JOURNAL OF APPLIED BEHAVIOR ANALYSIS 1995, **28,** 229–230 NUMBER 2 (SUMMER 1995)

EFFECTS OF DIFFERENTIAL NEGATIVE REINFORCEMENT ON DISRUPTION AND COMPLIANCE

Bethany A. Marcus and Timothy R. Vollmer
Louisiana State University

We examined the effects on compliance of two types of differential negative reinforcement (DNR) with a 5-year-old girl with a history of severe disruption. During DNR (communication), escape from instructional trials was provided contingent on a communicative behavior. During DNR (compliance), escape was provided contingent on compliance. Both interventions decreased inappropriate behavior and increased appropriate behavior. However, during DNR (communication), compliance rarely occurred.

DESCRIPTORS: functional communication training, differential negative reinforcement, compliance

Disruption and noncompliance during instructional activity are among the most challenging behaviors displayed by children with developmental disabilities. Treatment of disruptive noncompliance has included antecedent manipulations, differential reinforcement, escape extinction, and functional communication training (FCT). Each of these interventions typically increases appropriate behavior (compliance or communication) concurrent with decreases in aberrant behavior. However, in FCT studies, appropriate behavior is usually defined as an alternative request (communication) for escape. Thus, it is possible for a client to escape instructions with minimal task engagement.

The purpose of this study was to examine the effects of two types of differential negative reinforcement (DNR) on compliance: DNR (communication) and DNR (compliance). DNR (communication) represents a form of FCT because aberrant behavior is placed on extinction while an alternative request is negatively reinforced by escape. Few FCT studies have: (a) assessed direct or indirect effects of the procedure on compliance (but see Bird, Dores, Moniz, & Robinson, 1989, for a notable exception); or (b) assessed DNR (communication) and DNR (compliance) as potentially complementary procedures.

METHOD: *Subject and setting.* Sally was a 5-year-old girl with Down syndrome, language delay, and speech articulation difficulties who appeared to be functioning in the moderate range of mental retardation. Sally was referred for assessment and treatment of severe behavior problems. She had a history (since infancy) of self-injurious behavior (SIB), aggression, and disruption. All sessions were conducted in an unoccupied room in Sally's school. Three to four sessions, lasting 10 min, were usually conducted 5 days per week.

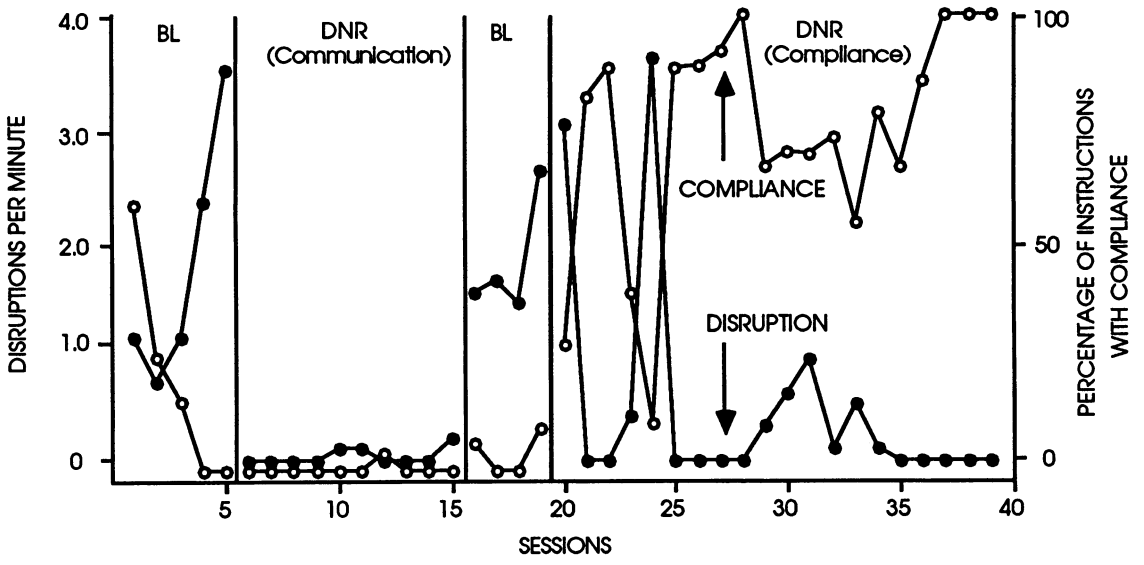
Response measurement. Disruption was defined as Sally throwing instructional materials at least 0.6 m or removing her buttocks from the chair used during instructional sessions, except during breaks. *Compliance* was defined as following an instruction given by the therapist within 5 s after an initial verbal request or demonstration without physical guidance. *Communication* was defined as vocally saying "finished." *Independent behavior* was defined as completion of a task independent of instruction.

Data collection and reliability. The dependent variables were responses per minute of disruption, communication, and independent behavior, and percentage of trials with compliance. Data were collected on hand-held computers by a trained observer seated in the corner of the room. A second observer simultaneously (but independently) recorded data during 26.8% of the sessions. Session times were divided into consecutive 10-s intervals to calculate interobserver agreement. In each interval the smaller number of observed responses was divided by the larger number of observed responses; these values were averaged across the session. Agreement on each dependent variable exceeded 97% in all conditions.

Procedure. A functional analysis was conducted based on the procedures described by Iwata, Dorsey, Slifer, Bauman, and Richman (1982). The assessment conditions included negative reinforcement (escape from demands), positive reinforcement (tangible item), positive reinforcement (attention), no consequence (no interaction), and play (control). Disruptive behavior occurred almost exclusively in the negative reinforcement condition. (Although SIB was observed in the tangible positive reinforcement condition, the current intervention focused on disruption.)

The two forms of DNR were examined in an ABAC design. During all sessions, Sally was given three-prompt instructions (verbal, model, physical) on a fixed-time (FT) 30-s schedule. All work took place at a table, and Sally was asked to remain seated. Instructions and tasks included being seated in a chair at the table (to begin the session or following breaks), putting together blocks, and stringing rubber shapes on a cord. During baseline (A condition), the experimenter presented instructions, and praise was contingent on correct completion of the instructions (except following physical guidance). Escape from instructional tasks was provided contingent on occurrences of disruption. During DNR (communication) (B condition), instructions were terminated contingent on escape mands (saying "finished"), and Sally received a 20-s break; disruption resulted in guided compliance. That is, when Sally attempted to leave the chair, the response was scored as disruption and she was prompted to stay seated (i.e., physical guidance). Similarly, when Sally threw instructional materials, she was required to remain seated. If disruption occurred during a three-prompt sequence, she was immediately guided to comply with the instruction. During DNR (compliance) (C condition), Sally was given a 20-s break contingent on compliance. Disruption resulted in guided compliance just as in DNR (communication). The schedule of reinforcement (escape) for compliance was gradually increased across sessions from fixed-ratio (FR) 1 to FR 3.

RESULTS AND DISCUSSION: The figure displays Sally's disruption and compliance during the study. During baseline conditions, disruption averaged 1.76 responses per minute (range, 0.7 to 2.6), and compliance averaged 12.6% (range, 0% to 57.9%). During DNR (communication), disruption averaged 0.04 responses per minute (range, 0 to 0.2). However, Sally exhibited compliance during



only one DNR (communication) treatment session and was escaping all instructions. During DNR (compliance), rates of disruption averaged 0.48 responses per minute (range, 0.4 to 3.6), and compliance averaged 74% (range, 10.5% to 100%).

During baseline conditions, the mean rate of target communicative behaviors was 1.45 responses per minute (range, 0.5 to 2.3), but increased to an average of 3.2 responses per minute (range, 2.5 to 3.7) during DNR (communication) and decreased to an average of 0.06 responses per minute (range, 0 to 0.3) during DNR (compliance). Task-related independent behavior averaged 0.07 responses per minute (range, 0 to 0.4) during baseline, 0 responses per minute during DNR (communication), and 1.01 responses per minute (range, 0 to 2.7) during DNR (compliance).

Both DNR (communication) and DNR (compliance) significantly reduced rates of disruption. However, compliance rarely occurred during DNR (communication). Although prior FCT studies have demonstrated reductions in target inappropriate behaviors and increases in mands, compliance data often are not reported, nor is compliance typically a primary dependent variable. The findings of this study, however, should be viewed as preliminary because each treatment condition was presented only once and with only 1 participant. Nonetheless, the distinct behavior change correlated with each condition supports the need for further research.

For Sally, the effects of DNR (communication) were more immediate in reducing disruption. However, DNR (communication) may have suppressed disruption because she was not exposed to functionally aversive stimulation (i.e., task engagement). Therefore, the functional relationship between tasks and disruption may have been unchanged. For teachers, parents, and other caregivers, reduced levels of a participant's inappropriate behavior may be only a part of their overall concern. Task engagement is equally important to an individual's habilitation. If contingencies are not placed on compliance, DNR (communication) alone may sometimes result in low task compliance. Thus, DNR (communication) may be combined with DNR (compliance), either at the outset of treatment or when DNR (communication) alone yields low compliance, as a means of enhancing both adaptive communication skills and task completion.

REFERENCES

Bird, F., Dores, P. A., Moniz, D., & Robinson, J. (1989). Reducing severe aggressive and self-injurious behaviors with functional communication training. *American Journal on Mental Retardation, 94,* 37–48.

Iwata, B. A., Dorsey, M. F., Slifer, K. J., Bauman, K. E., & Richman, G. S. (1982). Toward a functional analysis of self-injury. *Analysis and Intervention in Developmental Disabilities, 2,* 3–20.

We thank the East Baton Rouge school district for assisting in this study. We also thank Brett Casey, Lynn Baham, and Rob Adams for assistance in data collection and calculation. Reprints may be obtained from Timothy R. Vollmer, Department of Psychology, Louisiana State University, Baton Rouge, Louisiana 70803. Received September 26, 1994; final acceptance March 6, 1995; Action Editor, F. Charles Mace.