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A PRELIMINARY ANALYSIS OF INSTRUCTIONAL CONTROL IN THE MAINTENANCE OF APPROPRIATE BEHAVIOR

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This bridge study evaluated the effects of contingency-specifying instructions (CSIs) and incomplete instructions (IIs) in terms of establishing instructional control of appropriate behavior. Results suggested that instructional control and maintenance were achieved with CSIs but not with IIs. Results are discussed in terms of the potential use of instructional control in the maintenance of appropriate behavior for children with attention deficit hyperactivity disorder.

DESCRIPTORS: attention deficit hyperactivity disorder, delay to reinforcement, instructional control, maintenance, rule-governed behavior

Skinner (1969) described behavior acquired through direct contact with environmental contingencies (i.e., contingency-shaped behavior) as being distinct from behavior acquired through verbal descriptions of environmental contingencies (i.e., rule-governed behavior or instructional control). Whereas contingency-shaped behavior is defined as being under the control of environmental contingencies, rule-governed behavior is defined as being under the control of verbal stimuli called commands, rules, or instructions (Catania, Shimoff, & Matthews, 1989). In the basic literature, numerous studies have focused on the role of verbal stimuli in human operant behavior. For example, Shimoff, Catania, and Matthews (1981) evaluated the relative sensitivity to schedule changes of instructed and contingency-shaped key presses with college students. The results suggested that contingency-shaped responding was sensitive to schedule changes and instruction-shaped responding was not. The results of Shimoff et al. and other studies (e.g., Joyce & Chase, 1990) in the basic literature suggest that behavior under instructional control may be less sensitive to changes in schedules of reinforcement than is contingency-shaped behavior. In fact, Shimoff et al. asserted that "such insensitivity is a defining property of instructional control" (p. 207).

Rules or instructions may or may not contain an explicit description of a behavioral contingency. The consequences of verbal stimuli also can be implied rather than explicitly stated within the instruction (Malott, Whaley, & Malott, 1997). Verbal statements that have implied consequences have been referred to as "incomplete rules" (Malott et al.) or instructions. Malott et al. cited the minimal instruction "Be quiet!" as an example of an incomplete instruction and described the implied consequences as "or you're really gonna get it!"

Joyce and Chase (1990) conceptualized the insensitivity of behavior under instructional control to changes in contingencies as an example of maintenance of responding following schedule changes. Similarly, Catania et al. (1989) suggested that establishing instructional control and the resulting insensitivity to changes in contingencies can be a desired outcome "when natural consequences are weak or when consequences are likely to maintain undesirable behavior" (p. 121). Thus, it may be useful to establish instructional control in order to

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facilitate maintenance of appropriate behavior with children who engage in aberrant behavior. Few studies have evaluated the impact of instructional control on appropriate and aberrant behavior, and none have evaluated the role of instructional control in the maintenance of appropriate behavior following schedule changes.

The current study was designed as a bridge study to evaluate instructional control as a method to promote maintenance of appropriate behavior. Although the phenomenon of instruction-induced insensitivity to changes in contingencies has been observed in numerous studies in the basic literature (i.e., Joyce & Chase, 1990; Shimoff et al., 1981), it has not been evaluated as a means of facilitating maintenance of appropriate behavior in the applied literature. Thus, the purpose of the current study was to evaluate whether instruction-induced insensitivity to contingency changes might be used in the programming of maintenance of appropriate behavior with children who have been diagnosed with attention deficit hyperactivity disorder (ADHD). In addition, we evaluated the relative impact of contingency-specifying instructions and incomplete instructions on subsequent insensitivity to changes in contingencies in the form of maintenance of appropriate behavior following changes in schedules of reinforcement.

METHOD

Participants, Setting, and Reinforcers

Participants were 3 boys (7 years old) who had been diagnosed with ADHD and had histories of engaging in disruptive behavior during instructional situations. Sessions were conducted in two classrooms at a university laboratory school (Andy and Guy) or in a room at an elementary school (Chad). Five coupons representing five categories of reinforcers (i.e., peer attention, tangible items, edible items, adult attention, and escape) were used as reinforcers. The participants had been trained previously in exchanging coupons to obtain reinforcers and could do so at any time during the day except during experimental sessions.

Response Measurement and Interobserver Agreement

Data were collected on latency (elapsed time in seconds from an instruction until the first occurrence of disruptive behavior, which was defined as inappropriate vocalizations or the participant being out of his seat). A second observer was present during 27% to 39% of sessions for interobserver agreement purposes. Interobserver agreement was calculated by dividing the smaller duration measure by the larger duration measure and converting this ratio to a percentage. Mean agreement was 99% for Andy and Guy (ranges, 93% to 100% and 86% to 100%, respectively) and 91% (range, 33% to 100%) for Chad.

Experimental Design and Procedure

We used an alternating treatments design across reinforcement, extinction, and reinforcement plus increasing response requirements conditions to evaluate the effects of contingency-specifying instructions (CSIs) and incomplete instructions (IIs). Approximately five sessions were conducted per day.

Reinforcement. CSI sessions during reinforcement were initiated when the instruction, ''Sit and wait quietly, and you might get a coupon,'' was provided with no information regarding the availability of reinforcement. A goal for engagement in appropriate behavior was calculated for each participant using the mean latency to disruptive behavior during a series of baseline sessions (data available from the first author). Each session ended after (a) the therapist observed disruptive behavior or (b) the goal for duration of appropriate behavior was achieved. If the participant successfully reached his goal, the therapist said, ''Good job waiting quietly; you can have a coupon,'' and the participant was allowed to select a coupon from the array. If the therapist observed disruptive

behavior, the therapist told the participant, ''It's time to check your schedule and move to the next activity.'' If the participant asked about the coupon following disruptive behavior, the therapist said, ''The coupon isn't available this time.'' II sessions during reinforcement were identical to CSI sessions during reinforcement except that the therapist provided the instruction, ''Sit and wait quietly.''

Extinction. CSI sessions during extinction were the same as CSI sessions during reinforcement except that no reinforcement was delivered if the participant successfully met his goal. The instruction that the therapist provided during CSI sessions was identical to the instruction provided during reinforcement (i.e., ''Sit and wait quietly and you might get a coupon''). When the participant met the termination criterion for each session, the therapist told the participant, ''It's time to check your schedule and move to the next activity.'' If a participant asked about the coupon, he was told, ''The coupon isn't available this time.'' II sessions during extinction were the same as CSI sessions during extinction except that the therapist provided the instruction, ''Sit and wait quietly.''

Reinforcement plus increasing response requirement. This phase was implemented for Guy and Chad, but not for Andy because his participation in the program ended before this phase could be implemented. Sessions during reinforcement plus increasing response requirement were the same as sessions during reinforcement except that as each participant successfully reached his target goal, the goal was increased systematically in each instructional condition. Goals were increased incrementally until the delay was equal to 5 min.

RESULTS AND DISCUSSION

Figure 1 shows the results of the reinforcement, extinction, and reinforcement plus increasing response requirements conditions for each participant. During the reinforcement condition, each participant eventually achieved his goal across both CSI and II for three consecutive sessions. During the extinction condition, the latency to disruptive behavior decreased in the II condition. By contrast, throughout the extinction condition, each participant continued to meet his goal in the CSI condition. During the reinforcement plus increasing response requirement condition, Chad and Guy consistently met their goals as they increased during CSI. During II, Chad continued to reach his goals as they increased. However, Guy was not able to consistently meet his goal during II, and the latency to disruptive behavior gradually decreased.

The results suggest that instructional control was achieved with the CSI, resulting in maintenance of appropriate behavior in the absence of reinforcement for all 3 participants. The data also suggest that instructional control was not achieved with the II. The extinction condition was the test for the establishment of instructional control. The results of the extinction condition suggest that the behavior was sensitive to the changes in contingencies during II but not during CSI (i.e., instructional control was established with the CSI but not with the II).

The phenomenon of instruction-induced insensitivity to changes in contingencies (i.e., instructional control) has been observed in numerous studies in the basic literature (i.e., Joyce & Chase, 1990; Shimoff et al., 1981). The results of the current study extend the literature on instructional control by providing an application of the use of instruction-induced insensitivity to changes in contingencies in an applied context. Specifically, these results suggest that the programming of instructional control, an effect often observed in the basic literature, may be useful in the facilitation of maintenance of appropriate behavior in applied situations. The results also suggest that differential levels of instructional control may be achieved across different types of instructions.

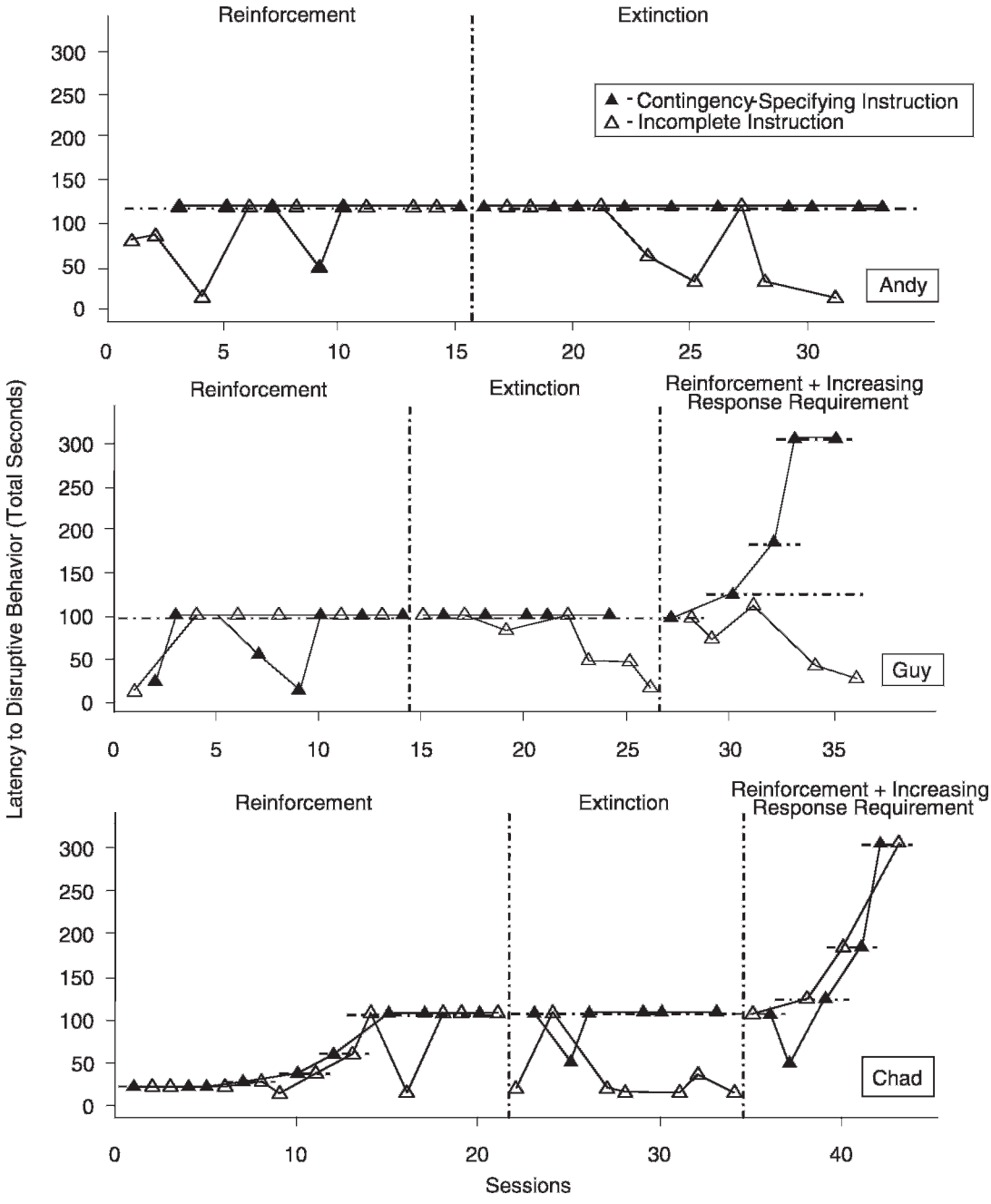

Figure 1. Latency to disruptive behavior during reinforcement and extinction for Andy and reinforcement, extinction, and reinforcement plus increasing response requirements for Guy and Chad. The dashed horizontal lines indicate the goal for each condition.

One way the results may be interpreted is in terms of a relative establishment of indiscriminable contingencies (Stokes & Baer, 1977) via instructional control. This interpretation is based on the supposition that the II allowed discrimination of the schedules of reinforcement in place. At the same time, the wording of the CSI may have resulted in unpredictability of the schedule of reinforcement in place and the prevention of discrimination. In addition, the wording of the CSI, ''Sit and wait quietly and you might get a coupon,'' implied an intermittent schedule of reinforcement, and this may have accounted for the different levels of instructional control exerted by the two types of instructions. Resistance to extinction is generally increased when behavior has been maintained on an intermittent schedule of reinforcement (Ferster & Skinner, 1957). The current results suggest that the CSI and the implied intermittent schedule of reinforcement may have affected the subsequent insensitivity of behavior to changes in reinforcement contingencies. Future studies should evaluate the effects of instructions on relative sensitivity of behavior to changes in schedules of reinforcement when those instructions have been demonstrated to control responding yet imply different types of schedules of reinforcement. Another partial explanation is that the participants' prior verbal histories with the respective types of instruction may have influenced the different levels of instructional control observed with each instruction. It has been suggested previously that prior verbal histories may affect the insensitivity of behavior to changes in reinforcement contingencies across instruction types (Catania et al., 1989).

A limitation of the current study is that the termination of sessions following disruptive behavior may have resulted in a functional contingency. Although the contingency for disruptive behavior was identical across all conditions, the unknown function of this contingency is a potential limitation. Other potential limitations are the lack of additional CSI sessions with Guy during extinction and the difficulty of controlling for histories of reinforcement with each type of instruction. The number of times reinforcement is paired with respective instructions might affect responding during extinction. We attempted to control for this possibility by implementing extinction only after reinforcement was delivered during three consecutive sessions within each instructional condition during the reinforcement phase.

The current results suggest that instructional control may be used to facilitate maintenance of appropriate behavior across various contingency arrangements with children with ADHD. CSIs may be useful if maintenance of appropriate classroom behavior in the absence of reinforcement is a goal. For example, CSIs may be appropriate during classroom situations in which teachers are unable to determine if it will be possible to deliver reinforcement for engagement in appropriate behavior or when there are challenges to treatment integrity (Wilder, Atwell, & Wine, 2006). Further, it may be desirable to use instructions that are likely to result in insensitivity to changes in contingencies if consequences for appropriate behavior are likely to be inconsistent. However, future research on this topic that targets more socially significant behaviors is warranted before such conclusions can be drawn.

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