JOURNAL OF APPLIED BEHAVIOR ANALYSIS 2009, **42,** 819–825 NUMBER 4 (WINTER 2009)

ASSESSING THE UTILITY OF A DEMAND ASSESSMENT FOR FUNCTIONAL ANALYSIS

EILEEN M. ROSCOE, GRIFFIN W. ROOKER, SACHA T. PENCE, AND LYNLEA J. LONGWORTH

NEW ENGLAND CENTER FOR CHILDREN

We evaluated the utility of an assessment for identifying tasks for the functional analysis demand condition with 4 individuals who had been diagnosed with autism. During the demand assessment, a therapist presented a variety of tasks, and observers measured problem behavior and compliance to identify demands associated with low levels of compliance or high levels of problem behavior (low-probability demands) and demands associated with high levels of compliance or low levels of problem behavior (high-probability demands). Results showed that clearer functional analysis outcomes were obtained for 3 of the 4 participants when low-probability rather than high-probability demands were used.

DESCRIPTORS: functional analysis, negative reinforcement, motivating operation

Research has shown that altering antecedent variables associated with the demand context can alter the motivating operation for escape-maintained problem behavior (e.g., Kodak, Lerman, Volkert, & Trosclair, 2007; Piazza, Contrucci, Hanley, & Shore, 1997; Smith, Iwata, Goh, & Shore, 1995; Zarcone, Iwata, Mazaleski, & Smith, 1994). However, few studies have conducted an empirically based method for identifying aversive events. When these assessments have been conducted, they typically involve the presentation of potentially aversive events or tasks and the measurement of escape or avoidance responses other than the target behavior of clinical concern (e.g., Fisher et al., 1994; Zarcone, Crosland, Fisher, Worsdell, & Herman, 1999). An exception was a study by Zarcone et al. (1994), who identified tasks associated with high levels of compliance and low levels of problem behavior (high-probability [high-*p*] tasks) and those associated with low levels of compliance and higher levels of problem behavior (low-probability [low-*p*] tasks).

Because detection of escape as a maintaining variable relies on the presentation of aversive events, it is important to include tasks in the demand condition that may evoke problem behavior maintained by escape. Only one study to date has included a preassessment for identifying tasks for use during the functional analysis demand condition (Cooper et al., 1992). However, the utility of the task assessment for enhancing functional analysis outcomes was unclear for a number of reasons. First, the preassessment consisted of an interview format, which has been shown to have limited reliability. Second, the types of tasks presented were limited to academic tasks only. Third, problem behavior was not measured in the context of these tasks. Therefore, it is not clear whether the tasks identified evoked problem behavior. Data from the subsequent analysis suggest that aversive tasks were not identified for the majority of participants because an association between problem behavior and task preference was observed for only 1 of the 10 participants. Fourth, and most important, the functional analysis conducted involved the delivery of consequences for

We thank Jennifer Hammond for her assistance in conducting this study. Portions of this article were presented at the 33rd annual meeting of the Association for Behavior Analysis, San Diego, May, 2007.

Correspondence should be sent to Eileen M. Roscoe, New England Center for Children, 33 Turnpike Road, Southborough, Massachusetts 01772 (e-mail: eroscoe@necc.org).

doi: 10.1901/jaba.2009.42-819

appropriate behavior only, preventing one from determining the utility of their preassessment for informing functional analyses of problem behavior.

If demands included in the functional analysis demand condition are not empirically identified, they may not function as motivating operations and may result in a false-negative outcome for escape-maintained behavior. Therefore, the purpose of the current study was to evaluate the utility of a demand assessment procedure for identifying tasks for inclusion during the functional analysis demand condition.

METHOD

Participants and Setting

Four individuals, who attended a residential school or group home for individuals with disabilities and who were reported to engage in problem behavior associated with academic and self-care demands, participated. Parental consent was obtained for all participants prior to their involvement in this study. Steve was a 14-year-old boy who had been diagnosed with autism and exhibited aggression, including punching, hitting, kicking, grabbing, and hair pulling. Candace was a 10-year-old girl who had been diagnosed with autism and exhibited aggression, including hitting, kicking, pinching, and grabbing. Tyler was a 22-year-old man who had been diagnosed with profound mental retardation and engaged in property destruction, including grasping and tearing, throwing, or pushing paper off tables. Jill was a 10-year-old girl who had been diagnosed with Smith-Magenis syndrome and exhibited self-injurious behavior (SIB), including face slapping and head-to-object hitting. Sessions for all participants were conducted in a quiet classroom.

Response Measurement and Interobserver Agreement

Observers recorded the frequency of participants' problem behavior as described above (all sessions) and the frequency of demand presentation and percentage of compliance (demand assessment sessions). Compliance was defined as completion of the demand after either the first or second prompt.

Interobserver agreement was assessed by having a second observer independently record behavior. Each session was divided into consecutive 10-s intervals, and agreement was calculated by dividing the smaller number of responses by the larger number of responses for each interval and calculating a mean for the fractions to obtain the percentage of agreement between the two observers. Agreement was collected during 33% of the demand assessment sessions and 30% of functional analysis sessions for all participants. For Steve, mean interobserver agreement was 97% (range, 87% to 100%) for all targeted behaviors during the demand assessment and 93% (range, 83% to 100%) for the functional analysis. For Candace, mean interobserver agreement was 96% (range, 80% to 100%) for all behaviors during the demand assessment and 100% for the functional analysis. For Tyler, mean interobserver agreement was 97% (range, 87% to 100%) for all behaviors during the demand assessment and 96% (range, 90% to 100%) for the functional analysis. For Jill, mean interobserver agreement was 96% (range, 82% to 100%) for all behaviors during the demand assessment and 99% (range, 94% to 100%) for the functional analysis.

Demand Assessment

Twelve tasks, similar to those used on participants' individualized education plans, were included. Tasks were selected for each participant from a range of skill areas, including academic (e.g., sight words), daily living (e.g., tying a shoe), and domestic (e.g., throwing away a napkin). In addition, approximately half of the demands required physical movement (e.g., walking across the room). During each 5-min session, the therapist continuously presented one task, using three-step prompting (i.e., vocal,

model, and physical prompts). If the participant engaged in the target behavior, the therapist removed the task for 30 s. If the participant complied, the therapist delivered brief praise and immediately presented the task again. Demands were randomly chosen for each session, and each type of demand was assessed twice, using a multielement design. Results were used to identify high-*p* demands (those associated with higher levels of compliance or lower levels of problem behavior) and low-*p* demands (those associated with lower levels of compliance or higher levels of problem behavior).

Functional Analysis

A functional analysis (based on that described by Iwata, Dorsey, Slifer, Bauman, & Richman, 1982/1994) was conducted and included alone (Jill only), attention, control, low-*p* demand, and high-*p* demand conditions. All sessions were 10 min long. During the low-*p* demand condition, the therapist presented the two low-*p* tasks identified during the demand assessment in an alternated fashion. The therapist continuously presented demands using a three-step prompting hierarchy. If the participant complied, the therapist delivered brief praise (e.g., "nice work"). If the participant exhibited problem behavior, the therapist said "you don't have to," removed task materials, and turned away from the participant for 30 s. During the high-*p* demand condition, procedures were identical to the low-*p* demand condition; however, the therapist presented the two high-*p* tasks identified during the demand assessment.

RESULTS AND DISCUSSION

Figure 1 depicts the results from the demand assessment. For Steve, the two tasks associated with the highest levels of aggression and low levels of compliance (throw away napkin and sort silverware) were identified as low-*p* demands. The two tasks associated with the lowest levels of aggression and the highest levels of compliance (wipe table and sign "book") were identified as high-*p* demands. Because Candace exhibited high levels of compliance across all tasks, demands were defined based on levels of her aggression only. The two tasks associated with the highest levels of aggression (fold towel and button jacket) were identified as low-*p* demands, and two of the four tasks associated with the lowest levels of aggression (stand up, get fork, and give me *x* cents) were identified as high-*p* demands. For Tyler, the two tasks associated with the highest levels of property destruction and low levels of compliance (touch wall or table and sign "book") were identified as low-*p* demands. The two tasks associated with the lowest levels of property destruction and higher levels of compliance (count blocks and clean up toys) were identified as high-*p* demands. For Jill, the two tasks associated with the highest levels of SIB and low levels of compliance (stand up, touch toes, and wash dish) were identified as low-*p* demands and those associated with lower levels of SIB and moderate levels of compliance (wash face and give me *x* cents) were identified as high-*p* demands.

Figure 2 depicts results from the functional analysis. For Steve, Candace, and Tyler, low and undifferentiated levels of problem behavior were observed when a high-*p* demand condition was included, precluding clear determination of function. By contrast, when a low-*p* demand condition was conducted, differentially higher levels of problem behavior were observed in this condition, suggesting that their problem behavior was maintained by escape from low-*p* demands. For Jill, differentially higher levels of SIB were observed in both the high-*p* and low-*p* demand conditions, suggesting that her problem behavior was maintained by escape. Therefore, for Jill, clear functional analysis outcomes were obtained regardless of which type of demands were used.

Results from the functional analysis indicated that inclusion of the low-*p* demand condition

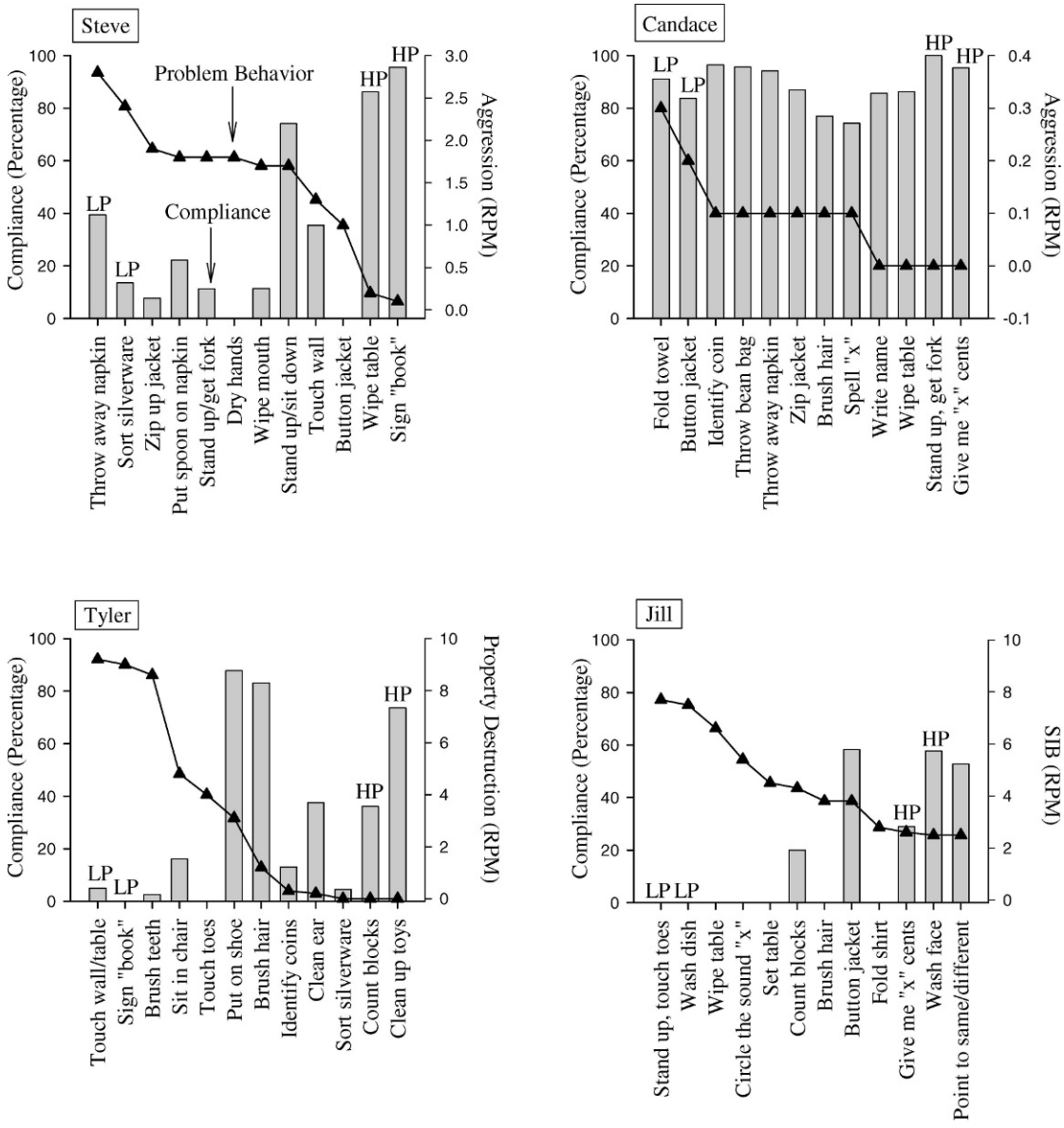

Figure 1. Compliance (percentage occurrence) and problem behavior (responses per minute) during demand assessments for Steve's aggression (top left), Candace's aggression (top right), Tyler's property destruction (bottom left), and Jill's SIB (bottom right).

resulted in clearer outcomes (differentially high levels of problem behavior during the demand condition) for 3 of the 4 participants. For Jill, higher levels of problem behavior were observed in both the high-*p* and low-*p* demand conditions, indicating that the demand assessment was not necessary for determining the function of her SIB. These findings suggest that for some participants, multiple demands may function as aversive events, making a demand assessment unnecessary. However, for the other participants, a number of demands may not be

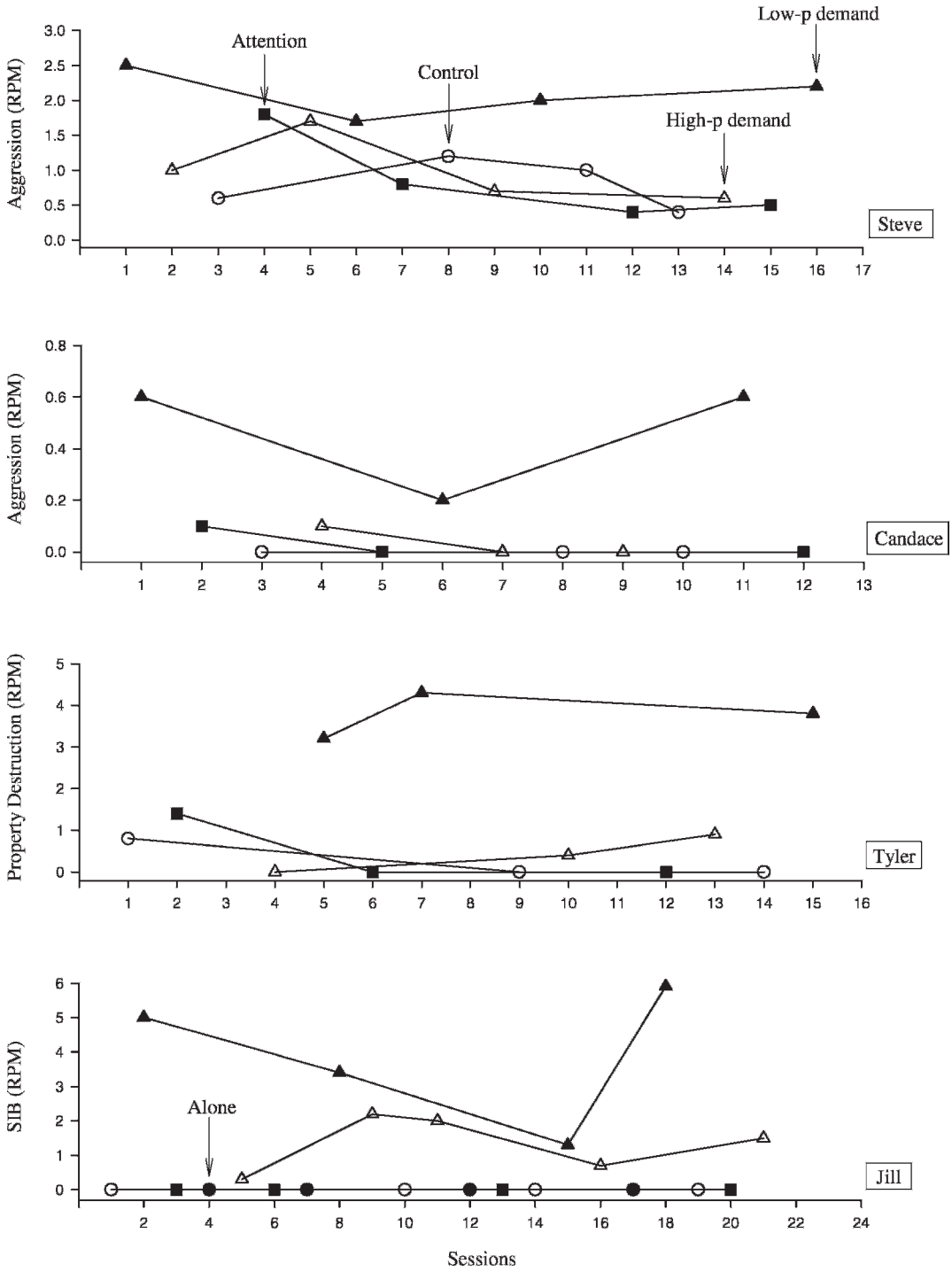

Figure 2. Compliance (percentage occurrence) and problem behavior during functional analyses for Steve's aggression (top), Candace's aggression (second panel), Tyler's property destruction (third panel), and Jill's SIB (bottom).

aversive, and their inclusion in functional analyses may result in unclear or false-negative outcomes for escape-maintained problem behavior.

The present findings suggest that when parents or caregivers report that an individual's problem behavior may be maintained by escape contingencies, it may be helpful for a clinician to conduct a demand assessment prior to the functional analysis. Although the demand assessment delays initiation of a functional analysis, the time investment may be worthwhile in that it may reduce the need for additional analyses by identifying appropriate negative reinforcers at the outset. Second, the demand assessment may be useful when little or no responding is observed during an initial functional analysis because relevant motivating operations are absent from the demand condition. By conducting a demand assessment, appropriate tasks may be identified for inclusion in an extended functional analysis demand condition that may facilitate determination of behavioral function.

Across all participants, the outcomes from the demand assessment indicated that none of the low-*p* or high-*p* demands identified could be consistently characterized as a certain type of demand. For example, for Steve, although both low-*p* demands were domestic, one low-*p* demand (throw away napkin) involved physical movement, whereas the other low-*p* demand (sort silverware) did not. For Steve's high-*p* demands, one demand (wipe table) was a domestic task that involved physical movement, whereas the other high-*p* demand (sign "book") was an academic task that was presented on a table top and required minimal physical movement. These findings suggest that asking a parent or caregiver which types of demands evoke problem behavior may not be sufficient because only some demands within a certain stimulus class (e.g., academic demands) may function as motivating operations. In addition, parents or other caregivers may be focused on either compliance to the task or problem behavior, not both. Thus, it may be helpful to assess specific demands empirically prior to their inclusion in a functional analysis and subsequent treatment assessment.

The current study extends previous work on negative reinforcement assessments in a number of ways. First, this is the first assessment that has been evaluated for identifying demands for inclusion during a standard functional analysis demand condition. Second, previous assessments have examined the effects of negative reinforcement on collateral responses (e.g., Fisher et al., 1994) or an alternative response (e.g., Zarcone et al., 1999), whereas the current study examined the effects of negative reinforcement on both the target response assessed in a functional analysis and an appropriate response (i.e., compliance with the task). Third, the effects of the demands were evaluated by repeatedly presenting them and withdrawing them contingent on problem behavior, allowing the target response to be evaluated in a free-operant context in which the effects of contingent removal of the demands could be examined. Conducting the demand assessment in this manner allowed the determination of negative reinforcement effects in addition to the determination of whether or not the demands functioned as motivating operations.

REFERENCES

Cooper, L. J., Wacker, D. P., Thursby, D., Plagmann, L. A., Harding, J., Millard, T., et al. (1992). Analysis of the effects of task preferences, task demands, and adult attention on child behavior in outpatient and classroom settings. *Journal of Applied Behavior Analysis*, *25*, 823–840.

Fisher, W. W., Piazza, C. C., Bowman, L. G., Kurtz, P. F., Sherer, M. R., & Lachman, S. R. (1994). A preliminary evaluation of empirically derived consequences for the treatment of pica. *Journal of Applied Behavior Analysis*, *27*, 447–457.

Iwata, B. A., Dorsey, M. F., Slifer, K. J., Bauman, K. E., & Richman, G. S. (1994). Toward a functional analysis of self-injury. *Journal of Applied Behavior Analysis*, *27*, 197–209. (Reprinted from *Analysis and Intervention in Developmental Disabilities, 2*, 3–20, 1982)

Kodak, T., Lerman, D. C., Volkert, V. M., & Trosclair, N. (2007). Further examination of factors that influence preference for positive versus negative reinforcement. *Journal of Applied Behavior Analysis*, *40*, 25–44.

Piazza, C. C., Contrucci, S. A., Hanley, G. P., & Fisher, W. W. (1997). Nondirective prompting and noncontingent reinforcement in the treatment of destructive behavior during hygiene routines. *Journal of Applied Behavior Analysis*, *30*, 705–708.

Smith, R. G., Iwata, B. A., Goh, H., & Shore, B. A. (1995). Analysis of establishing operations for self-injury maintained by escape. *Journal of Applied Behavior Analysis*, *28*, 515–535.

Zarcone, J. R., Crosland, K., Fisher, W. W., Worsdell, A. S., & Herman, K. (1999). A brief method for conducting a negative-reinforcement assessment. *Research in Developmental Disabilities*, *20*, 107–124.

Zarcone, J. R., Iwata, B. A., Mazaleski, J. L., & Smith, R. G. (1994). Momentum and extinction effects on self-injurious escape behavior and noncompliance. *Journal of Applied Behavior Analysis*, *27*, 649–658.

Received January 17, 2008
Final acceptance August 28, 2008
Action Editor, Jennifer Zarcone