Effects of Methylphenidate Alone and in Combination with Behavior Modification Procedures on the Behavior and Academic Performance of Hyperactive Children

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Twenty hyperactive 6- to 9-year-old children of normal intelligence were studied in a half-day laboratory classroom in a 2-week period baseline-treatment-reversal design for behavior modification. Under double-blind conditions half the children were placed on .3 mg/kg of Ritalin and half on placebo for the entire program. The classroom program consisted of a group period with immediate reinforcement possible, and an individual time period without immediate reinforcement possible. Behavior modification caused a significant decrease in non-attending, out-of-seat, inappropriate vocalizing and inappropriate peer interaction behavior in the group period. Fidgeting, a nontargeted behavior, was not significantly decreased during this period but did significantly decrease as a result of medication. No other drug effects occurred during this period. During the individual period, the results were essentially reversed. There were no significant behavior modification effects observed. Significant reductions resulted from medication in all behaviors except out-of-seat and fidgeting. Behavior modification alone significantly affected the two academic measures. No significant effects were seen on the Conners Abbreviated Teacher Rating Scale. No significant interactions were noted between medication and behavior modification.

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Many researchers have attempted to reduce hyperactivity in children through the use of amphetamines or behavior modification. However, relatively few studies have compared the additive effect of stimulant therapy and behavior modification versus either of these techniques used alone.

The use of amphetamines as a form of therapy for hyperactive children was first reported by Bradley (1937), who found Benzedrine effective in reducing the hyperactive behaviors of his institutionalized subjects. Since that time, more than 100 controlled studies have explored the relationship between drugs and hyperactivity, and have generally found that stimulant drugs have reduced hyperactive symptoms (Barkley, 1977).

Specifically, in a classroom setting, amphetamines seem to have a fairly consistent, significant effect in improving hyperactive children's behavior as rated by teachers on behavior rating scales. This effect is also generally present in tests requiring attention and fine motor coordination. The drug may have other positive effects, but these have not been shown consistently (Barkley & Cunningham, 1977).

Within the past 10 years, a large number of studies have documented the effectiveness of operant behavior modification procedures for treating children described as hyperactive, disruptive, or presenting behavior problems in the classroom. In public school settings, children labeled as disruptive by their teachers and principals significantly reduced their inappropriate, nonfunctional, and nonattending behaviors when decreases in these target behaviors were reinforced with auditory stimuli exchangeable for candy or pennies (Patterson, Jones, Whittier, & Wright, 1965), with school-related material (Bolstad & Johnson, 1972), with tangible rewards and punishments (Blanchard & Johnson, 1973), or with attention from trained, selected peers (Solomon & Wahler, 1973).

In two recent studies, the Conners Abbreviated Teacher Rating Scale (TRS) was used to identify children with hyperactive behaviors (O'Leary, Pelham, Rosenbaum, & Price, 1976; Rosenbaum, O'Leary, & Jacob, 1975); the investigators reported significant decreases in scores on the TRS and on a Problem Behavior Scale when improvements on individualized target behaviors were reinforced with sweets or money. Two important trends have been the attempt to ensure that improved behavior will continue when special treatment procedures are removed (Bolstad & Johnson, 1972; Drabman, Spitalnick, & O'Leary, 1973; Walker, Hops, & Johnson, 1975), and the increased emphasis on directly rewarding improved academic performance (Ayllon & Roberts, 1974).

The relative effectiveness of operant behavior modification alone, stimulant drugs alone, and both used in combination has been studied infrequently. Christensen and Sprague (1973) studied the reduction of seat movement in 12 children using stabilimetric cushions. They noted the additive effect of methylphenidate on contingent reinforcement and concluded that drug therapy and behavior modification were superior to behavior modification alone.