

Behavior Therapy

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Behavior therapy or behavior modification has emerged as the treatment for ADD with greatest promise as an alternative to medication. Given its promise as an alternative treatment, it is somewhat surprising that very few ADD children have been treated with behavioral techniques. In one recent survey, 90 percent of the ADD children in one community had received treatment with a psychostimulant medication, but only 10 percent had been treated with behavior modification.¹

Although many early studies demonstrated that behavioral procedures substantially improved the classroom behavior of children with a variety of problematic behaviors,² with few exceptions,³ the approaches were not applied with children specifically diagnosed as hyperactive or ADD until the mid-1970s.^{4,5} Since then a number of studies have shown that behavior modification is an effective treatment for ADD in classroom and home settings. Compared to the volume of research on psychostimulants, however, less is known about behavioral interventions in ADD. For example, there is only sparse information available regarding the effects of behavior modification on learning or achievement in ADD children, and no information exists regarding long-term effects. This discussion of the effects of behavior therapy is thus less extensive than that regarding medication effects. A relatively larger portion of this discussion is devoted to practical issues in the implementation of behavior therapy with ADD children.⁶

The rationale for using behavior modification with ADD children is the same as the rationale for its application to other problems

in clinical and medical psychology. Behavior modification with ADD children thus draws on the principles of social learning theory to analyze the continuing reciprocal interaction between individuals, their behavior, and the environment, with the goal of first identifying the environmental and intrapersonal correlates of problematic behaviors and then using contingency management procedures to manipulate those correlated events and change the behaviors.⁷ It is interesting to note that early theorists argued that behavior modification would not be effective with ADD children because their defective CNS arousal mechanisms interfered with the influences of rewards and punishments.⁸ There are several recent studies suggesting that ADD children may respond to certain types of reward procedures differently from non-ADD children.^{9,10} As we shall discuss, however, many studies have shown that behavior modification is effective with this population. Nonetheless, the belief that ADD is not amenable to behavioral treatment is still common among physicians.

HOW TO DO BEHAVIOR MODIFICATION WITH ADD CHILDREN

Before describing the "how tos" of a behavioral intervention, we need to emphasize that implementing an effective behavioral intervention is not a simple process. Although the principles that underlie the approach are somewhat intuitive and quite consistent with common sense for most people, it takes quite a bit of skill and practice to develop and fine-tune a comprehensive behavioral program for the typical ADD child. Lack of attention to this point has led many parents and physicians to give up on behavior modification programs before they have been adequately tried. Some physicians and psychologists give parents a 10-minute lecture on behavior modification or hand them a pamphlet describing how to reward good behavior and ignore bad behavior. Those parents may then spend several weeks attempting to establish some programs on their own. If this process does not result in an effective treatment (and it is highly unlikely that it will), then both the practitioner and the parents decide that behavior modification is ineffective. Unless the practitioner is willing and able to spend the long hours necessary to implement a behavioral intervention as described below, the best action that can be taken instead of this all-too-common approach is to refer the patient to a psychologist who has been trained in and is skilled in behavior modification. Alternatively, the physician in individual or group practice could have a behaviorally oriented psychologist in joint practice. In either case it is critical for the primary care physician to understand that behavior modification for ADD is much

more complicated than it appears on the surface and that it almost always requires the intervention of a trained professional. What follows is a description of how to implement a good behavior modification program with an ADD child.

Assessment

Beyond diagnosis (discussed earlier), the primary purposes of assessment are to gather information to conceptualize the child's problem in social learning terms and to evaluate the effects of treatment procedures. The first step in assessment is thus a functional analysis defining the child's ADD as a set of specific cognitive and behavioral problems and identifying the variables that currently determine the nature of the problem and can be modified to produce behavioral and cognitive change. Assessment continues throughout intervention, allowing continual evaluation of response to treatment and modifications in treatment strategy. Assessment information is gathered through interviews, rating scales, and observations.

Interviews

A behavior therapist's interview differs from other therapeutic interviews in several ways. Much information is gathered through interviews with the parents and teachers—who are seen first—rather than with the child. Rather than a detailed history, emphasis is placed on a complete description of the current problems, which becomes the focus of treatment. The formats and goals of the interviews with parents and teachers are similar. After the problem has been described in general terms, the therapist guides the interviewee through a series of three steps: (1) major problem areas are identified, (2) each major problem is then broken down into more specific problem behaviors, and (3) the relationships between the specific problem behaviors and their setting and consequent events are analyzed. The resulting set of material constitutes a comprehensive description of the problem at home and in school. Analysis of the relationships among the behaviors and the correlated environmental events is called a functional analysis, and provides both the targets for and the methods of the behavioral intervention.

Consider the following main problem areas identified for one ADD child seen in a clinic: (1) task completion, (2) bedwetting, (3) following directions, (4) behavior away from home, (5) telling the truth, and (6) playing with other children. Each major problem area was broken down into more circumscribed problems. Regarding the first problem area, task completion, three subproblems were generated: not getting dressed in the morning before school, taking too

long to walk to the school bus stop, and taking too long to clean his room. Discussion of the first two subproblems revealed that a typical morning began with the child taking longer than necessary to eat breakfast before his mother then asked him to get dressed. Because he had a history of not getting dressed promptly, his mother frequently nagged him to hurry up, often growing impatient and dressing him herself. In addition, the child often took so long to walk to the school bus stop that he missed the bus and had to be driven to school by his mother. Thus one aspect of the "task completion" problem was identified along with associated environmental events that could be manipulated to affect it.

Both antecedent and consequent events are identified. Antecedents are events that precede behaviors, while consequences follow them. An antecedent in the above example is the television cartoon that the child watches before and during breakfast. An intervention that focused on antecedent events might involve turning off the television so that the child cannot watch it during breakfast, resulting in the desired effect of decreasing the time it takes the child to eat. A consequent event that could be modified in the above example is the mother's driving the child to school when he misses the school bus.

During initial interviews, the same procedure is followed for each major problem area. Discussion moves from the general to the specific and to an analysis of the correlated antecedent and consequent events. In addition to information regarding a functional analysis of the child's behavior, other information should be gathered during initial parental interviews. Table 5-1 presents an assessment outline that is used in the Florida State University Child Study Center Treatment Programs directed by the author. Note that a variety of areas are explored, and that much attention is devoted to the parents and family. Recent research has suggested that familial variables such as paternal alcohol consumption,¹¹ maternal depression and isolation,¹² and parenting style^{13,14} are related to the degree of child symptomatology. Assessment information on these variables may prove useful during treatment and should be routinely gathered.

The major domain of difficulty for ADD children is the school, and interviews with teachers—an important part of assessment—follow the same general goals and guidelines as parent interviews. Several additional points should be kept in mind, however. Although most ADD children are initially referred for treatment by teachers, teachers are not obligated to cooperate with treatment programs. While the practitioner's only concern is the referred child, the teacher is responsible for 20 to 30 other children under his or her care. The therapist should remain sensitive to the teacher's situation, be supportive of efforts to cooperate, and make the teacher's role in

assessment and intervention interfere as little as possible with his or her other responsibilities. For example, teachers should not be expected to come to the clinic for interviews. Although the practitioner's going out to the school marks a major departure from traditional approaches to treatment with ADD children, where all contact occurs within the professional's office, an ADD child's problems simply cannot be treated without substantive teacher contact.

In contrast to interviews with parents and teachers through which information is obtained by direct questioning and discussion, information is derived from the child primarily through observation and inference. Because most ADD children come into contact with professionals at the ages of 7 or 8 years, it is unlikely that valid information can be obtained from questioning them directly about their problems. Instead, the interviewing period should be used to obtain a sample of the child's behavior. The therapist should interact with the child in several different situations and should observe the child's behavioral and cognitive style as well as the content of his or

TABLE 5-1. OUTLINE FOR CHILD ASSESSMENT

Outline of information that should be obtained in the course of a child assessment: Information should usually be gathered from the following situations: (1) interview and observation of the child with his parents (and perhaps siblings); (2) interview with the parents together; (3) interviews with the parents separately; (4) interview with the child alone; (5) observation of the child with siblings; (6) observation of the child in school; (7) consultation with the child's teacher; (8) psychometric data (rating scales, test scores, etc.) provided by parents and teacher; and (9) sociometric information from the child's classroom. The information gathering process should be expected to take from one to three sessions with the family and from one to two sessions at the school. Remember, of course, that assessment is not completed after intake. It continues throughout the course of therapy.

- I. Behavior during interview
 - A. with family
 - B. with therapist
 - C. other (include physical description)
- II. Presenting problem
 - A. nature of problem (describe as accurately as possible the major problems; include frequency, intensity, duration, eliciting variables, environmental responses)
 - B. history
 - 1. developmental antecedents (deviations in pregnancy and birth, child's physical health, and motor and language development)
 - 2. other antecedents (problem onset, probable setting events, correlated significant family events, school history, diet, etc.)
 - 3. past problems (detailed description of treatment, outcome and perceptions; include medications—name, dose, type of adminis., duration, prescribing M.D., response)

(cont.)

TABLE 5-1. (cont.)

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- C. consequences of problem (effects of the problem on the family as a unit; on the child's relationship with his siblings and parents; on the parent's relationship with one another; on the school and the child's relationship with teacher and peers; on the child's self concept; etc.)
 - D. current treatment (e.g., psychoactive medication, other psychotherapy, classroom interventions, school psychologists, etc.—same information as above)
 - III. Problems other than presenting (e.g., fears, enuresis; scan checklists for clues)
 - IV. Child's social relationships (include both positive and negative aspects)
 - A. parents
 - B. siblings
 - C. teacher
 - D. peers (neighborhood and school)
 - V. Academic assessment
 - A. intelligence
 - B. achievement
 - C. grades
 - D. other
 - VI. Family information (get specifics)
 - A. state of the marriage (history—divorce, etc., present relationship—likes and dislikes about the marriage and each other, sources and nature of arguments, etc.; obtain with great care)
 - B. emotional problems in parents (current, past, treatment and outcome)
 - C. use of alcohol (current, past, treatment and outcome)
 - D. emotional or behavior problems in siblings (current, past, treatment and outcome)
 - E. emotional problems in relatives (current, past, treatment and outcome)
 - F. disciplinary procedures (past and present; results)
 - G. family reinforcers (i.e., what do they do together to have fun?)
 - H. financial state (also include parents' education and occupation)
 - I. religion
 - VII. Assets and liabilities (both personal and for treatment; include child's likes, dislikes, hobbies, etc.)
 - A. child's
 - B. parents' and family's
 - C. school setting's and teacher's
 - VIII. Nonspecific information (obtain for all involved parties)
 - A. attributions (i.e., what are seen as the major contributing variables to the problem)
 - B. feelings (how everyone feels about everyone else)
 - C. expectations from therapy
 - D. willingness to change
 - E. motivation for treatment
 - F. goals in therapy (desired outcome)
 - IX. Reason for seeking treatment at this particular time
 - X. Recommended course
 - XI. Prognosis
 - XII. Priority for treatment
 - XIII. Diagnosis (DSM III)
 - XIV. Comments
-

her responses. The interview can begin with the child drawing pictures or playing with blocks while talking with the therapist. To learn about peer relationships, the therapist might ask: "Who did you play with at recess today? What did you do? Who are your best friends? What did you do after school yesterday?"

The general rule is to ask specific questions that will allow inferences to be made but will not threaten the child. Throughout the session, the therapist should watch for the specific problems identified in the teacher and parent interviews (e.g., noncompliance), and observe how they are manifested in the therapist-child interaction. Finally it should be emphasized that children are often anxious and inhibited in the clinic and may not show their usual symptoms. As Sleator discusses in Chapter 2, failure to observe a serious problem in the clinic does not necessarily mean that one does not exist.

Observation

Trained observers and elaborate coding schemes, common in research settings, are difficult to implement in clinical settings. Instead, parents and teachers are trained to observe and record children's behavior at home and at school. This information should be used to corroborate that obtained in interviews, validating the functional analysis generated therein, and it should also serve as a baseline for comparing treatment changes. In the classroom, for example, teachers should record the target behaviors that they and the therapists have identified in interviews.¹⁵ Infrequent problems, such as fighting, should be monitored with a continuous frequency count maintained throughout the school day. High-frequency problems such as "out of seat" behavior should be monitored for only a portion of the day (for 15 minutes during morning seatwork activity, for example) to prevent the teacher from being overwhelmed by data collection. Problems such as noncompliance need to be monitored in conjunction with correlated stimuli such as teachers' requests or commands.

The exact nature of the monitoring system for any case depends on the identified target behaviors and the structure of the classroom or home settings.¹⁶ The therapist must insure that the amount of observational data gathered is sufficient to portray an accurate picture of the child's functioning, generally 1 or 2 weeks of assessment, without overburdening parents and teachers and without giving measurement considerations priority over treatment. In addition to training parents and teachers in observation, it is often helpful for the clinician initially to observe the parent-child interaction in a structured setting in the clinic^{17,18} and to observe the child in the classroom and on the playground at school.

Peer Relationships

The importance of peer relationships in child psychopathology and in ADD in particular emphasizes the need to evaluate that domain in assessment. The most useful information that can be gathered regarding peer relations is descriptions of the target child provided by classmates. Procedures for gathering such information are called classroom sociometrics. An extensive discussion of sociometrics is beyond the scope of this chapter, and the interested reader should consult other sources.¹⁹⁻²¹ One type of sociometric that can be used in clinical practice is the simple positive and negative nomination technique in which each child in a classroom is asked (in a brief, private interview) to name three classmates he or she likes and three he or she dislikes. Nomination sums can be used to determine the extent to which the target child is disliked compared to other children. This instrument can be administered by the involved professional, the classroom teacher, or an aide. Other procedures such as the PEI discussed in Chapter 3 provide more extensive information, but administration and scoring are quite complicated.²²

In an attempt to make the gathering of sociometric data more practical, the author has developed an interactive, computerized version of the PEI and the simple positive and negative nomination inventory that can be used in any classroom setting in which the children have access to an Apple II computer. The children's interaction with the computer can be easily supervised by the teacher, who can return the disk to the psychologist or physician's office, where it can be scored by computer. However sociometric information is gathered, confidentiality issues require that permission to administer a classroom sociometric be obtained at the school or district level. It is worth emphasizing that sociometrics provide data that cannot be gathered any other way. Neither direct observations nor teacher ratings provide an adequate picture of an ADD child's peer relationships.

Summary

The importance of objective records of the child's behavior cannot be overemphasized. The correspondence between teacher and parent interview reports and actual behavior may often be low because teachers and parents are not aware of the functional relationships involved in their interactions with the target child. A therapist who successfully teaches a child's teacher and parents to monitor and record behavior makes them aware of these relationships and is on the way to a successful intervention. Manuals that are helpful in teaching these techniques are available.^{23,24} This section has provided only

an overview of a behavioral approach to assessment in treatment of ADD, and the interested clinician should pursue additional reading.^{6,25-27}

Treatment

The behavior therapist's role in treatment is to teach parents and teachers to change their behavior and restructure the environment to facilitate improvement in the referred child. Before specific treatment strategies are discussed, seven general points should be noted:

1. In the initial interviews it is important to emphasize to both parents and teachers that the focus of therapy will be on teaching them procedures that they can use to help the child and that the responsibility for changing the child is primarily theirs. A therapist's first job is to convince parents and teachers that they can help the child and to motivate them to try. If commitment on the part of parent and teacher is absent, these potentially powerful change strategies will not work.
2. Changing the behavior of an ADD child is a long and arduous process, and it is imperative that parents become sufficiently proficient that they can continue treatment long after clinic contact has ended. This means that even though classroom interventions may be a major focus of most behavioral interventions with ADD children, parent training is essential. Parents need to be given the expectation that the family's involvement in treatment is likely to be long-term, lasting years rather than weeks, and that it will require a great deal of time and effort, as well as financial expense on their part. It will require both parents and other adults in the child's life making changes in their own behaviors and life-styles in order to respond appropriately and consistently to the child's behavior.
3. As discussed above, the complexity of behavioral interventions means that the approach cannot be undertaken successfully by a primary-care physician. A trained consultant working directly with parents and teachers is required.
4. It often needs to be made clear to parents and teachers that behavior modification can be used to treat ADD regardless of the etiology of the problem—that is, even if ADD is caused by a central processing dysfunction.
5. Before treatment begins the child should be made aware of the need for treatment, its purpose, and its nature.

6. Because behavior therapy involves highly individualized treatment programs that depend on each referred child's problems and response to specific procedures, the present discussion should not be considered a list of necessary or sufficient components of treatment. Instead, this discussion presents an outline of common procedures utilized in standard interventions.
7. The treatment procedures described have been used primarily with ADD children of elementary school age. Treatment for preschool and adolescent ADD children has not yet been studied.

Parent and Teacher Training

Treatment begins with the parents and teacher reading about social learning approaches to treatment of child behavior problems^{23,24} and discussing the readings with the therapist. After initial assessment and in series of sessions held separately with parents at the clinic and with the teacher at school, the therapist works with them to develop detailed programs designed to modify the child's problematic behaviors. The general procedures employed include: (1) praise and social reinforcement for appropriate behavior, and ignoring for minor inappropriate behaviors; (2) environmental restructuring (Premack contingencies); (3) token reinforcement; and (4) time out from positive reinforcement (brief isolation).

For example, for children who take too long to get dressed in the morning, a program can be instituted that makes breakfast contingent upon being dressed and having morning chores completed. For aggressive and severe noncompliant behavior at school, a multi-level program can be established in which the child is punished with brief (5- to 10-minute) time-out periods of isolation for initial transgressions, and with longer periods (e.g., being sent home from school) for serious or repeated offenses. Token reinforcement programs can be established in which the child earns or loses points for engaging in appropriate behavior or avoiding the commission of a prohibited behavior. Points at school can be earned for completing academic work or getting along well with other children, for example.

One type of contingency management program that has been shown to be effective with ADD children is a response-cost program. In a typical classroom response-cost program, the child is given at the start of each day a number of points that are exchangeable for a privilege (e.g., minutes of recess or free time). The child's behavior is monitored by the teacher, and points are lost for engaging in prohibited behaviors. In one program reported recently, the teacher had a small stand on her desk that supported numbered

cards that could be easily flipped over by hand. When the teacher saw the child go off-task, she flipped a card (for example, the number on a display went from 30 to 29) to "cost" the child a minute of free time.

With ADD children it is usually necessary to have the points exchangeable both for consequences delivered immediately after the appropriate behavior (e.g., free time as soon as work is completed) as well as for privileges delivered at home upon parental receipt of a positive daily report card.⁵

Figure 5-1 shows a sample daily report card for an ADD child who had problems in the areas noted in the figure. After the child's goals are specified during assessment, initial criteria for improvement are established. Each of the goals set for a child should be carefully shaped. It is unreasonable to expect an ADD child who completes none of his or her academic assignments to complete all of them during the first week of treatment. For this child, a 25 percent completion rate was deemed initially acceptable, to be increased gradually as the child's on-task behavior improves.²⁸ Similarly, baseline data revealed that the child's arithmetic work averaged 50 percent accurate, and 60 percent was thus set as the accuracy goal for the beginning of treatment. The child's baseline levels of talking out in class and bothering other children, both recorded by the teacher over a 2-week period, averaged 10 and 8 times per day, respectively. The initial goal was to have the child reduce each of these frequencies by two occurrences daily, as indicated in the report. As the child

Daily Report Card

Thomas R.

Date _____

- | | | |
|--|-----------|----------|
| 1. Completed 25% of assigned seat work | yes _____ | no _____ |
| 2. Math work at least 60% accurate | yes _____ | no _____ |
| 3. Talked out without permission
no more than 8 times | yes _____ | no _____ |
| 4. Got along well with other children
(no more than 6 complaints) | yes _____ | no _____ |
| Earned Reward? | yes _____ | no _____ |

Teacher's Signature _____

Figure 5-1. A sample daily report card that could be used in a behavior modification program with an ADD child.

successfully meets the goals for periods of time (e.g., a week), the criteria are made more stringent and further improvement is sought.

If children meet their goals, then the parents should provide a reward at home. The reward, which the parents should select after discussing it with the child, should be sufficiently motivating that the child will work hard for it but not so expensive that the parents are indulging the child. Rewards preferred by the author usually involve having the child earn activities or privileges that had previously been noncontingent—for example, earning time to ride his or her bicycle, work on the home computer, play outside, or watch television. If activities such as these are used, the parent must insure that access to them will be limited to times when the child has earned them by bringing home a positive daily report.

Implementation of behavior modification programs with ADD children, especially in the classroom setting, is quite involved. School visits may need to be twice-weekly initially, with frequent telephone contact with the teacher while the program is being developed. Once the intervention is going well, weekly contact may suffice. This description provides only a brief overview of behavioral treatment, and more extensive sources should be consulted before an intervention is attempted.^{7,15,29-32}

Child Training

Rather than focusing entirely on parent and teacher training, recent approaches have employed self-control training and social skills training provided to the children themselves. Self-control training is designed to teach the children to give themselves verbal instructions to slow down, evaluate their behavior, and act planfully in academic or social situations.³³⁻³⁵ Unfortunately, in spite of the hope initially raised by these cognitive behavioral procedures, they have not resulted in clinically significant behavior change in the natural environment.³⁶⁻³⁸ While such interventions, which place much of the responsibility for implementation on the target child, may benefit children with relatively mild disturbances, they are unlikely to prove effective with ADD children. ADD children are often not motivated to change their behavior, and their impulsivity and inattention are incompatible with the self-generated procedures involved in self-control programs.

Similarly, social skills training programs that rely on modeling, role playing, practice, and didactic instruction³⁹ have been shown to be ineffective with ADD children.⁴⁰ There is preliminary indication that an intensive social skills training program that includes extensive group practice and reinforcement for appropriate behavior might be a useful *adjunct* to a standard parent and teacher training program,⁴¹ but additional research is needed before this time-

consuming and expensive treatment can be recommended. There is no corresponding evidence that self-control training has incremental value for a standard behavioral intervention.^{18,36}

RESEARCH ON THE EFFECTIVENESS OF BEHAVIORAL INTERVENTIONS

Although empirical demonstrations of its effects are not as abundant as are investigations of stimulant effects, behavior therapy is an effective treatment for ADD children. The form of behavior therapy that has been used in most research endeavors is very similar to the variety described above that is offered in clinical settings. Such interventions have been shown to result in improvement on a number of dimensions, and several general statements can be made.

In the classroom it has been shown that some ADD children treated with behavior therapy show the same degree of improvement on standard teacher rating scales as children on low to moderate dosages of medication,^{28,41,42} and that this improvement is greater than changes shown by untreated controls.^{5,41} Further, treated children's observed on-task behavior in the classroom increases and disruptive behavior decreases with behavioral intervention as much as with medication.^{28,41,43,44} Finally, several case studies have shown that a behavioral intervention increases ADD children's academic productivity.⁴³⁻⁴⁵

As an example of the effects of a behavioral intervention, consider a study from the author's laboratory in which a seriously disturbed ADD-aggressive child was treated for a year. The child was a confirmed medication responder (he was a positive responder to pemoline and an adverse responder to methylphenidate) but his parents and physician were concerned about continuing medication.⁴⁵ The child was referred by his parents and physician to determine whether a behavioral intervention could be used as an alternative to psychostimulant medication. The child was a bright 9-year-old who met criteria for both ADD and conduct disorder diagnoses. He was exhibiting severely disruptive behavior in the classroom, including noncompliance, defiance, talking out, disturbing other children when they were trying to work, fighting on the playground, and failing to complete assigned tasks. The purpose of the study was to see if we could develop a behavioral intervention that was sufficiently effective that the child could be maintained in a regular classroom setting without medication.

Figure 5-2 shows the conditions included in this year-long treatment and reports the results on the observational measure of on-task classroom behavior during one of the child's academic periods. Fol-

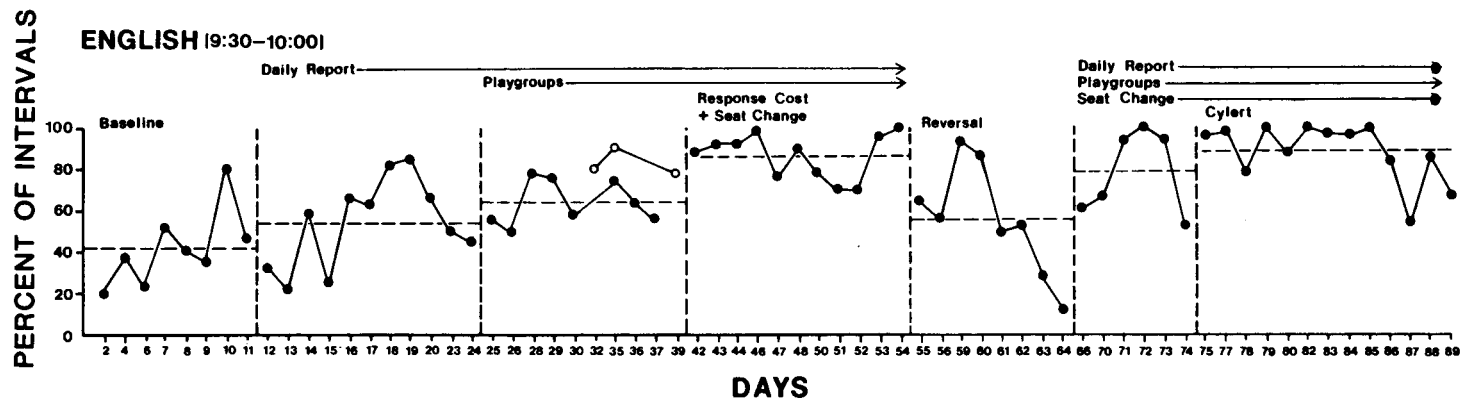


Figure 5-2. Percentage of observed on-task classroom behavior in an ADD child plotted as a function of continuous treatment conditions over a year-long intervention.

lowing the procedure of starting with the least complex intervention and moving to ones that required progressively more involved procedures, therapists first implemented a daily report card that targeted the child's problematic behaviors. Then a school-based reward (getting out of class 20 minutes early to play with a college undergraduate and a selected peer) was added to the home-based reward for the daily report. Next the response-cost contingency described above⁴⁴ was implemented. When a card was flipped (e.g., from 30 to 29), that was a signal to the child that he had lost a minute of his playgroup that day.

As Figure 5-2 illustrates, the daily report condition alone—which approximates standard behavioral interventions offered in outpatient settings—was not particularly effective with this child. Progressively more powerful behavioral procedures had to be added to the treatment package before the child showed substantially improved classroom behavior. Maximum improvement was reached only when the response-cost procedure was added to the daily report and playgroup condition. At the same time, however, the teacher complained consistently that the relatively simple response-cost procedure interfered with performance of her other classroom duties, an opinion that was not confirmed by observational data of the way the teacher spent her time. Nonetheless, she believed that having the child change seats, which she had done when her implementation of the response-cost began, was making him better, and said she wanted to discontinue the response-cost procedure.

In order to determine whether the behavioral program rather than other factors that might have changed over time accounted for the observed changes in the child's behavior, all treatment components were withdrawn during the reversal phase. The fact that the child's behavior deteriorated during reversal demonstrated that the treatment had been effective. That the child's behavior during the phase following reversal did not reach the level that preceded reversal showed that the teacher was not correct in her assessment that response-cost was unnecessary.

The other measures of this child's behavior that were gathered—including daily academic performance, teacher ratings, and observations of disruptive behavior—showed the same pattern of response to treatment as did this measure of on-task behavior. In contrast, the classroom sociometric, the PEI,²² that was administered periodically throughout the year of treatment revealed that this child's peers did not perceive him as having improved in his relations with them. His score on the PEI aggression factor was almost three standard deviations above his class mean even during the response-cost phase of treatment.

Because of the teacher's unwillingness to continue the

response-cost procedure and the lack of impact that the therapists had on his peer relations, the decision was made to add pemoline (37.5 mg qam) to his treatment. In a double-blind, placebo-controlled assessment, it had been previously determined that pemoline improved his classroom behavior, academic performance, and peer interactions. The same response was observed during this last phase of his classroom treatment.

During the next academic year, pemoline was continued, but the teacher declined the opportunity to have a behavioral intervention developed for this child in her classroom, believing that she could handle him with her own methods. He grew steadily worse over that year, however, and the following year he was staffed for placement in an emotionally handicapped (EH) classroom. Today he is enrolled in an EH class with a very highly structured behavioral intervention because his behavior is considered unmanageable in a regular classroom.

This single-subject study demonstrated that a behavioral intervention that included a response-cost component was as effective in increasing on-task behavior and academic performance as was added psychostimulant medication. The study also showed that for a seriously disturbed, aggressive ADD child, a simple daily report program helped but was not a sufficient intervention. School-based rewards and a response-cost program had to be added before the intervention had a major beneficial effect.

Finally, the study illustrates the fact that behavioral interventions without powerful components directly focused on peer relationships do not result in changes in this domain. As discussed above, ADD children have very seriously disturbed peer relations, and disturbances in peer relations are strongly predictive of continued pathology.^{21,46} Correction of peer problems is thus of primary importance in treatment of ADD children.

Unfortunately, as noted earlier, programs that have tried to teach ADD children aspects of good social skills through individual or small group instructional, modeling, and coaching sessions have not been effective.^{40,47} For example, Figure 5-3 presents the results from one of the author's studies that employed behavior modification, methylphenidate, and social skills training.⁴¹ Twenty-four hours worth of group training sessions failed to add any incremental effect to the behavioral intervention and actually slightly worsened behavior in children who received the social skills training alone. The dependent measure in the figure, negative peer nominations, is the sociometric measure most predictive of later psychopathology. The average children in the ADD children's classrooms received 2 or 3 negative nominations. As Figure 5-3 clearly shows, the children were far above the normal range even after 6 months of treatment,

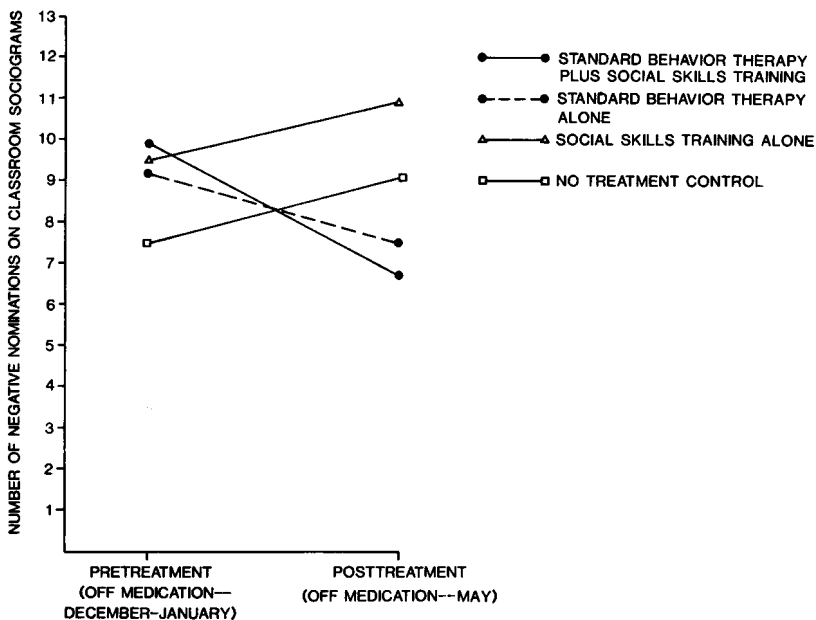


Figure 5-3. Number of negative nominations received from classmates in a sociometric procedure administered in the classrooms of ADD children participating in a therapy study.

highlighting the need for an effective treatment for their peer disturbances.

What kinds of things can be done to maximize the effects of treatment for hyperactive children's peer relationships? There are several suggestions in the literature regarding components that might best contribute to an effective treatment. Three components appear to show promise: (1) powerful, school-based, contingency management programs; (2) psychostimulant medication; and (3) social skills training added to these interventions for some children. This assertion is based upon the consistent finding that the social behavior of some hyperactive children represents both behavioral excesses (leading to high peer rejection) that need to be decreased, and social skills deficits (reflected in low popularity) that need to be increased.

The behavior modification programs that appear to show the greatest promise are those that involve close monitoring of children's behavior in natural settings, that use powerful consequences, and that continue for relatively long periods of time. The *recess* pro-

gram developed at Oregon is a good example of such an intervention.⁴⁸ In that program a trained consultant monitors and provides consequences for the target child's playground behavior during school recesses. It is interesting to note that the only two studies to have shown decreases in negative nominations among rejected children,^{41,47} both did so apparently by increasing on-task behavior and decreasing disruptiveness; social skills training had no effect in either study. Intensive reward-based programs have been criticized regarding the issues of generalization and maintenance; that is, can the effects be made to transfer to settings other than the one in which the treatment was implemented, and can the effects be made to last over time once the treatment is withdrawn? Nonetheless, powerful contingency-management programs appear to be the best starting place in treating peer difficulties among hyperactive children.

Although stimulants have resulted in improved behavior on teacher ratings of conduct disorders in previous studies, there has been a reluctance to conclude that the drugs improve peer interactions, specifically by reducing aggressive, disruptive, and intrusive behaviors. Several studies, however, now have shown beneficial drug effects on these behaviors as well as drug-induced increases in prosocial behavior.³⁵ There is some suggestion, however, that these beneficial drug effects may be limited to children who are highly aggressive and disruptive. For example, as noted earlier, in one study pemoline improved aggressive hyperactive children's playground behavior but worsened (i.e., made more withdrawn) nonaggressive hyperactive children's behavior.⁴⁰

As in other domains, there is wide variability in individual children's response to treatment of deviant peer relations, and greater reliance on single-subject methodology would facilitate determination of necessary treatment components. For example, it is probably the case that individual hyperactive children will not require all three treatment components identified. A nonaggressive hyperactive child with a learning disability, for example, might need only cognitive instruction in social skills and/or intensive tutoring,⁴⁷ and powerful, school-based contingency management programs such as *recess* might not be necessary once the child has acquired these skills. Role-play or hypothetical situation tasks offer promise in determining whether a child has a deficit in his or her knowledge of social skills or, instead, brings different goals to social relations.^{49,50} Similarly, psychostimulant medication might facilitate such a child's acquisition of the social information being taught,^{51,52} and a double-blind, placebo-controlled, clinical drug trial could be used to assess the utility of the pharmacological treatment component for both training and behavior.⁵³ Finally, the need for an operant component of treatment could be evaluated in a single-subject fashion.

For an aggressive child without a social skills knowledge deficit, a combined pharmacological and behavioral intervention could be assessed, utilizing a single-subject design to determine the appropriate combination of behavioral components and drug dosages (see discussion below).⁵⁴ In both cases a comprehensive assessment would provide information regarding exactly which components were necessary in the treatment of a particular child.

Thus far the discussion has centered on the effects of behavioral interventions on ADD children's classroom behaviors and peer relationships. What have the data shown about whether behavioral parent training has been effective with ADD children? A multitude of investigations over the past decade have demonstrated the effectiveness of behavioral programs for training parents whose children have a variety of problems, including noncompliance, aggression, and autism.⁵⁵ Helpful texts with programs for training parents of ADD children have been written,⁵⁶ and the current author has been training parents of ADD children for more than a decade. At the same time, controlled investigations demonstrating the effectiveness of training for parents of children specifically diagnosed as ADD are lacking. In the few that have been conducted, it has been shown that parents rate their children as improved following behavioral intervention^{41,57} and that observed parent-child interactions improve with behavioral intervention.¹⁸

COMBINED PHARMACOLOGICAL AND BEHAVIORAL INTERVENTION

A great deal of research remains to be conducted, but two conclusions relevant to the notion of a combined intervention for attention-deficit and conduct disorders can be drawn:

1. Despite the evidence for their effectiveness, both behavior modification therapy and psychostimulant medication have limitations that mean that neither alone constitutes a *sufficient* or *maximally effective* treatment for ADD.
2. Each of these treatment modalities has something to offer that can improve the other's effectiveness.

Insufficiencies of Psychostimulant Medication

At least four limitations of drug treatment can be noted. First, stimulant therapy is rarely sufficient to bring children into a normal range of academic and social functioning. Many double-blind, placebo-controlled studies have shown that teachers' ratings, most often on

the conduct and hyperactivity factors of the Conners Teacher Rating Scale⁵⁸ or the Abbreviated Conners Teacher Rating Scale,⁵⁹ improve considerably when children receive psychostimulant medication.^{61,69} At the same time, when moderate dosages of psychostimulant medication are administered the average rating during drug treatment is usually a standard deviation above the normative mean.^{62,63} Very few medicated children improve sufficiently that no further intervention appears necessary as long as medication is continued.⁶⁴ Stimulants improve productivity and/or accuracy on academic assignments,^{65,66} but these effects are generally smaller than effects on teacher ratings.^{60,67}

Similarly, medication effects on direct observations of classroom and play behaviors are not as large as effects typically obtained on teacher ratings, and children are rarely so much improved on these measures that they fall within a normal range.^{40,68,69} Finally, when sociometrics are used as measures of peer relationships, beneficial drug effects are often not found.^{40,41,70} It is important to note that psychostimulant effects are limited to the time when the drugs are physiologically active, 3 to 10 hours after administration for social behavior and perhaps less for optimal cognitive effects, depending on the form of medication.

A second limitation of drug treatment is that it does not work for all children. Only 60 to 70 percent of children show a beneficial response to psychostimulant medication alone, with the others showing either no effect or an adverse response that requires medication withdrawal.^{60,61} The proportion of children who show a beneficial response on teacher ratings can be increased by increasing the dosage of medication administered, but that tactic gives rise to additional problems. Children who show a beneficial response in cognitive functioning to a relatively low dose, for example, may have an adverse response in that domain to the higher doses necessary to cause improvement in teacher ratings.^{63,71-73} Additionally, adverse physiological and social effects such as growth suppression and social withdrawal are apparent when relatively high but common dosages of psychostimulant medication are employed.^{40,74}

A third limitation of psychostimulant medication treatment involves its use to treat behavior problems that occur at home. In order to avoid the growth suppressant effects that accompany high dosages, psychostimulants are now most often administered only during school hours, and parents are left to their own means to control their child's behavior during nonschool hours. In addition, a variety of parent and parent-child interactive variables are strongly related to hyperactive and aggressive symptomatology.^{14,75-77} Although directionality of the relationships has yet to be established, there are no reasons to believe that simply medicating the child will prove suf-

ficient to modify maternal stress and depression, paternal alcohol abuse, inappropriate parental discipline, and other variables that affect the ADD and conduct disorder (CD) children's adjustment. Intervention for these problems in addition to the child's may be necessary.

A fourth limitation of psychostimulant medication is that without exception studies that have followed children treated with psychostimulant medication for periods up to 5 years have failed to provide any evidence that the drugs improve ADD children's long-term prognosis.⁷⁸⁻⁸¹ Although their methodological inadequacies require that these studies be interpreted cautiously,⁵⁷ nonetheless, despite the evidence for short-term gains, beneficial treatment effects do not appear to be maintained when psychostimulant medication, as typically administered, is used as a long-term treatment for the average ADD child.

There are many other possible limitations of psychostimulant medication. Some past concerns such as state-dependent learning⁸² have not been shown to be valid,⁸³ while others such as negative effects on self-esteem⁸⁴ have not yet been systematically evaluated but merit study. One point on which there is widespread agreement is that pharmacological intervention alone is an insufficient treatment for ADD.^{84,85}

Insufficiencies of Behavior Therapy

The shortcomings of behavioral interventions with ADD children are similar to those of psychostimulant medication. First, although a growing number of studies have shown that behavior therapy is effective in improving parent and teacher ratings on standardized rating scales of ADD, posttreatment ratings are usually one SD above normative means.^{4,5,28} Similarly, direct observations of classroom behavior and classroom sociometric instruments usually reveal that children often continue to function well outside of the normal range after treatment.^{4,18,41,45,86} As with psychostimulant medication, when short-term effects of behavioral interventions are obtained, they are limited to the period when the programs are actually in effect. Studies of behavior therapy's effects have thus revealed consistent, short-term improvement on a variety of measures while the contingencies are in effect, but the final levels of functioning are most often not in the normal range, and improvement has not been demonstrated in several critical domains.

A second limitation of behavior therapy with ADD and CD children is that a substantial number of children (comparable to the proportion cited for stimulant medication) fail to show improvement.^{41,87} In many cases this is no doubt because parents and teachers fail to

implement the behavioral programs as directed. A large percentage of teachers, who are not obligated to cooperate with outside consultants, will not even begin a behavioral intervention.^{44,88} Many parents—up to half of those beginning treatment—discontinue against therapeutic advice.^{89,90} Even when parents and teachers *apparently* comply with treatment, therapist contact in clinical behavior therapy is typically limited to once per week, and manipulation checks of whether parents and teachers actually follow through with treatment are almost never conducted.^{5,18,28,41} It is becoming increasingly evident that parents and teachers of children who failed to show maximal improvement in these studies may not have implemented the treatment programs appropriately, if at all.^{45,91-93} Regarding parents, single mothers with relatively lower levels of education, income, and contact with other adults have greatest difficulty implementing and maintaining behavioral treatment.^{94,95} As typically administered, behavior therapy would thus not be expected to be particularly effective with ADD and CD children whose parents have these characteristics. In summary, behavior therapy depends on the motivation and capabilities of the significant adults in the child's life. If these adults are unwilling or unable to implement the interventions, and the objections or obstacles to intervention cannot be overcome, then behavior therapy will not be effective.

As some of the limitations of medication can be removed by increasing the dosage, the effects of behavior therapy can be maximized by increasing the power and comprehensiveness of the intervention.⁵³ As with psychostimulant medication, however, this tactic introduces problems. For example, a highly structured, closely monitored contingency-management program (e.g., response-cost) in effect throughout the school day appears more likely to result in large improvement than a clinical behavior therapy approach. Because it is very difficult to conduct such a system unassisted, however, a regular classroom teacher is less willing and less able to implement the more powerful of the two programs, as we discovered in the case study discussed above.

A final possible limitation of behavior therapy with ADD children is the lack of evidence for long-term effects, studies of which have not been conducted. A number of studies with behavior problem children (in all likelihood a mixture of ADD, CD, and oppositional disorder diagnostic categories) have shown that a substantial number of children fail to maintain treatment gains for periods of time as short as one year following intervention.^{86,91,95} Demonstration of generalization over time is one of the major concerns of those employing behavioral interventions with children.⁹⁶ Unfortunately, at our current stage of knowledge the best guess regarding the long-

term effects of behavior therapy with ADD and CD children is that short-term effects will often fail to maintain. If this were true, then, as with psychostimulant medication, lack of long-term effects would be the major limitation of behavior therapy with ADD children.

Potential Benefits of a Combined Intervention

Theoretically, the effects of a combined pharmacological and behavioral intervention can differ from the effects of the component treatments in several different ways.^{97,98} The two treatments can interact to potentiate one another, yielding a combined effect greater than the total of the two component effects, or they can interact to inhibit one another, yielding an effect that is less than the effects of either component. Alternatively, the combined effect can simply be additive, equaling the total of the components. Finally, reciprocation can occur in which the combined outcome is the same as one or the other component.

The major potential benefit of a combined behavioral and pharmacological approach to treatment of ADD *appears* to be that additivity and/or potentiation occur, thus minimizing the shortcomings of both treatments and yielding an intervention that may come closer to maximal effectiveness than either component alone. Our use of the term "appears" is purposeful. There are as yet few data on which to base such a conclusion. Further, it is important to note that there are large individual differences in response to medication, behavior therapy, and their combination. Although we shall argue that many ADD children, including those with concurrent CD, respond best to a combined intervention, some children respond best to one or the other component treatment. Group studies that present only averaged data can be misleading, and the combined treatment must be examined in individuals, as well as in groups, in order to provide the most accurate analysis of its effects.

As discussed in Chapter 3, the major theories regarding the biochemical bases of ADD hypothesize functional deficiency in one of the neurotransmitter systems of the central nervous system. For example, the catecholamines, dopamine and norepinephrine, play a major role in mediating behavioral responses to reward and punishment.⁹⁹ If some ADD or CD children have a catecholamine dysfunction, then their responses to behavioral interventions might be minimized. The implication of this hypothesis is that normalization of a catecholamine deficiency by psychostimulant medication would make a child more responsive to behavioral interventions. In one recent case study,¹⁰⁰ the effects of a reward program were considerably

greater on one dependent measure when the child received 0.3 mg/kg methylphenidate than when the child received placebo. This effect is compatible with but does not verify a catecholamine normalization hypothesis. No data have been generated that directly test this hypothesis with simultaneous physiological and behavioral measures.

In a similar vein, there is increasing evidence that the effects of psychostimulant medication on some ADD children can be facilitated by concurrent behavioral interventions.⁵¹ For example, one study reported a larger effect of 0.25 mg/kg methylphenidate after a behavioral intervention had been implemented for 13 weeks than beforehand.¹⁸ It is common in the animal psychopharmacology literature to find studies in which drug effects are dependent upon rates of behavior and schedules of reinforcement,⁹⁹ and it would not be surprising if similar findings were obtained with children.¹⁰¹

There are several studies showing that the effects of behavior therapy and psychostimulant medication under many conditions are additive. Given that each treatment alone fails to produce short-term effects that approach an asymptote of improvement, a closer approximation to a maximally effective treatment for many children can therefore be obtained by combining the two. Several recent studies have concluded that many treated children approach a normal range of functioning on all relevant measures *only* with a combined intervention.^{18,35,41,68}

An important result of additivity of the treatments is that maximal improvement in behavior can be reached without resorting to high dosages of psychostimulant medication, which have adverse effects, or to complex and highly structured behavioral interventions, which are not likely to be implemented by teachers in regular classroom settings. The risk/benefit ratio involved in treatment is thus decreased, and greater effects can be obtained with treatment levels that carry fewer risks.

Because less potent treatments are also less expensive, the cost-effectiveness of treatment can also be improved with a combined intervention. For example, a powerful, maximally effective contingency management intervention might require daily therapist trips to the school compared to the single weekly trip characteristic of clinical behavior therapy. At \$75 per visit, the more powerful behavioral intervention would cost an additional \$300 per week. In contrast, the addition of a low dose of psychostimulant medication to a typical clinical behavioral intervention might also maximize improvement, but would cost less than \$5 per week. Although such concerns are unimportant in research settings where costs are not born by a child's parents, in actual practice they are often one of the pri-

mary determinants of whether parents will seek out and follow through with treatment.

In addition to potential interactive or additive effects, behavior therapy and psychostimulant medication each have areas of deficit and effectiveness that the other intervention can complement. For example, parent training is a standard component of a behavioral intervention for ADD and CD, thus insuring that a treatment is available for the child and family's home problems that are typically not addressed by medication. Similarly, psychostimulant medication can reduce problematic behaviors that are difficult to treat with behavioral programs, such as low-rate, peer-directed aggression that occurs in the absence of adult authority.⁴⁰ An untested but intriguing possibility is that medication might facilitate behavioral treatment of other low-rate behaviors, such as stealing, that have been relatively unresponsive to behavioral interventions alone.¹⁰² A combined intervention might thus be more comprehensive in coverage than either treatment alone.

Finally, there are several reasons to speculate that long-term maintenance of treatment effects might be improved with a combined intervention. First, it is clear that ADD children suffer from a lack of cognitive and behavioral skills that are necessary for academic and social adjustment.¹⁰³ To the extent that these skills must be acquired for successful long-term outcome, medication alone—which does not teach a child alternative behaviors for coping with problematic situations—would not be expected to be a sufficient treatment.¹⁰⁴ However, the addition of a behavioral intervention that focused in part on teaching such skills³⁵ might improve the long-term outcome that would be achieved with medication alone. Conversely, the cognitive techniques that have been developed to facilitate long-term effects of behavioral interventions have not yet been shown to be effective in that respect.⁹⁶ The increasing evidence that stimulants may have beneficial effects on learning, however, suggests that the drugs might facilitate the acquisition of the cognitions taught in these programs.

Similarly, one of the suggestions that has been made to facilitate maintenance of behavioral treatment effects is to make the intervention one that is likely to be continued by the child's parents or teachers for a long time and/or maintained by naturally occurring contingencies following therapy termination.¹⁰⁵ Because the addition of a low dose of psychostimulant medication enables relatively greater effects to be achieved with a relatively less intensive, less complex, and thus more natural behavioral program, a combined intervention may be more likely to be maintained following therapeutic contact than a behavioral intervention alone.

Studies of Effectiveness of a Combined Intervention

There are thus a number of reasons to expect a combined behavioral and pharmacological treatment to be more effective with ADD than either treatment alone. The facts that both treatments as typically implemented are insufficient for the average ADD child and that they may have complementary, additive, and interactive effects provide a strong rationale for a combined intervention. Most of the ideas that have been discussed in this section, however, are at this point speculative and/or based on few studies. Much more research needs to be conducted before our knowledge of behavior therapy, psychostimulant medication, and their combination is adequate to draw firm conclusions in this regard.

A recent review of the available literature in which a combination of behavioral and stimulant treatments was used with ADD children revealed 19 independent studies.⁵⁴ Several conclusions were drawn in this review. First, 13 of the 19 independent studies (68 percent) showed superiority for a combined treatment on at least one classroom-based task, motor, or social measure. For those studies in which a behavioral or pharmacological effect was found, only very rarely was either of these treatments alone superior to their combination. In fact, if order of condition means, rather than statistical significance, were used to interpret results, the combination treatment was superior to treatments to which it was compared in virtually every study reviewed. It thus appears that, for the average ADD child treated in these studies, a combined behavioral and pharmacological intervention resulted in greater improvement than either treatment alone.

That conclusion is limited in several ways, however. First, it applies only to periods when medication is being administered. For example, in one study described above,⁴¹ the author examined (among the variables) the incremental effects of adding 0.3 mg/kg methylphenidate to a behavioral intervention conducted with ADD children in classroom settings. As Figure 5-4 shows, the children who received methylphenidate in addition to behavior modification, which included both parent and teacher training, were rated by teacher as considerably better than children who received behavior therapy plus placebo. As the figure also indicates, however, the incremental beneficial effects of medication did not last after the medication was withdrawn. Whether a systematic withdrawal and maintenance program could maintain the obviously beneficial effects of the combined treatment has yet to be investigated. A second limitation in these studies is that no long-term outcome studies of combined interventions have been conducted. Compared to the large numbers of sub-

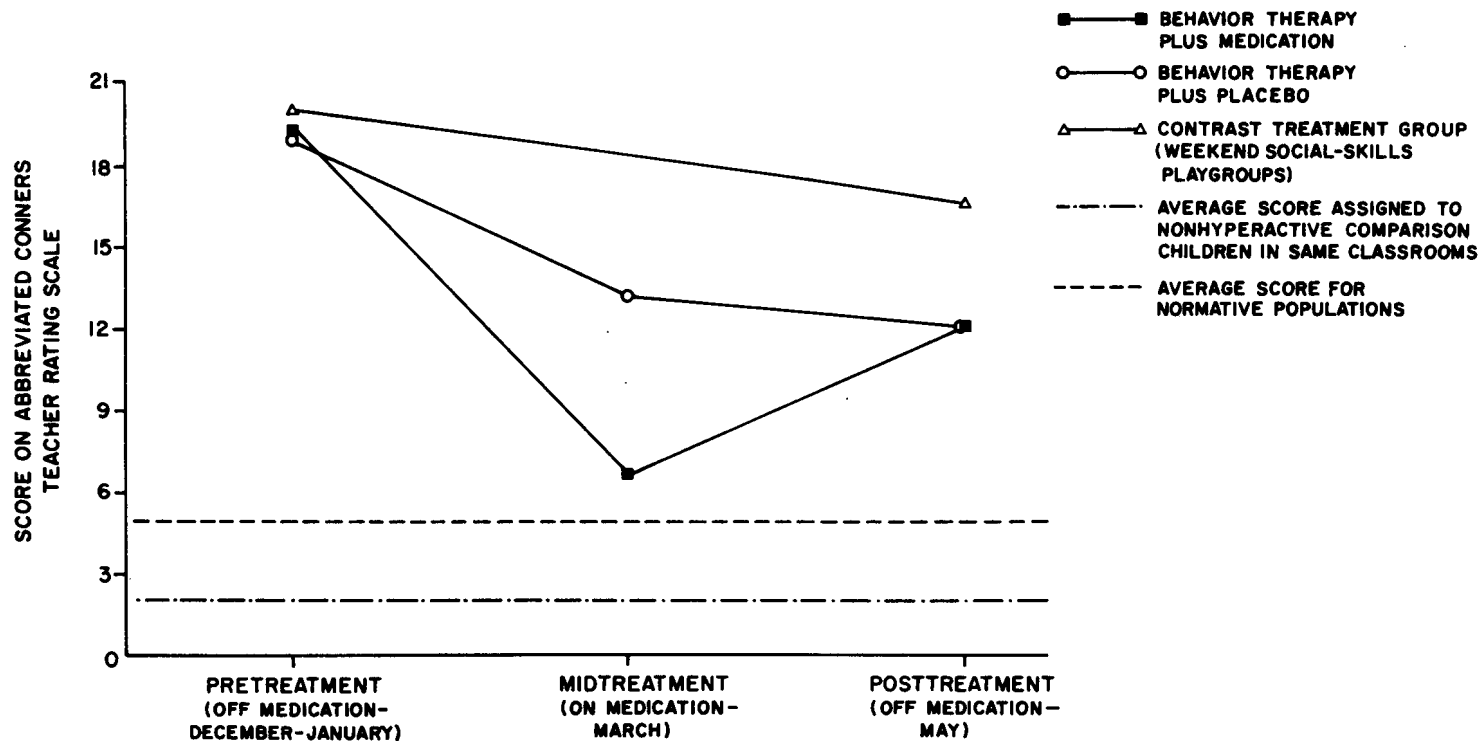


Figure 5-4. ACRS ratings made by teachers of ADD children participating in a therapy study plotted as a function of treatment condition and time.

jects who have been studied over considerably longer time periods with separate behavioral and pharmacological interventions, the combined intervention is relatively unstudied.

On the whole, studies conducted thus far suggest that a combined pharmacological and behavioral intervention for ADD is very promising. After a number of carefully conducted studies,⁵² the present author has been sufficiently convinced of this point for the past 5 years to have instituted it as the standard treatment in his summer treatment program at Florida State University. A 7-week summer day treatment program is used to evaluate for each child the combined and separate effects of psychostimulants and behavior modification. Based on the assessment, a long-term intervention for the child is recommended. Several case studies^{45,54,100} have shown this approach to have considerable validity as an assessment and treatment tool.

For example, a multiply handicapped child was evaluated who had been referred by his pediatric neurologist for assessment of whether psychostimulant medication, behavior modification, or the combination of the two was most effective in improving his learning and behavior.¹⁰⁰ Over a period of weeks the child learned lists of reading sight vocabulary words under different behavioral and drug conditions (e.g., with and without reward, with placebo or 0.3 mg/kg MPH). The initial assessment revealed that the child improved both with medication and with a behavioral program, but the combined intervention was most effective. A combined treatment regimen was therefore recommended for the child, and he has been maintained on that treatment for three years. Annual reassessments have demonstrated the continued incremental value of the combined pharmacological and behavioral intervention for this child.

This child responded to both the behavioral and the pharmacological components of the combined intervention, and his response to the combined treatments was additive, the combined effects equalling the sum of the components. As discussed above, however, there is considerable individual variability in response both to behavioral interventions and medication, and not all children will show best response to the combined treatment. Unfortunately, other than by directly measuring the child's response in a short-term treatment trial, there is no way to predict which children will respond to which treatments. The only way to determine what long-term treatment is best for an individual child is to conduct a single-subject assessment, as with the child described above. This highlights the importance of using carefully constructed behavioral assessments in evaluating treatment effectiveness for both behavioral and psychopharmacological interventions with ADD children.

REFERENCES

1. Boscoe J, Robin S: Hyperkinesis: Prevalence and treatment, in Whalen C, Henker B (eds): *Hyperactive Children: The Social Ecology of Identification and Treatment*. New York, Academic Press, 1980, pp 173-190.
2. O'Leary KD, O'Leary SG: *Classroom Management: The Successful Use of Behavior Modification*, ed 1. New York, Pergamon Press, 1972.
3. Patterson G: An application of conditioning techniques to the control of a hyperactive child, in Ullman L, Krasner L (eds): *Case Studies in Behavior Modification*. New York, Holt, Rinehart and Winston, 1965, pp 370-374.
4. Gittelman-Klein R, Klein DF, Abikoff H, Katz S, et al: Relative efficacy of methylphenidate and behavior modification in hyperactive children: An interim report. *J Abnorm Child Psychol* 4:461, 1976.
5. O'Leary KD, Pelham WE, Rosenbaum A, Price GH: Behavioral treatment of hyperkinetic children: An experimental evaluation of its usefulness. *Clin Pediatr* 15:510, 1976.
6. Barkley RA: Hyperactivity, in Mash EJ, Terdal LG (eds): *Behavioral Assessment of Childhood Disorders*. New York, Guilford, 1981, pp 127-184.
7. Kazdin AE: *Behavior Modification in Applied Settings*, ed 3. Homewood, Ill, Dorsey Press, 1984.
8. Wender P: *Minimal Brain Dysfunction in Children*. New York, Wiley, 1971.
9. Douglas VI, Parry PA: Effects of reward on a delayed reaction time task performance of hyperactive children. *J Abnorm Child Psychol* 11:313, 1983.
10. Parry PA, Douglas VI: Effects of reinforcement on concept identification in hyperactive children. *J Abnorm Child Psychol* 11:327, 1983.
11. Lang AR, Pelham WE, Johnston CJ, Gelernter S: Effects of deviant child behavior on adult stress and alcohol consumption: A laboratory investigation. Paper presented at the annual meeting of the Southeastern Psychological Association, Atlanta, March 1985.
12. Johnston C: Maternal characteristics associated with externalizing disorders in children: A family systems perspective. Unpublished manuscript, Florida State University, 1985.
13. Patterson GR: *A Social Learning Approach: Coercive Family Process*, vol 3. Eugene, Ore, Casalia Publishing Co., 1982.
14. Paternite CE, Loney J: Childhood hyperkinesis: Relationships between symptomatology and home environment, in Whalen CK, Henker B (eds): *Hyperactive Children: The Social Ecology of Identification and Treatment*. New York, Academic Press, 1980, pp 105-144.
15. O'Leary KD, O'Leary SG: *Classroom Management: The Successful Use of Behavior Modification*, ed 2. New York, Pergamon Press, 1977.
16. Sulzer-Azaroff B, Reese EP: *Applying Behavioral Analysis: A Program for Developing Professional Competence*. New York, Holt, Rinehart and Winston, 1982.
17. Barkley RA, Cunningham CE: The effects of methylphenidate on the

- mother-child interactions of hyperactive children. *Arch General Psychiat* 36:201, 1977.
18. Pelham W, Schnedler R, Bologna N, Contreras A: Behavioral and stimulant treatment of hyperactive children: A therapy study with methylphenidate probes in a within-subject design. *J App Behav Analysis* 132:221, 1980.
 19. Foster S, Ritchey W: Issues in the assessment of social competence in children. *J Applied Behav Analysis* 12:625, 1979.
 20. Hops H, Greenwood C: Social skills deficits, in Mash E, Terdal L (eds): *Behavioral Assessment of Childhood Disorders*. New York, Guilford, 1980, pp 347-396.
 21. Milich R, Landau S: Socialization and peer relations in hyperactive children, in Gadow K, Bialer I (eds): *Advances in Learning and Behavioral Disabilities*, vol 1. Greenwich, Conn, JAI Press, 1982, pp 283-339.
 22. Pekarik E, Prinz R, Liebert D, et al: The pupil evaluation inventory: A sociometric technique for assessing children's behavior. *J Abnorm Child Psychol* 4:83, 1976.
 23. Madsen C, Madsen C: *Teaching/Discipline: A Positive Approach for Educational Development*, ed 3. Boston, Allyn & Bacon, 1981.
 24. Patterson G: *Families: Application of Social Learning to Family Life*. Champaign, Ill, Research Press, 1976.
 25. Atkesen BM, Forehand R: Conduct disorders, in Mash EJ, Terdal LG (eds): *Behavioral Assessment of Childhood Disorders*. New York, Guilford, 1981, pp 185-220.
 26. Hinshaw SP, Henker B, Whalen CK: Self-control in hyperactive boys in anger-inducing situations: Effects of cognitive-behavioral training and methylphenidate. *J Abnorm Psychol*, in press.
 27. O'Leary KD, Johnson SB: Psychological assessment, in Quay H, Werry J (eds): *Psychopathological Disorders of Childhood*, ed 2. New York, Wiley, 1979, pp 210-246.
 28. O'Leary S, Pelham W: Behavior therapy and withdrawal of stimulant medication with hyperactive children. *Pediatrics* 61:211, 1978.
 29. Gelford DM, Hartmann DP: *Child Behavior Analysis and Therapy*, ed 2. New York, Pergamon Press, 1984.
 30. Martin G, Pear J: *Behavior modification: What It Is and How to Do It*, ed 2. Englewood Cliffs, NJ, Prentice-Hall, 1983.
 31. Ross AO: *Child Behavior Therapy*. New York, Wiley, 1981.
 32. Sulzer-Azaroff B, Mayer GR: *Applying Behavior-Analysis Procedures with Children and Youth*. New York, Holt, Rinehart and Winston, 1977.
 33. Camp B: Two psychoeducational treatment programs for young aggressive boys, in Whalen C, Henker B (eds): *Hyperactive Children: The Social Ecology of Identification and Treatment*. New York, Academic Press, 1980, pp 191-220.
 34. Douglas V, Parry P, Marton P: Assessment of a cognitive training program for hyperactive children. *J Abnorm Child Psychol* 4:389, 1976.
 35. Hinshaw SP, Henker B, Whalen CK: Cognitive-behavioral and pharmacological interventions for hyperactive boys: Comparative and combined effects. *J Consul and Clin Psychol* 52:739, 1984.

36. Friedling C, O'Leary S: Effects of self-instructional training on the second- and third-grade hyperactive children: A failure to replicate. *J Applied Behav Analysis* 12:211, 1979.
37. Hobbs S, Moguin LE, Tyroler M, Lahey BB: Cognitive behavior therapy with children: Has clinical utility been demonstrated? *Psychol Bulletin* 87:147, 1980.
38. Krehbiel GG, Milich R: Issues in the assessment and treatment of socially rejected children, in Prinz RJ (ed): *Advances in Behavioral Assessment of Children and Families*, vol 2. Greenwich, Conn, JAI Press, in press.
39. Oden S, Asher S: Coaching children in social skills for friendship making. *Child Devel* 48:495, 1977.
40. Pelham WE, Bender ME: Peer relationships in hyperactive children: Description and treatment, in Gadow K, Bialer I (eds): *Advances in Learning and Behavior Disabilities*, vol 1. Greenwich, Conn, JAI Press, 1982, pp 365-436.
41. Pelham WE, Schnedler RW, Bender ME, et al: The combination of behavior therapy and methylphenidate in the treatment of attention deficit disorders: A therapy outcome study, in Bloomingdale L (ed): *Attention Deficit Disorders*, vol 1. New York, Spectrum, in press.
42. Pelham W: Withdrawal of a stimulant drug and concurrent behavioral intervention in the treatment of a hyperactive child. *Behav Therapy* 8:473, 1977.
43. Ayllon T, Laymen D, Kandell H: A behavioral-educational alternate to drug control of hyperactive children. *J Applied Behav Analysis* 8:179, 1975.
44. Rapport M, Murphy A, Bailey J: The effects of a response cost treatment tactic on hyperactive children. *J School Psychol* 18:98, 1980.
45. Atkins M, White K, Pelham WE, et al: Behavioral and pharmacological treatment of a hyperactive, aggressive child. Manuscript submitted for publication, 1985.
46. Pelham WE, Milich R: Peer relationships in hyperactive children. *J Learn Disabil* 17:560, 1984.
47. Coie JD, Krehbiel G: Academic versus social skills training with low achieving, socially rejected children. *Child Developm*, in press.
48. Walker H, Street A, Garrett B, et al: Recess Consultant Interval Recording System. Eugene, Oregon, CORBEH, 1978.
49. LaGreca AM: Social competence in learning-disabled children: Directions for the future, in Milich R (chair): *Peer Relations of Children with Behavior or Learning Problems*. Symposium conducted at the annual meeting of the American Psychological Association, Anaheim, August 1983.
50. Renshaw PD, Asher SR: Social knowledge and sociometric status: Children's goals and strategies for social interaction. *Merrill-Palmer Quart* 29:353, 1983.
51. Pelham WE: The effects of stimulant drugs on academic achievement in hyperactive and learning disabled children. *Thalamus* 3:1, 1983.
52. Pelham WE: The effects of psychostimulant drugs on learning and academic achievement in children with attention deficit disorders and

- learning disabilities, in Torgesen JK, Wong B (eds): *Psychological and Educational Perspectives on Learning Disabilities*. New York, Academic Press, in press.
53. Pelham WE: Childhood hyperactivity: Diagnosis, etiology, nature and treatment, in Gatchel R, Baum A, Singer J (eds): *Behavioral Medicine and Clinical Psychology: Overlapping Disciplines*. Hillsdale, NJ, Erlbaum, 1982.
 54. Pelham WE, Murphy H: Combined pharmacological and behavioral interventions for the attention deficit and conduct disorders, in Hersen M, Breuning S (eds): *Behavior Therapy and Psychopharmacology: An Integrative Approach*. New York, Wiley, in press.
 55. Dangel RF, Polster RA (eds): *Parent Training: Foundation of Research and Practice*. New York, Guilford, 1984.
 56. Barkley RA: *Hyperactive Children: A Handbook for Diagnoses and Treatment*. New York, Guilford, 1981.
 57. Dubey DR, O'Leary SG, Kaufman KF: Training parents of hyperactive children in child management: A comparative outcome study. *J Abnorm Child Psychol* 11:229, 1983.
 58. Conners C: A rating scale for use in drug studies with children. *Amer J Psychiat* 8:84, 1969.
 59. Werry J, Sprague R, Cohen M: Conner's teacher rating scale for use in drug studies with children—An empirical study. *J Abnorm Child Psychol* 3:217, 1975.
 60. Cantell DP, Carlson G: Stimulants, in Werry JS (ed): *Pediatric Psychopharmacology*. New York, Brunner/Mazel, 1978, pp 171–207.
 61. Conners CK, Werry JS: Psychopharmacology, in Quay H, Werry J (eds): *Psychopathological Disorders of Childhood*, ed 2. New York, Wiley, 1979, pp 336–386.
 62. Quinn P, Rapoport J: A one year follow-up of hyperactive boys treated with imipramine and methylphenidate. *Amer J Psychiat* 132:241, 1975.
 63. Sprague R, Sleator E: Methylphenidate in hyperkinetic children: Differences in dose effects on learning and social behavior. *Science* 198:1274, 1977.
 64. Sleator E, von Neumann A: Methylphenidate in the treatment of hyperkinetic children. *Clin Pediatrics* 13:19, 1974.
 65. Pelham WE, Bender ME, Caddel JM, et al: The dose-response effects of methylphenidate on classroom academic and social behavior in children with attention deficit disorder. *Arch Gen Psychiat*, in press.
 66. Pelham WE, Swanson J, Bender M, Wilson J: Dose-response effects of pemoline on hyperactivity: Laboratory and classroom measures. Paper presented at the annual meeting of the American Psychological Association, Montreal, September 1980.
 67. Kavale K: The efficacy of the stimulant drug treatment for hyperactivity: A meta-analysis. *J Learn Disabil* 15:280, 1982.
 68. Abikoff H, Gittelman R: Does behavior therapy normalize the classroom behavior of hyperactive children? *Arch Gen Psychiat* 41:449, 1984.
 69. Whalen CK, Henker B, Collins BE, et al: A social ecology of hyperactive boys: Medication effects in structured classroom environments. *J Applied Behav Analysis* 12:65, 1979.

70. Rie HE, Rie ED, Stewart S, Ambuel JP: Effects of methylphenidate on underachieving children. *J Consult Clin Psychol* 4:250, 1976.
71. Brown R, Sleator E: Methylphenidate in hyperactive children: Differences in dose effects on impulsive behavior. *Pediatrics* 64:408, 1979.
72. Swanson J, Kinsbourne M, Roberts W, Zucker K: Time-response analysis of the effect of stimulant medication on the learning ability of children referred for hyperactivity. *Pediatrics* 61:21, 1978.
73. Swanson JM, Sandman C, Deutsch C, Baren M: Methylphenidate (Ritalin) given with or before breakfast (part 1): Behavioral, cognitive and electrophysiological effects. *Pediatrics* 72:49, 1983.
74. Mattes JA, Gittelman R: Growth of hyperactive children on maintenance regimen of methylphenidate. *Arch Gen Psychiat* 40:317, 1983.
75. Cantwell DP: Familial-genetic research with hyperactive children, in Cantwell DP (ed): *The Hyperactive Child: Diagnosis, Management, Current Research*. Hollywood, NY, Spectrum, 1975, pp 93-108.
76. Hetherington EM, Martin B: Family interaction, in Quay HC, Werry JS (eds): *Psychopathological Disorders of Childhood*. New York, Wiley, 1979, pp 247-302.
77. Mash EJ, Johnston C: Parental perceptions of child behavior problems, parenting self-esteem, and mother's reported stress in younger and older hyperactive and normal children. *J Consult Clin Psychol* 51:86, 1983.
78. Charles L, Schain R: A four-year follow-up study of the effects of methylphenidate on the behavior and academic achievement of hyperactive children. *J Abnorm Child Psychol* 9:495, 1981.
79. Riddle D, Rapoport J: A 2-year follow-up of 72 hyperactive boys. *J Nerv Ment Dis* 162:126, 1976.
80. Satterfield JH, Hoppe CM, Schell AM: A prospective study of delinquency in 110 adolescent boys with attention deficit disorder and 88 normal adolescent boys. *Amer J Psychiat* 139:795, 1982.
81. Weiss G, Kruger E, Danielson U, Elman M: Effects of long-term treatment of hyperactive children with methylphenidate. *Canad Med Assn J* 112:159, 1975.
82. Swanson J, Kinsbourne M: The cognitive effects of stimulant drugs on hyperactive (inattentive) children, in Hale G, Lewis M (eds): *Attention and the Development of Cognitive Skills*. New York, Plenum, 1979, pp 249-274.
83. Stephens R, Pelham WE, Skinner R: The state-dependent and main effects of pemoline and methylphenidate on paired-associates learning and spelling in hyperactive children. *J Consult Clin Psychol*, 52:104, 1984.
84. Whalen CK, Henker B: Hyperactivity and the attention deficit disorders: Expanding frontiers. *Pediat Clin N Amer*, in press.
85. Gadow KD: Pharmacotherapy for learning disabilities. *J Learn Disabil* 16:290, 1983.
86. Kent R, O'Leary KD: A controlled evaluation of behavior modification with conduct problem children. *J Consult Clin Psychol* 44:586, 1976.
87. Patterson G: Intervention for boys with conduct problems: Multiple setting treatment and criteria. *J Consult Clin Psychol* 42:471, 1974.
88. Gittelman R, Abikoff H, Pollack E, et al: A controlled trial of behavior

- modifications and methylphenidate in hyperactive children, in Whalen CK, Henker B (eds): *Hyperactive Children: The Social Ecology of Identification and Treatment*. New York, Academic Press, 1980, pp 221-246.
89. Firestone P, Kelly MJ, Goodman JT, Davey J: Differential effects of parent training and stimulant medication with hyperactives. *J Amer Acad Child Psychiat* 20:135, 1981.
 90. Fleischman MJ: A replication of Patterson's "Intervention for boys with conduct problems." *J Consult Clin Psychol* 49:342, 1981.
 91. Bernal RA, Kinnert MD, Schultz LA: Outcome evaluation of behavioral parent training and client-centered parent counseling for children with conduct problems. *J Appl Behav Analysis* 13:677, 1980.
 92. Flanagan S, Adams HE, Forehand R: A comparison of four instructional techniques for teaching parents to use time-out. *Behav Therapy* 10:94, 1979.
 93. Murphy HA: Behavioral Treatment of Classroom Hyperactivity. Unpublished manuscript, Department of Psychology, Florida State University, 1983.
 94. Firestone P, Witt JE: Characteristics of families completing and prematurely discontinuing a behavioral parent-training program. *J Pediat Psychol* 7:209, 1982.
 95. Wahler RG: The insular mother: Her problems in parent-child treatment. *J Applied Behav Analysis* 13:207, 1980.
 96. Alexander JF, Malouf RE: Intervention with children experiencing problems in personality and social development, in Mussen PH (ed): *Handbook of Child Psychology*. New York, Wiley, 1983, pp 913-981.
 97. Uhlenhuth EH, Lipman RS, Covi L: Combined pharmacotherapy and psychotherapy: Controlled studies. *J Nerv Ment Dis* 148:52, 1969.
 98. Hollon SD, Beck AT: Psychotherapy and drug therapy: Comparison and combinations, in Garfield SL, Bergin AE (eds): *Handbook of Psychotherapy and Behavior Change: An Empirical Analysis*. New York, Wiley, 1978.
 99. Seiden L, Dykstra L: *Psychopharmacology*. New York, Van Nostrand Reinhold, 1977.
 100. Schell RM, Pelham WE, Bender M, et al: The use of a multi-element design in the assessment of task structure, reinforcement and methylphenidate on the learning-delayed, mildly retarded child with attention deficit disorder. *Behav Assess*, in press.
 101. Schroeder SR, Lewis MH, Lipton MA: Interactions of pharmacotherapy and behavior therapy among children with learning and behavioral disorders, in Gadow K, Bialer I (eds): *Advances in Learning and Behavioral Disabilities*, vol 2. Greenwich, Conn, JAI Press, 1983, pp 179-225.
 102. Reid JB, Hendriks AF: Preliminary analysis of the effectiveness of direct home intervention for the treatment of predelinquent boys who steal, in Hamerlyunck LA, Handy LC, Mash EJ (eds): *Behavior Change: Methodology, Concepts, and Practice*. Champaign, Ill, Research Press, 1973.

103. Douglas VI: Attentional and cognitive problems, in Rutter M (ed): *Developmental Neuropsychiatry*. New York, Guilford, 1983, pp 280-329.
104. O'Leary KD: Pills and skills for hyperactive children. *J Applied Behav Analysis* 13:191, 1980.
105. Stokes TF, Baer DM: An implicit technology of generalization. *J Applied Behav Analysis* 10:349, 1977.