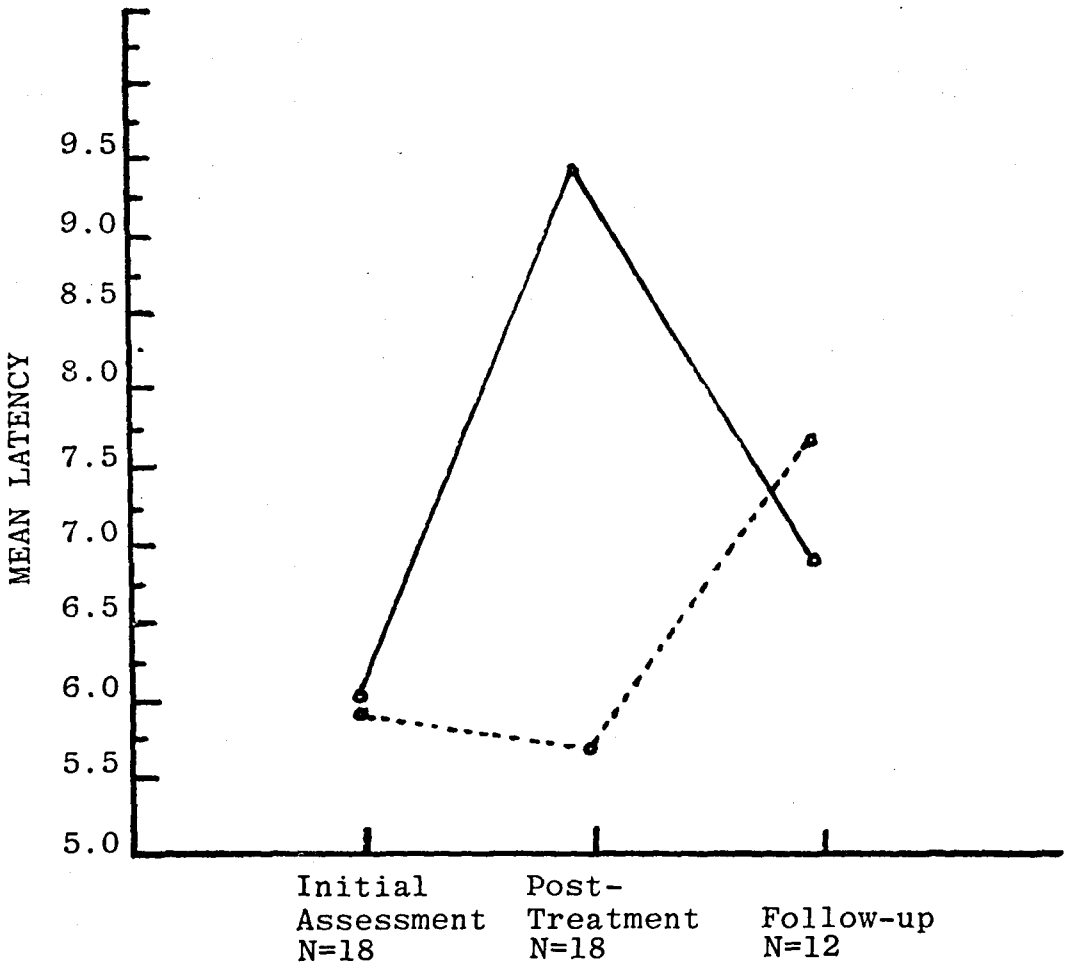

Figure 2. Mean matching familiar figures test latency scores

Table 4

Analysis of Variance of Matching Familiar Figures Test Error Scores

Source of Variance	df	MS	F
Between			
Group	1	11.83	2.25
Error between	16	5.25	
Within			
MFF Error	2	4.02	1.13
Group x MFF Error	2	7.57	2.13
Error within	26	3.54	

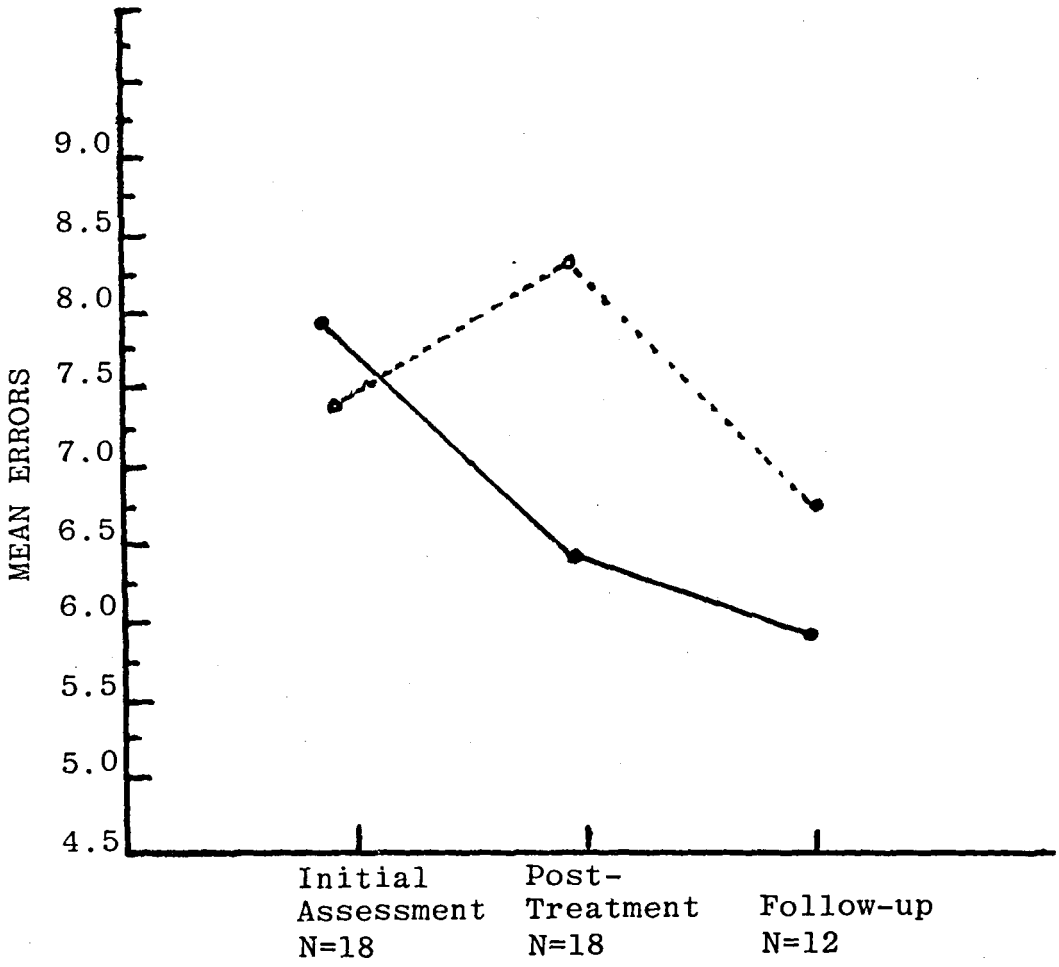

Figure 3. Mean matching familiar figures test error scores

Table 5

Analysis of Variance for Physical Aggressive Behaviors Observed in the Gymnasium

Source of Variance	df	MS	F
Between			
Group	1	.44	.07
Error between	16	6.72	
Within			
Gym Physical	1	1.78	.60
Group x Physical	1	.11	.04
Error within	16	2.94	

Table 6

Analysis of Variance for Verbal Aggressive Behaviors Observed in the Gymnasium

Source of Variance	df	MS	F
Between			
Group	1	1.36	.04
Error between	16	33.88	
Within			
Gym Verbal	1	12.25	1.69
Group x Gym Verbal	1	1.36	.19
Error within	16	7.24	

Table 7

Analysis of Variance for Aggression (Total) Observed in the Gymnasium

Source of Variance	df	MS	F
Between			
Group	1	0.25	0.00
Error between	16	56.01	
Within			
Gym Total	1	23.36	3.58
Group x Gym Total	1	0.694	0.11
Error within	16	6.52	

Table 8

Analysis of Variance of Physical Aggressive Behaviors Observed in School

Source of Variance	df	MS	F
Between			
Group	1	4.0	0.19
Error between	16	20.86	
Within			
School Physical	1	16.0	2.34
Group x School Physical	1	1.78	0.26
Error within	16	6.82	

Table 9

Analysis of Variance of Verbal Aggressive Behaviors Observed in School

Source of Variance	df	MS	F
Between			
Group	1	64.0	1.79
Error between	16	35.68	
Within			
School Verbal	1	93.44	4.06
Group x School Verbal	1	44.44	1.93
Error within	16	23.01	

Table 10

Analysis of Variance for Aggressive Behaviors (Total) Observed in School

Source of Variance	df	MS	F
Between			
Group	1	100.0	1.22
Error between	16	82.20	
Within			
School Total	1	32.11	0.66
Group x School Total	1	28.44	0.58
Error between	16	48.84	

Table 11

Analysis of Variance of Physical Aggressive Behaviors Observed in the Living Units

Source of Variance	df	MS	F
Between			
Group	1	11.11	2.54
Error between	16	4.36	
Within			
Unit Physical	1	2.78	3.96
Group x Unit Physical	1	1.00	1.43
Error within	16	0.70	

Table 12

Analysis of Variance of Verbal Aggressive Behaviors Observed in the Living Unit

Source of Variance	df	MS	F
Between			
Group	1	124.69	3.73
Error between	16	33.41	
Within			
Unit Verbal	1	84.028	3.27
Group x Unit Verbal	1	4.69	0.18
Error within	16	25.67	

Table 13

Analysis of Variance of Aggressive Behaviors (Total) Observed in the Living Units

Source of Variance	df	MS	F
Between			
Group	1	90.25	1.89
Error between	16	47.86	
Within			
Unit Total	1	84.03	3.13
Group x Unit Total	1	2.25	0.08
Error within	16	26.82	

Table 14

Analysis of Variance of the Total Physical Aggressive Behaviors Observed

Source of Variance	df	MS	F
Between			
Group	1	.69	.01
Error between	16	54.04	
Within			
Total Physical	1	.69	.06
Group x Total Physical	1	4.69	.40
Error within	16	11.88	

Table 15

Analysis of Variance of the Total Verbal Aggressive Behaviors Observed

Source of Variance	df	MS	F
Between			
Group	1	498.7	2.12
Error between	16	235.04	
Within			
Total Verbal	1	413.44	7.38
Group x Total Verbal	1	21.78	.39
Error within	16	56.04	

Table 16

Analysis of Variance of the Total

Aggressive Behaviors Observed

Source of Variance	df	MS	F
Between			
Group	1	462.25	1.15
Error between	16	401.50	
Within			
Total	1	380.25	4.70
Group x Total	1	6.25	0.08
Within	16	80.87	

Intercorrelations. Intercorrelations of the dependent measures are presented in Table 17. Visual

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Insert Table 17 about here

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examination of the data related to the ICBS demonstrate further the reliability and validity of the device in assessing impulsive behaviors. Teacher ratings correlated significiantly (p .05) across all three rating periods. The first ratings correlated .89 with the second and .81 with the third. The second period ratings correlated .91 with the third. Validational data for the ICBS is provided in a significant correlation with behavior frequency count data taken in the school classrooms. The ICBS correlated .55 (p 05) with impulsive aggressive behaviors in the classroom upon initial administration. At post-treatment the ICBS correlated again significantly .50 (p 05) with the behavioral observations. The ICBS was related significantly to behavioral measures made outside the classroom as well, suggesting that it may be measuring a general impulsive tendency rather than impulsivity present only in classroom situations. Impulsive assaultive behaviors in the gymnasium and the sum total of those behaviors across the three observation settings correlated .66 and .63 respectively with pre-treatment ICBS. At follow-up there were no significant

Table 17

Intercorrelations of the Dependent Measures, Age

IQ, and, Length of Hospitalization

Measure (Period)	1	2	3	4	5	6	7	8	9	10	11	12	13	14	15	16	17	18	19	20
MFF																				
1. Latency (1)		.19	.36	-.31	-.13	-.01	-.15	-.22	-.55	.06	-.25	.06	-.02	.01	.10	.10	-.05	.20	-.19	.05
2. Latency (2)			.14	-.01	-.70*	-.24	-.33	-.47*	-.48	-.27	-.02	-.32	-.39	-.47*	-.20	-.42	-.28	.23	.27	.01
3. Latency (3)				.23	-.42	-.38	-.29	-.37	-.47	-.36	.53	-.36	-.08	-.04	-.32	-.17	.06	-.40	-.18	-.26
4. Errors (1)					.07	-.09	.35	.40	.41	.11	.28	.11	.20	.22	.19	.15	.30	-.55*	-.36	.36
5. Errors (2)						.50	.45	.65*	.58*	.38	-.10	.32	.20	.40	.30	.40	.23	-.54*	-.35	.01
6. Errors (3)							.65*	.58*	.52	.00	-.53	.42	.29	.20	.20	.32	-.03	-.40	-.13	.05
ICBS																				
7. (1)								.89*	.81*	.30	-.19	.66*	.56*	.55*	.33	.63*	.32	-.59*	-.23	.54*
8. (2)									.91*	.46	.04	.63*	.50*	.57*	.50*	.65*	.53*	-.71*	-.43	.46
9. (3)										.53	.00	.69*	.67*	.64	.55	.79*	.59*	-.83	-.44	.47
Behavior Frequency																				
Count																				
10. Unit Total (1)											.33	.56*	.62	.62*	.44	.76*	.68*	-.25	-.25	.38
11. Unit Total (2)												-.14	.08	.20	.07	.62*	.56*	-.12	-.20	-.08
12. Gym Total (1)													.80*	.70*	.59*	.87*	.62*	-.53*	-.25	.37*
13. Gym Total (2)														.79*	.30	.87*	.61*	-.32	-.22	.43
14. School Total (1)															.27	.91*	.58*	-.47*	-.34	.61*
15. School Total (2)																.47	.78*	-.33	-.11	.08
16. Total (1)																	.71*	-.44	-.25	.54*
17. Total (2)																		-.30	-.25	.22
Age (Months)																				
18.																			.33	-.54*
IQ																				
19.																				.22
Length of Hospitalization																				
20.																				

(1) = Pre-treatment N = 18

(2) = Post-treatment N = 18

(3) = Follow-up N = 12

* $p < .05$

correlations between the ICBS and the other variables.

For the pre-treatment administration of the MFF correlations with the ICBS and the behavior frequency counts were non-significant. At post-treatment evaluation, MFF latency correlated with the ICBS -.47 and with MFF errors -.70, both significant ($p < .05$) MFF errors correlated significantly (.65) with the ICBS. Follow-up testing with the MFF produced no significant correlations among the other variables. Post-hoc interest in the variables age and IQ prompted their inclusion in the correlation matrix. IQ did not correlate significantly with any variable. Age at the time of pre-treatment evaluation correlated significantly with pre-treatment MFF errors -.55, pre-treatment ICBS -.59; pre-treatment assaultiveness in gym -.53, school -.47, post-treatment MFF errors -.54 and post-treatment ICBS -.71. The resulting trend suggests that as the age of the subject increased the tendency to behave impulsively decreased.

Individual Comparisons

Comparison of individual data of treatment and control pairs is presented in Table 18.

Insert Table 18 about here

The comparisons below were made by examining the data from the pre-treatment and post-treatment evaluations. It can be seen by inspecting these data that 56% of the subjects in the treatment group had improved ICBS ratings as opposed to 22% for the control group. Ratings deteriorated from 22% of the treatment group compared to 66% for the control group. On the MFF error scores 89% of the treatment subjects versus 33% of the control subjects showed improvement. Eleven percent of the treatment subjects and 56% of the control subjects made more errors. Eighty-nine percent of the treatment group and 11% of the control group made fewer errors. For the latency measurements of the MFF improvement was evident in 89% and 33% of the treatment and control groups respectively. Latencies decreased for 11% of the treatment group compared to 67% for the controls. For the behavior frequency counts of the impulsive aggressive behaviors, 56% of both treatment and control groups had reduced scores. However, only 22% of the treatment group scores increased while 44% of the control group had increased counts.

Table 18

Comparison of Data for Individual Treatment and Control Subject Pairs

		Treatment								Control							
						Behavior Frequency Counts								Behavior Frequency Counts			
Subject Pairs	Period	Age (Months)	ICBS	MFF Latency	MFF Errors	Living Unit Total	Gym Total	School Total	Total	Age (Months)	ICBS	MFF Latency	MFF Errors	Living Unit Total	Gym Total	School Total	Total
	1	119	37	8.8	9	0	0	0	0	109	33	3.6	10	5	9	10	24
A	2		27	12.9	7	0	0	0	0		37	2.8	10	0	6	22	28
	3										38	5.6	8				
	1	109	41	4.6	9	0	16	25	41	110	35	5.2	9	0	10	19	29
B	2		36	7.3	6	16	19	0	35		34	2.5	9	10	4	0	14
	3		38	6.7	7												
	1	115	34	7.5	6	6	19	13	38	117	34	3.6	9	15	12	19	46
C	2		33	8.9	8	0	10	24	34		38	5.1	10	0	8	19	27
	3		35	6.3	7												
	1	131	27	2.7	7	5	10	7	22	130	27	3.6	6	0	0	0	0
D	2		30	12.9	6	0	4	10	14		33	5.1	9	6	0	0	6
	3		30	3.2	5												
	1	132	30	2.8	11	16	10	5	31	132	35	8.0	8	14	8	15	37
E	2		32	7.7	7	9	7	13	29		38	5.0	9	8	5	16	29
	3		32	7.2	5												
	1	135	35	3.7	10	0	2	5	7	158	32	5.1	8	10	7	12	29
F	2		31	9.8	9	0	0	0	0		36	2.8	9	6	10	9	25
	3		26	8.8	7												
	1	161	39	8.1	7	5	10	0	15	148	24	5.2	10	10	4	10	24
G	2		33	11.0	4	8	5	0	13		28	8.3	6	23	8	23	54
	3		26	8.9	7						28	12.1	4				
	1	168	30	5.3	7	0	0	4	4	154	30	6.8	3	15	9	15	39
H	2		25	6.5	6	0	4	5	9		29	4.8	11	0	8	3	11
	3		31	7.4	6						30	5.4	8				
	1	182	9	8.5	5	0	0	0	0	169	18	7.2	6	0	0	0	0
I	2		9	8.4	4	0	0	0	0		18	14.0	3	0	0	3	3
	3		10	9.1	3						18	8.8	7				

1 = Pre-treatment

2 = Post-treatment

3 = Follow-up

Discussion

The results of this study again substantiate that in part a cognitive-behavioral treatment for the modification of impulsive behaviors in emotionally disturbed children can be effective. The cognitive tempo of the treatment group, as reflected by the MFF latency scores, changed significantly. While a trend can be inferred, the anticipated corresponding change in the error rate for the control subjects merely approached significance. Further significant generalization of effects of the treatment program were reflected by significant decreases in the teacher ratings of classroom behaviors. The treatment effects did not evidence themselves in any of the behavior frequency counts taken to assess the effects of the social problem solving training. The apparent lack of effect produced by the social problem solving training will be discussed in relation to the adequacy of the study. The significant treatment effects evident at the post-treatment evaluation did not persist to the follow-up session. This apparent transience of treatment effects is at odds with previous findings (Kendall and Finch, 1976) and is open to several interpretations; either the treatment effects of the cognitive-behavioral

treatment are transient and Kendall and Finch (1976) were in error, or, the treatment effects persisted at the follow-up session and methodological deficiencies in the present study prevented their accurate measurement.

The substantial number of intercorrelations found among the ICBS and MFF latency measures provide validational data for those measures. The reliability of the error measure of the MFF as well as its lack of responsiveness to the treatment effects inhibits any assertion of validational confirmation.

The adequacy of the present study in testing the proposed hypothesis is considered next. In determining the short range effects of the treatment package, as reflected in ICBS and MFF scores, the present study proved adequate. The practical considerations of time and limited subject pool prevented the utilization of more subjects and the subsequent benefit derived from increasing the power of the hypothesis test. Future research might benefit through employing larger numbers of subjects. Adapting the cognitive-behavioral treatment program to either group application or the use of multiple therapists would make the use of more subjects more practical.

Upon examination of the behavior frequency count and the follow-up data for the ICBS and the MFF, methodological deficiencies which prohibit the meaningful interpretation of the data become apparent. The lack of inter-rater reliabilities and the rotation of observers within experimental settings allowed error sources to exist uncontrolled and unmeasured. These factors contributed in unknown degrees to the non-significant results in the behavior frequency count data. A better procedure would be to eliminate the rotation of observers between settings and employ pairs of raters to measure inter-rater reliabilities directly. The significant main effects differences which arose in the behavior frequency count may be interpreted in several ways. The differences may be the result of a type I (alpha) error, a particularly plausible explanation in view of the number of analyses to which the data were subjected. Conditions external to the experimental control situation may have produced the main effects differences. Finally because of the small number of subjects involved changes in individual subject data could result in misleading group data effects.

Due to discharge from the hospital eight of the original subjects were lost from the study. One treatment

and one control subject were lost during the treatment sessions. One treatment and five control subjects were lost during the follow-up period. These losses had an obvious direct and, less apparent, indirect effect on the follow-up data. Directly the losses prevented the completion of the follow-up behavioral assessment and significantly affected the MFF and ICBS which were completed. The loss of five control subjects placed inordinate weight on the data provided by the remaining four subjects. Their loss combined with the loss of the treatment subject prohibits meaningful interpretation of the follow-up data. Of less direct influence are the effects of the influx of eight additional patients into the treatment environment during the follow-up period of the study. The effects of replacement patients and their resultant interaction with the experimental subjects are unknown. However, since several items on the ICBS require the teacher to rate the student relative to his peer group, it can be asserted that changes in the peer group will produce changes on this dependent measure.

Several implications and indications for future research arose from the present study. As in Kendall and Finch (1976) the production of the desired therapeutic effect in the treatment group is contrasted with the higher

ICBS ratings, lower MFF latencies and higher MFF error rate which arose in the control group. This increase in the control subjects' impulsiveness is probably due to the dynamic theoretical model of the treatment center as a whole in which the expression of feelings is emphasized. While this may or may not be the treatment of choice for overly inhibited children, it would not appear to be the desired model for children who already have problems with impulse control (Kendall and Finch, 1977, p. 16). This encouragement of expressiveness apparently resulted in the increased impulsivity of the control subjects. This deteriorative tendency has the effect of inflating the value of any therapeutic effect in the treatment group. Any treatment package employed must not only produce positive effect but must also counteract the negative effect of the environment. The cognitive-behavioral treatment program promoting reflective thinking in problem solving situations, as opposed to the uninhibited expressiveness associated with more dynamic therapies, would seem to benefit the patient population of the treatment center.

Because of the methodological deficiencies clouding the interpretation of the behavior frequency count data, future research should begin with a replication of this study eliminating those deficiencies. The elimination

of the rotation of the raters between experimental settings and the computation of inter-rater reliabilities would have a high cost/benefit ratio. The role of a cost response contingency during the social problem solving training should also be tested. Until such methodological weaknesses are corrected the question of whether behavioral changes can be produced and maintained by a cognitive behavioral treatment program will go unanswered.

Post-hoc analysis revealed that the treatment group had a higher mean IQ, 98 compared to 86, and a longer mean hospitalization period, 165 days compared to 139 days. Through the significance of these differences was not statistically tested, in future research it is suggested that these factors be controlled through matching of the experimental and control groups on this dimension.

In conclusion, data have been presented that in part support the cognitive behavior modification approach. More valid methods are required, however, before firm clinical prescription can be made.

References

Armentrout, J. A. Parental child-rearing attitudes and preadolescents' problem behaviors. Journal of Consulting and Clinical Psychology, 1971, 37, 278-285.

Block, J., Block, J. H., & Harrington, D. M. Some misgivings about the matching familiar figures test as a measure of reflection-impulsivity. Journal of Developmental Psychology, 1975, 10, 611-632.

Camp, B. W., & Bash, M. A. S. Think aloud program. Unpublished manual, 1975. Available from Dr. B. W. Camp, University of Colorado Medical School, Denver, Colorado.

Finch, A. J., Jr., Pezzuti, K. A., Montgomery, L. E., & Kemp, S. R. Reflection-impulsivity and academic attainment in emotionally disturbed children. Journal of Abnormal Child Psychology, 1974, 125, 273-275.

Finch, A. J., Jr., Kendall, P. C., Deardorff, P. A., Anderson, J., & Sitarz, A. M. Reflection-impulsivity, persistence behavior, and locus of control in emotionally disturbed children. Journal of Consulting and Clinical Psychology, 1975, 43, 748.

Kagan, J. The matching familiar figures test (manual), 1965. Available through Center for Research in Personality, Harvard University, Cambridge, Mass. 02138.

Kagan, J. Reflection-impulsivity: the generality and dynamics of conceptual tempo. Journal of Abnormal Psychology, 1966, 71, 17-24.

Kagan, J., & Kogan, N. Individual variation in cognitive processes. In P. H. Mussen (Ed.), Carmichael's manual of child psychology. New York: Wiley, 1970.

Kagan, J. & Messer, S. A reply to "some misgivings about the matching familiar figures test as a measure of reflection-impulsivity." Developmental Psychology, 1975, 11, 244-247.

Kagan, J., Pearson, L., & Welch, L. Conceptual impulsivity and inductive reasoning. Child Development, 1966, 34, 583-594.

Kagan, J., Pearson, L., and Welch, L. Modifiability of and impulsive tempo. Journal of Educational Psychology, 1966, 57, 359- 65.

Kagan, J., Rosman, B. L., Day, D., Albert, J., & Phillips, W. Information processing in the child: significance of analytic and reflective attitudes. Psychological Monographs: General and Applied, 1964, 78, 1-37.

Kendall, P. C., & Finch, A. J., Jr. A cognitive-behavioral treatment for impulsive control: a case study. Journal of Consulting and Clinical Psychology, 1976, 44, 852-857.

Kendall, P. C., & Finch, A. J., Jr. A cognitive-behavioral treatment for impulsivity: a group comparison study. Journal of Consulting and Clinical Psychology, 1978, 48, 110-118.

Matushiba, J. An instrument for classifying impulse control among boys. Journal of Consulting Psychology, 1964, 28, 87-90.

Meichenbaum, D. H. & Goodman, J. Training impulsive children to talk to themselves. Journal of Abnormal Psychology, 1971, 77, 115-126.

Messer, S. B. Reflection-impulsivity: stability and school failure. Journal of Educational Psychology, 1970, 61, 480-497.

Messer, S. B. Reflection-impulsivity: a review. Psychological Bulletin, 1976, 83, 1053-1071.

Montgomery, L. E. & Finch, A. J., Jr. Reflection-impulsivity and locus of conflict in emotionally disturbed children. Journal of Genetic Psychology, 1975, 126, 89-91.

Nelson, W. M., III, Finch, A. J., Jr., & Hooke, J. F. Effects of reinforcement and response cost on cognitive style in emotionally disturbed boys. Journal of Abnormal Psychology, 1975, 84, 426-428.

Weinrich, R. J. Inducing reflective thinking in impulsive, emotionally disturbed children. Unpublished thesis, Virginia Commonwealth University, 1975.

Wen, Shih-Sung. Modifying children's impulsivity through redundancy and variability training. Journal of Abnormal Psychology, 1971, 82, 440-444.

Yando, R. M., & Kagan, J. The effect of task complexity on reflection-impulsivity. Cognitive Psychology, 1970, 1, 192-200.

Zelniker, J. N., Ault, R., & Parsons, J. Analysis and modification of search strategies of impulsive and reflective children on the matching familiar figures test. Child Development, 1972, 43, 321-335.

Appendix 1

Comparative Clinical Diagnoses of the Treatment and Control Groups

Within the treatment group there were five subjects diagnosed as overanxious reactions of childhood, one feeding disturbance (anorexia nervosa), one organic brain syndrome, one encopresis and one unsocialized aggressive reaction of childhood. Within the control group there were three depressive neuroses, three unsocialized aggressive reactions of childhood, two adjustment reactions of adolescence and one overanxious reaction of childhood.

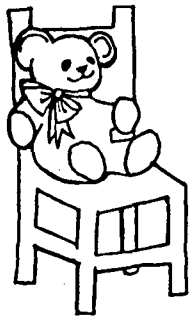
Appendix 2

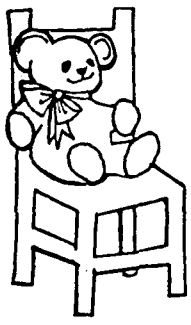
Voluntary Consent Form

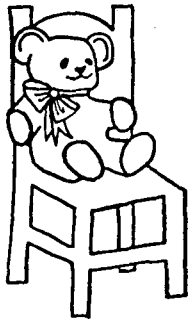
I _____ hereby acknowledge that I am participating in Mr. Furgurson's study voluntarily. I also understand that once I have agreed to participate that I still have the right to withdraw from the study at any time. I further understand that all of the information will be kept confidential.

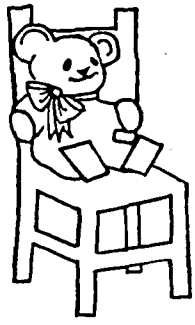
Appendix 3

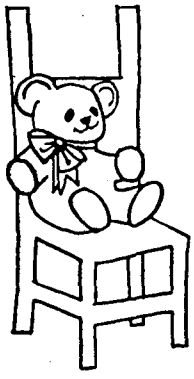
Matching Familiar Figures Test Sample

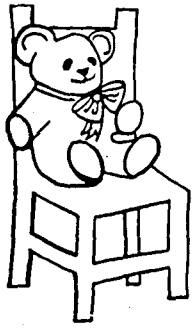


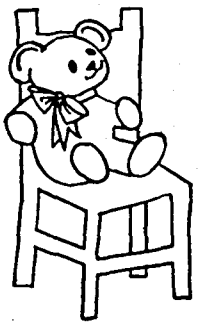












Instructions to Subject: Point to the picture below that matches the picture on top.

Appendix 4

BEHAVIOR SCALE

Child's name:_____ Teacher's name:_____

Rate this child's behavior in the following nine areas. For each category, circle the (X) above the best suited description.

1. Breaks rules

X	X	X	X	X
consistently	frequently	occasionally (average)	rarely	never

2. Disruptive classroom behavior

X	X	X	X	X
keeps to self, almost never interferes	watches others but does not participate	participates only when provoked	occasionally initiates disturbance	interferes frequently, indulges in horseplay

3. Control of temper

X	X	X	X	X
frequent outbursts and tantrums; uninhibited	tends to act out more than most	becomes angry only when provoked	rarely loses his temper	never becomes angry

4. Attention span

X	X	X	X	X
easily engrossed in work, even with distractions present	not as easily distracted from work as most	distracted only by commotion in the classroom	distracted by little sounds	self-distracting; can't stick to any task

5. Work consistency

X	X	X	X	X
quality varies from one minute to the next	more erratic than most	quality varies somewhat (average)	tends to be consistent	highly consistent or steady improvement

6. Cooperation

X	X	X	X	X
Almost always stubborn	tends to be stubborn	occasionally stubborn (average)	usually compliant	always compliant

7. Tolerance for frustration

X	X	X	X	X
persists, no matter how hard the task	keeps at a hard task longer than most	makes a reasonable effort	gives up or gets angry rather easily	seems to give up before he starts

8. Mood or affect

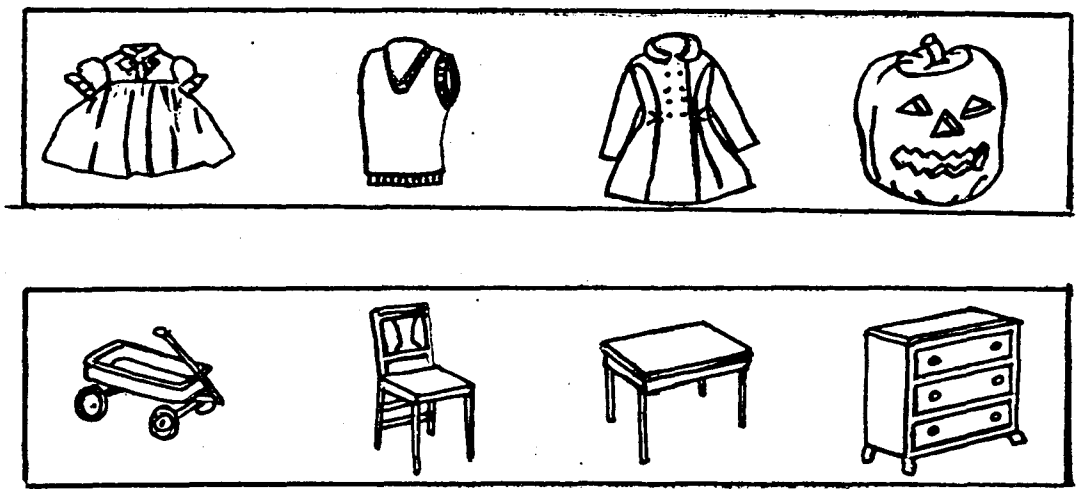
X	X	X	X	X
Controlled, inhibited, flat	rarely expresses how he feels	appropriately spontaneous; usually even-tempered	somewhat exaggerated and inappropriate	moody, cries easily, prone to inappropriate emotional responses

9. Impulse control

X	X	X	X	X
wants to do everything immediately	hardly ever waits	becomes impatient, but nevertheless waits	less excitable than most; can delay gratification	very patient; works for long range goals

Appendix 5

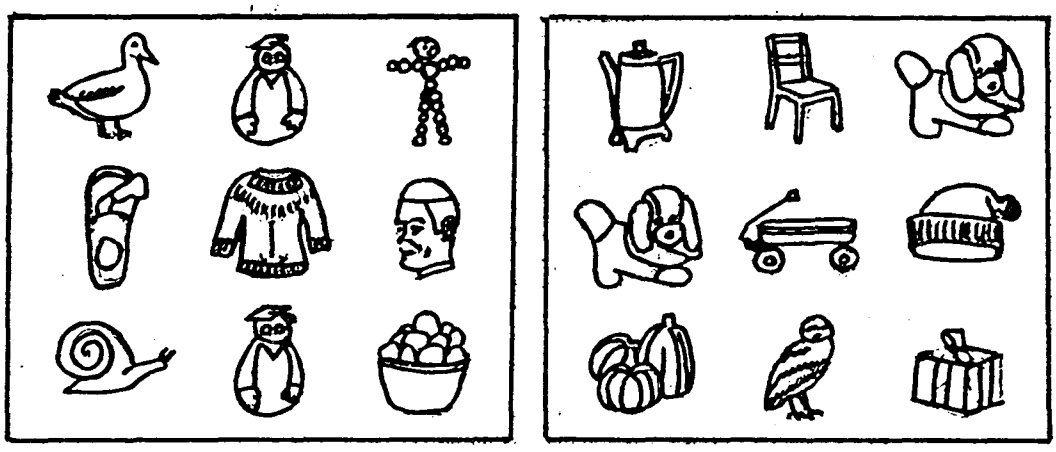
Session 1--Training Materials Sample



Instructions to Subject: Find the one that doesn't belong with the others.

Appendix 6

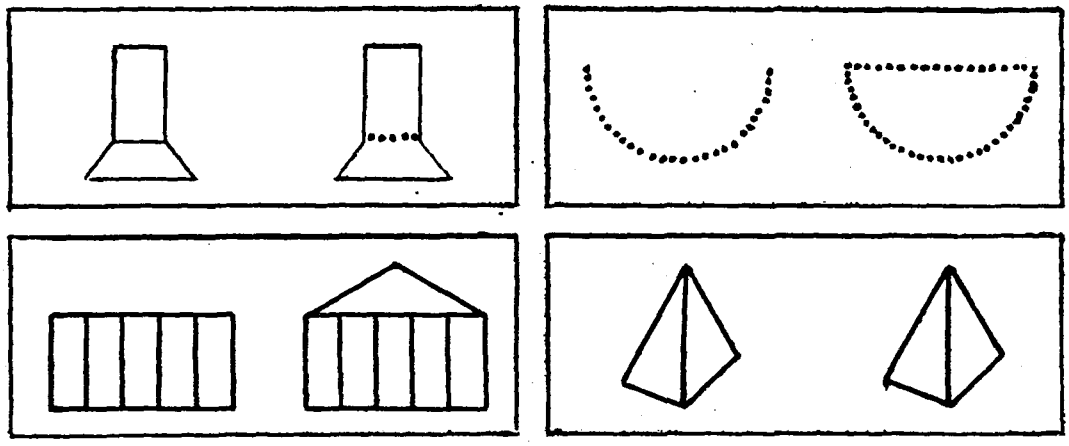
Session 2--Training Materials Sample



Instructions to Subject: Find the pictures that match.

Appendix 7

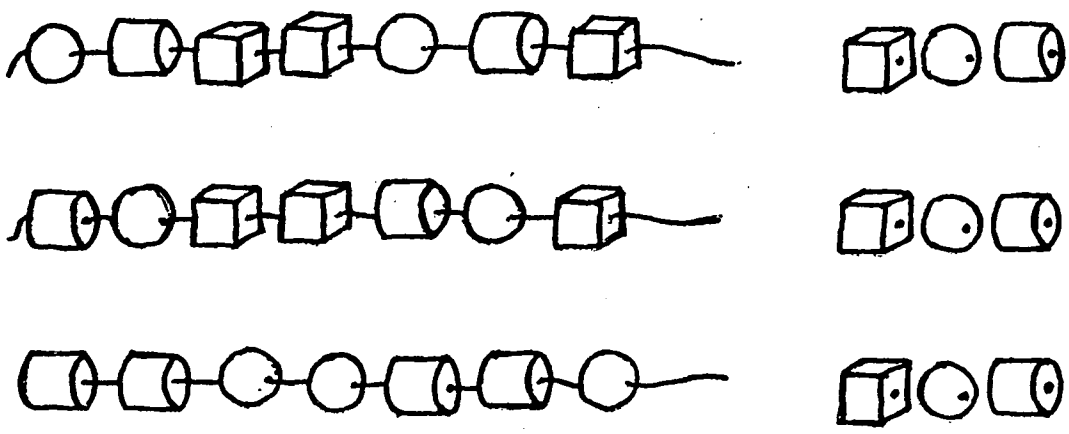
Session 3--Training Materials Sample



Instructions to Subject: Tell me, are the pictures the same or different?

Appendix 8

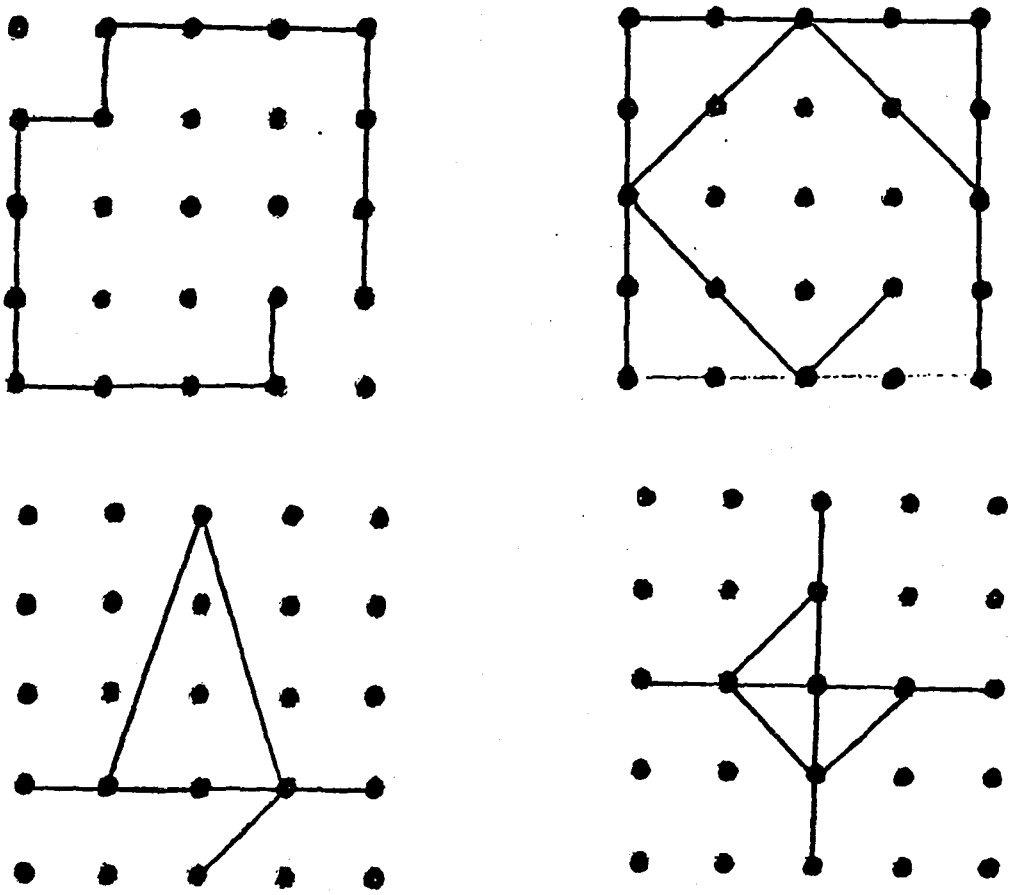
Session 4--Training Materials Sample



Instructions to Subject: Choose the shape that should follow next in the sequence.

Appendix 9

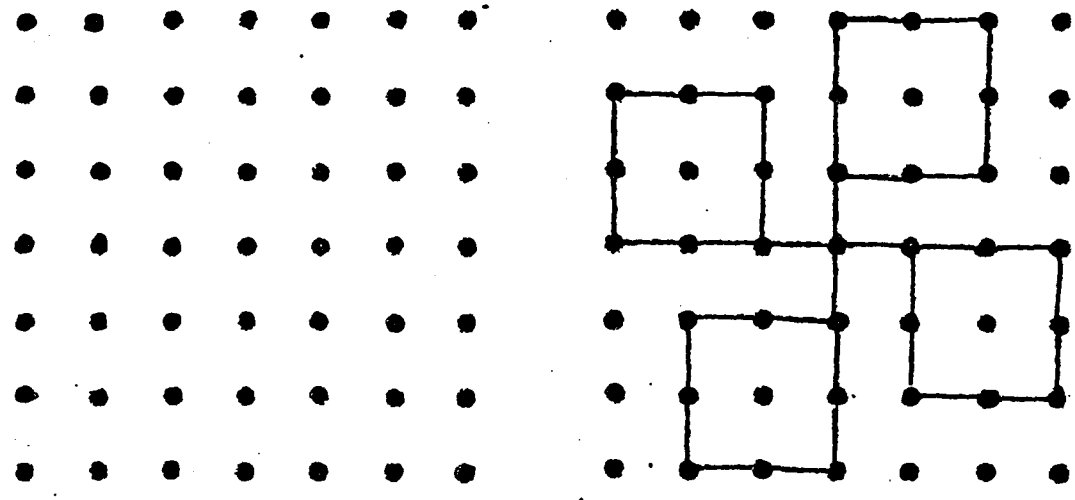
Session 5--Training Materials Sample



Instructions to Subject: Complete the drawing so that its the same on both sides.

Appendix 10

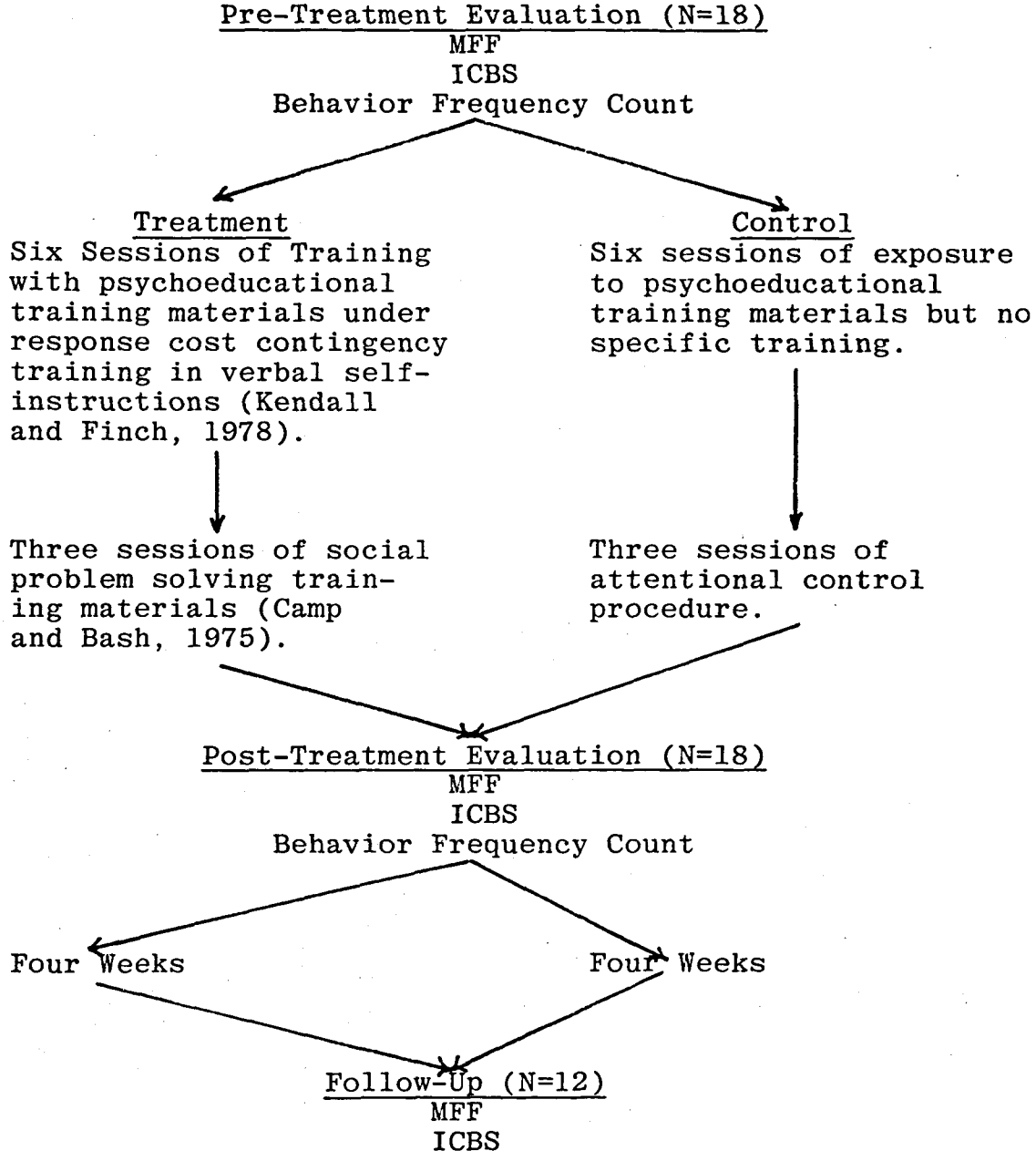
Session 6--Training Materials Sample



Instructions to Subject: Copy the design onto the blank dots.

Appendix 11

Flow Chart of the Experimental Process



VITA

The author was born in Danville, Virginia in 1948. He received his B.A. in psychology at Randolph Macon College, Ashland, Virginia in 1971. Prior to and concurrent with his entrance into the graduate program at the University of Richmond, he was employed at the Virginia Treatment Center for Children. The author will receive his M.A. in psychology from the University of Richmond in May 1978; his major interest has been the application of behavior modification techniques to behavior problems in children. The author is currently employed as senior psychologist for the Henrico County Crisis Intervention Center.