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A RAPID METHOD FOR EVALUATING THE NECESSITY FOR BOTH A BEHAVIORAL INTERVENTION AND METHYLPHENIDATE

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We examined the effects of a behavioral intervention and methylphenidate (MPH) on inappropriate behavior and sleep disturbance displayed by a 6-year-old boy who had been diagnosed with attention deficit hyperactivity disorder. Results showed that the behavioral intervention was effective in reducing inappropriate behaviors to near-zero levels regardless of the presence or absence of MPH.

DESCRIPTORS: behavioral pediatrics, attention deficit hyperactivity disorder, behavioral intervention, medication, sleep

Children who are diagnosed with attention deficit hyperactivity disorder (ADHD) often present with multiple behavioral concerns, including noncompliance and sleep disturbance (Frick & Lahey, 1991; Kaplan, McNicol, Conte, & Moghadam, 1987). The effects of treatment packages that involve both medication, such as methylphenidate (MPH), and environmental components can often be difficult to analyze. Cooper et al. (1993) provided a model for analyzing the separate effects of MPH and environmental variables (high and low levels of demands or parental attention) on compliant behavior in an outpatient clinic. The purpose of this study was to extend the multielement analysis described by Cooper et al. to a brief inpatient evaluation and to study the effects of a behavioral intervention and MPH on sleep and daytime behavior. This case example provides a method for assessing multiple variables in a relatively short (i.e., 10-day) time period and determining which treatment components are required for behavioral maintenance.

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METHOD

Tom, a 6-year-old boy with average intelligence and ADHD, was referred to an inpatient unit for assessment and treatment of self-injury, aggression, and sleep problems. His primary behavior problems consisted of noncompliance (e.g., refusing to pick up the pencil, refusing to write, pushing work onto the floor, destruction, and out-of-seat behavior), aggression (e.g., hitting, kicking, biting, and pinching), and self-injury (e.g., head banging). Based on a previous outpatient evaluation, these behaviors were shown to be associated with demands. Sleep concerns consisted of stereotypy during sleep (e.g., body rocking). Tom had been taking MPH for 3 years and continued to have both behavioral and sleep problems. The referring physician requested an evaluation of the effects of MPH and specifically asked for a behavioral intervention to replace MPH. Target tasks included instructional-level ma-

terials chosen on the basis of individual education plan goals, teacher materials, or target interviews, and consisted of writing tasks, mathematical problems, and reading. Observers recorded all responses using a 6-s partial-interval recording procedure for daytime data. All daytime sessions lasted 5 to 10 min. Sleep was videotaped for approximately 10 hr per night via an infrared recorder during the last 5 days of hospitalization (medical studies were conducted during the first 2 nights). Observers viewed the tapes and scored sleep using a 1-min partial-interval recording system. Sleep was defined as eyes closed and body lying still with little or no movement. Daytime behavioral interobserver agreement checks were conducted on 82% of the sessions, with a mean occurrence agreement of 99% (range, 87% to 100%). Nighttime behavioral agreement checks were conducted on 42% of all sessions, with a mean agreement of 99% (range, 95% to 100%).

Design and Procedures

The effects of MPH and the behavioral intervention recommended during Tom's outpatient evaluation were studied within an ABCB reversal design, with A being MPH plus behavioral intervention, B being behavioral intervention only, and C being no intervention. To assess the facilitative effects of MPH, Tom received 7.5 mg (0.38 mg/kg) MPH at 7:00 a.m. and 10:00 a.m. and 5 mg (0.25 mg/kg) at 12:30 p.m. and 3:30 p.m. during the first 2 days of his admission (Phase A) and was off MPH during the final three phases (BCB). The first two phases were conducted in a double blind format, in which either a placebo or an MPH capsule was administered to Tom. Only the pharmacist was aware of the schedule of medication.

During all sessions, Tom was given a sheet of math problems to complete. The behavioral intervention consisted of (a) a sequential prompting procedure (verbal followed by gestural and then physical prompts) that was terminated contingent upon compliance, (b) attention and preferred activities on a fixed-ratio 1 schedule contingent upon compliance, and (c) escape extinction (the prompting sequence continued independent of problem behavior). During Phase C, these treatment components were removed. That is, Tom was given general directions to complete math problems rather than sequential prompts, and no consequences were delivered for compliance, noncompliance, off-task behavior, or aggression. The behavioral intervention was implemented for the first 6 days of Tom's admission (13 sessions) while he was both on (Phase A) and off (Phase B) MPH. Assessment conditions were conducted within 1.5 to 2 hr of MPH administration. The behavioral intervention was then removed for 1 day (three sessions) while Tom was off MPH and was then reinstated for the final three sessions. To further assess the role of demands on his aberrant behavior, a free-play (noncontingent access to toys) without attention condition was interspersed with the behavioral intervention during the first two phases (A and B) of the evaluation. All inappropriate and appropriate behavior was ignored during free-play, and Tom was given noncontingent access to toys. No specific procedures were used to increase his sleep; nursing staff simply put Tom to bed on a regular schedule (starting at 8:00 p.m., with no videotaping until the lights were turned off, and ending at 7:00 a.m.) and ignored him after he was put to bed.

RESULTS AND DISCUSSION

The top panel of Figure 1 shows that during the first phase, when the behavioral intervention and MPH were both in effect, Tom's inappropriate behavior decreased from moderate levels to near-zero levels after the

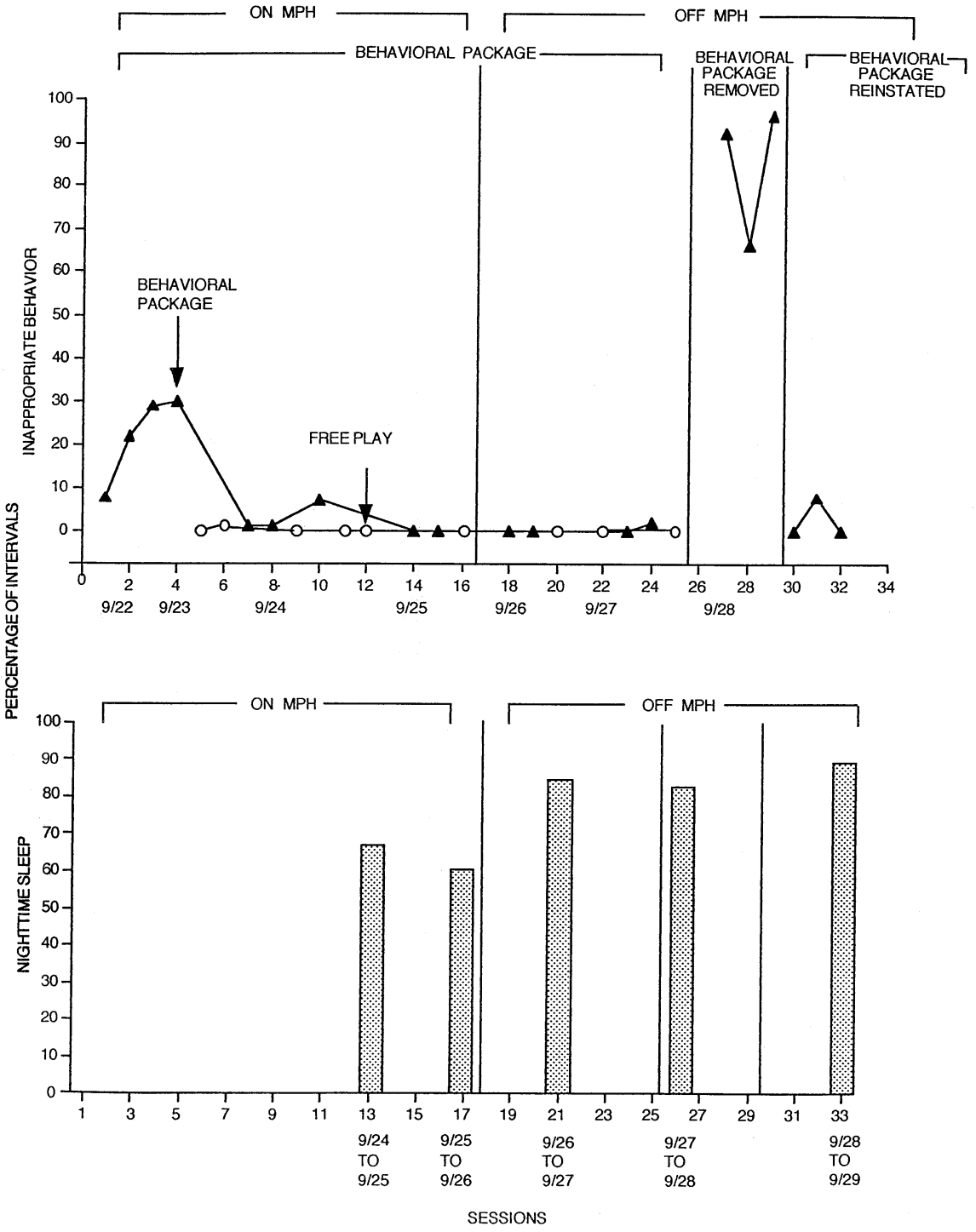

Figure 1. Percentage of inappropriate behaviors (top panel) and percentage of time spent in sleep (bottom panel).

first four treatment sessions and rarely occurred during the free-play condition. Inappropriate behavior remained low when MPH was withdrawn and the behavioral intervention remained in effect (Phase B). During Phase C, when the behavioral intervention was removed, inappropriate behavior increased substantially and ranged from 66% to 96%. However, when the behavioral intervention was reinstated (return to Phase B), inappropriate behavior again occurred only rarely (0% to 8%). These results suggest that inappropriate behavior was maintained by escape from demands and was effectively controlled by the behavioral intervention.

The effects of MPH on Tom's sleep are shown in the bottom panel of the figure. His percentage of sleep improved when he was off MPH, suggesting either that the MPH negatively affected his sleep or that he responded consistently better to the sleep schedule of the inpatient unit during the course of his admission.

One limitation of this study was the exclusion of an MPH-only phase. Tom was admitted after having been prescribed MPH for approximately 3 years, and his behavioral problems had not improved with this treatment. Therefore, the behavioral intervention was evaluated to assess whether Tom's inappropriate behavior could be managed without MPH.

Overall, this evaluation showed that Tom's inappropriate behavior was socially mediated (escape from demands) and was successfully treated with a straightforward behavioral intervention. These results replicate those of Cooper et al. (1993) in showing how the relative effects of multiple variables (medication and environmental) can be assessed rather quickly during a brief inpatient admission. In addition, the method could be extended in clinical situations as warranted to study interactive effects of biological (e.g., sleep) and environmental variables on ongoing behavior.

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