JOURNAL OF APPLIED BEHAVIOR ANALYSIS 2011, **44,** 903–907 NUMBER 4 (WINTER 2011)

DIFFERENTIAL REINFORCEMENT WITH AND WITHOUT BLOCKING AS TREATMENT FOR ELOPEMENT

NATHAN A. CALL

MARCUS AUTISM CENTER AND EMORY UNIVERSITY SCHOOL OF MEDICINE

AND

RYAN S. PABICO, ADDIE J. FINDLEY, AND AMBER L. VALENTINO

MARCUS AUTISM CENTER

Blocking is a frequent component of treatments for elopement. Unfortunately, blocking may not always be feasible because elopement often occurs when supervision is low or the behavior cannot be prevented. The present study evaluated the use of blocking in the treatment of elopement by using differential reinforcement of other behavior with and without blocking. In this case, results suggested that blocking may be an essential component for differential reinforcement–based treatments of elopement.

Key words: blocking, differential reinforcement, elopement

Elopement, or leaving caregiver supervision without consent, is a problem with potentially dangerous consequences for individuals with intellectual disabilities (Matson & Rivet, 2008). Blocking attempts to elope or access to the reinforcer maintaining elopement is a common treatment component (Falcomata, Roane, Feeney, & Stephenson, 2010; Piazza et al., 1997; Rapp, Vollmer, & Hovanetz, 2005; Tarbox, Wallace, & Williams, 2003), but caregivers may find it difficult to anticipate the behavior and quickly restrain the eloping individual. Interventions that do not involve blocking also have proven to be effective (Kodak, Grow, & Northup, 2004; Piazza et al., 1997; Tarbox et al., 2003). Given that blocking some individuals' elopement may be impractical or even impossible, a direct comparison of treatments that do and do not include blocking seems to be worthwhile. This study evaluated the role of blocking in treating the elopement of an individual with autism.

METHOD

Participant and Setting

Jimmy was a 5-year-old boy who had been diagnosed with autism and had been admitted to a day-treatment program for the assessment and treatment of elopement. Jimmy did not exhibit functional vocal communication, although he used several signs to mand for preferred items and activities. He frequently used a sign to request "water," because playing in water was a preferred activity. He had a history of eloping towards sources of water, and, on one occasion, jumped into a lake even though he was unable to swim. Thus, his caregivers expressed concern about the potentially life-threatening consequences of his elopement.

Response Measurement and Interobserver Agreement

Elopement was defined as any part of the body passing the plane of the doorway of the session room. Data were collected by trained observers who used paper and pencil to score

We thank Chris Tullis and Lily Wilson for their work on this study. Ryan Pabico is currently affiliated with the Center for Behavior Analysis and Language Development.

Correspondence concerning this article should be addressed to Nathan A. Call, Marcus Autism Center, 1920 Briarcliff Rd., Atlanta, Georgia 30329 (e-mail: nathan.call@choa.org).

doi: 10.1901/jaba.2011.44-903

the frequency of elopement within 10-s intervals. A second observer independently collected data during 67% of sessions during the functional analysis and 42% of treatment sessions. For interobserver agreement purposes, an exact agreement was scored in a given interval if both observers recorded the same frequency of elopement during each 10-s interval. The number of 10-s intervals in which both observers scored the same frequency of behavior (agreement) was then divided by the total number of 10-s intervals (i.e., those with agreement and disagreement), and the resulting quotient was converted to a percentage. Mean agreement for elopement was 99% (range, 98% to 100%) during the functional analysis and 99% (range, 87% to 100%) during treatment.

Functional Analysis

A modified functional analysis was conducted using a multielement design (e.g., Piazza et al., 1997). Throughout all analyses, a retrieval procedure was implemented in which Jimmy was returned to the location from which he had eloped after 20 s. All sessions were conducted in two adjacent therapy rooms (referred to as Room A and Room B). Furniture blocked the hallway to prevent egress from Room A to anywhere other than Room B (and vice versa). A paired stimulus preference assessment (Fisher et al., 1992) was conducted prior to the functional analysis to identify a highly preferred item. The same highly preferred item was used in the toy play and tangible conditions. In the toy play condition, Jimmy was provided attention and free access to the highly preferred item. Prior to tangible sessions, Jimmy began in Room B, where he was provided with 2 min of access to the highly preferred item. After this 2-min presession exposure to the preferred item in Room B, he was moved to Room A, which contained no preferred items, and the 10-min session began. Elopement resulted in 20 s of access to his highly preferred item in Room B. This reinforcement interval did not begin until he contacted the highly preferred item in Room B. In the attention condition, attention was restricted and delivered in the form of a mild reprimand for 20 s contingent on elopement. In the escape condition, a three-step progressive prompting procedure (verbal, model, and physical prompts) was implemented. The specific demands consisted of receptive identification of body parts, such as ''touch your head,'' that were selected from goals identified from his educational program. Elopement resulted in a 20-s break from demands. Sessions lasted 10 min, and the room used for Room A or Room B alternated across sessions.

Treatment Evaluation

It was hypothesized that failure to block elopement would result in degradations in treatment effectiveness, potentially because elopement continued to be reinforced. Therefore, after the functional analysis, a treatment evaluation was conducted using a reversal design to compare the occurrence of elopement during baseline and two treatment conditions that consisted of resetting differential reinforcement of other behavior (DRO) with and without blocking. Baseline was identical to the tangible condition of the functional analysis, including the use of Rooms A and B, placement of items in the rooms, and presession access to the preferred item. The DRO with blocking condition represented treatment implementation by caregivers or therapists who were able either to block elopement or to block access to reinforcement when it did occur. The DRO without blocking condition represented implementation of the same treatment, but in a situation in which a therapist or caregiver was unable to block elopement. Finally, caregivers in the natural environment may attempt to block every instance of elopement but may fail to do so. Therefore, DRO plus variable-ratio (VR) 2 for elopement was conducted to evaluate the effectiveness of a treatment that included blocking but was implemented with less than ideal procedural fidelity.

DRO with blocking. As was the case in baseline, Jimmy received 2 min of presession access to the preferred item in Room B and then was moved to Room A. After the session began in Room A, the therapist provided Jimmy with 20-s access to the preferred leisure item in Room B contingent on the absence of elopement from Room A for 30 s. Jimmy was guided back to Room A at the conclusion of the reinforcement interval. A therapist blocked attempts to elope from Room A by stepping into the doorway or using his or her hands to gently redirect Jimmy's upper body (i.e., back, shoulders, arms, etc.) in the opposite direction. The DRO interval was increased by 15 s after every two consecutive sessions in which no elopement occurred.

DRO without blocking. This condition was identical to DRO with blocking except that the same reinforcement contingencies available via the DRO schedule in that condition were available contingent on either elopement from Room A or meeting the DRO contingency.

DRO plus VR 2 for elopement. This condition was identical to DRO with blocking except that elopement was reinforced on a VR 2 schedule. That is, half of all elopement attempts resulted in 20-s access to the preferred item in Room B, and the other half of elopement attempts were blocked. Therapists used a printed sheet of randomized numbers with a mean of two to cue them as to how many responses to block prior to reinforcing elopement.

RESULTS AND DISCUSSION

In the functional analysis (Figure 1, top), rates of elopement were elevated during the tangible and attention conditions relative to the toy play and escape conditions. These results indicated that elopement was maintained by positive reinforcement in the form of access to preferred leisure items and attention.

Results of the treatment evaluation are shown in Figure 1 (bottom). A treatment for elopement maintained by attention was implemented separately (data not shown but are available from the first author). Jimmy engaged in similar levels of elopement during baseline, DRO without blocking, and DRO plus VR 2 for elopement. However, elopement decreased during DRO with blocking. In the final phase, the DRO schedule was thinned to a slightly more practical interval (120 s), while low rates of elopement were maintained.

Results for the one individual in this study suggest that blocking may be an essential component for treatments designed to address elopement. This is potentially problematic given the nature of elopement, which can make blocking difficult. Results suggest that caregivers may need to be vigilant to ensure that individuals under their care do not access the maintaining reinforcer when they elope.

DRO without blocking could be characterized as a concurrent schedule involving a DRO 30-s schedule for the absence of elopement and a continuous reinforcement schedule for elopement. Such a schedule may have favored elopement because refraining from the behavior delayed reinforcement that otherwise was available immediately. Results from DRO plus VR 2 showed that an intermittent schedule of reinforcement was sufficient to maintain problematic levels of elopement, even when the same reinforcer was available for the absence of elopement. However, the fact that Jimmy engaged in elopement under this specific concurrent schedule does not necessarily mean he would have continued to do so if one or more of the parameters of the schedule had been altered. Previous research has shown that manipulating parameters such as response effort, or the quality, quantity, or delay to reinforcement can bias responding toward or away from problem behavior (e.g., Horner & Day, 1991; Peck et al., 1996). Future research could extend the current study by examining whether blocking is still necessary when one or more of these reinforcement parameters is altered to favor the nonoccurrence of elopement or the emission of an alternative response. For example, it may be possible to bias responding away from elopement by ensuring that the quality or magnitude of reinforcement available

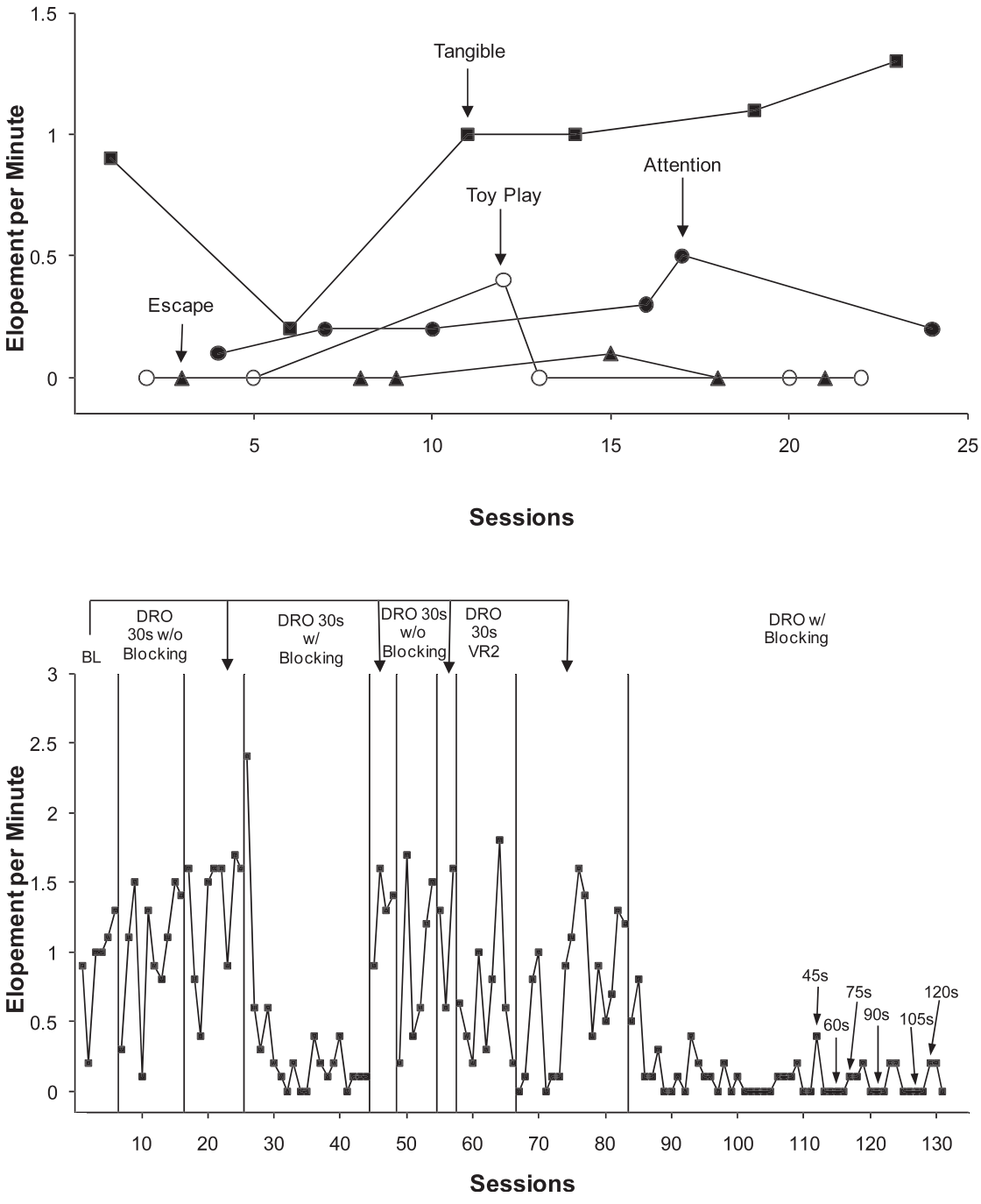

Figure 1. Responses per minute (elopement) during the functional analysis (top) and DRO treatment evaluation (bottom) for Jimmy.

for meeting a DRO contingency is superior to that which is available contingent on elopement.

The reinforcer was available only via the omission contingency when blocking was included. Thus, it is possible that blocking reduced elopement through extinction. However, the specific mechanism responsible for the effectiveness of blocking in the present study cannot be determined. Previous studies have shown that blocking can function as a punisher (Lerman & Iwata, 1996) or extinction (Smith, Russo, & Le, 1999). Another possibility is that blocking altered the establishing operations associated with reinforcers that maintained the behavior that competed with elopement during the DRO interval.

Despite the fact that the schedule of reinforcement was thinned to 120 s, the current study is limited by the fact that the longest DRO interval achieved was still relatively brief. Also, although decreases in elopement did generalize to the home and a classroom following caregiver training, we did not systematically collect data on this outcome. Finally, blocking elopement on a VR 2 schedule resulted in rates of elopement that were similar to those during DRO without blocking. This finding suggests that less than ideal implementation of blocking may be no more effective than not blocking at all. However, this study is limited by the fact that only one intermittent schedule of reinforcement was evaluated. Future research that examines a continuum of intermittent reinforcement schedules could facilitate identification of the requisite level of procedural fidelity necessary to achieve reductions in elopement (e.g., St. Peter Pipkin, Vollmer, & Sloman, 2010).

REFERENCES

Falcomata, T. S., Roane, H. S., Feeney, B. J., & Stephenson, K. M. (2010). Assessment and treatment of elopement maintained by access to stereotypy. *Journal of Applied Behavior Analysis*, *43*, 513–517.

Fisher, W., Piazza, C. C., Bowman, L. G., Hagopian, L. P., Owens, J. C., & Slevin, I. (1992). A comparison of two approaches for identifying reinforcers for persons with severe and profound disabilities. *Journal of Applied Behavior Analysis*, *25*, 491–498.

Horner, R. H., & Day, H. M. (1991). The effects of response efficiency on functionally equivalent competing behaviors. *Journal of Applied Behavior Analysis*, *24*, 719–732.

Kodak, T., Grow, L., & Northup, J. (2004). Functional analysis and treatment of elopement for a child with attention deficit hyperactivity disorder. *Journal of Applied Behavior Analysis*, *37*, 229–232.

Lerman, D. C., & Iwata, B. A. (1996). A methodology for distinguishing between extinction and punishment effects associated with response blocking. *Journal of Applied Behavior Analysis*, *29*, 231–233.

Matson, J. L., & Rivet, T. T. (2008). Characteristics of challenging behaviours in adults with autistic disorder, PDD-NOS, and intellectual disability. *Journal of Intellectual & Developmental Disability*, *33*, 323–329.

Peck, S. M., Wacker, D. P., Berg, W. K., Cooper, L. J., Brown, K. A., Richman, D., et al. (1996). Choice-making treatment of young children's severe behavior problems. *Journal of Applied Behavior Analysis*, *29*, 263–290.

Piazza, C. C., Hanley, G. P., Bowman, L. G., Ruyter, J. M., Lindauer, S. E., & Saiontz, D. M. (1997). Functional analysis and treatment of elopement. *Journal of Applied Behavior Analysis*, *30*, 653–672.

Rapp, J. T., Vollmer, T. R., & Hovanetz, A. N. (2005). Evaluation and treatment of swimming pool avoidance exhibited by an adolescent girl with autism. *Behavior Therapy*, *36*, 101–105.

Smith, R. G., Russo, L., & Le, D. D. (1999). Distinguishing between extinction and punishment effects of response blocking: A replication. *Journal of Applied Behavior Analysis*, *32*, 367–370.

St. Peter Pipkin, C., Vollmer, T. R., & Sloman, K. N. (2010). Effects of treatment integrity failures during differential reinforcement of alternative behavior: A translational model. *Journal of Applied Behavior Analysis*, *43*, 47–70.

Tarbox, R. S. F., Wallace, M. D., & Williams, L. (2003). Assessment and treatment of elopement: A replication and extension. *Journal of Applied Behavior Analysis*, *36*, 239–244.

Received August 26, 2010
Final acceptance April 18, 2011
Action Editor, John Borrero