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USE OF LATENCY TO PROBLEM BEHAVIOR TO EVALUATE DEMANDS FOR INCLUSION IN FUNCTIONAL ANALYSES

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Few direct-assessment procedures are designed to identify potential negative reinforcers (e.g., including demands in the escape condition of functional analyses). Two participants were systematically exposed to a series of demands nominated by caregivers as potential negative reinforcers. Sessions ended following the first instance of problem behavior, and a hierarchy of demand aversiveness was created based on the latency to the first problem behavior. Subsequent functional analyses confirmed the predictive value of the hierarchy, with shorter latency demands consistently producing more differentiated functional analysis outcomes.

DESCRIPTORS: demand, escape-maintained problem behavior, functional analysis, latency, negative reinforcer

In contrast to preferred stimuli that are identified in structured preference assessments (e.g., Fisher et al., 1992), demands are typically selected for functional analyses based on indirect sources of information. Few empirically validated assessments of negative reinforcers exist, with the notable exception of one described by Zarcone, Crosland, Fisher, Worsdell, and Herman (1999). Participants were taught an arbitrary response and then were exposed to caregiver-identified potential negative reinforcers during brief sessions. Brief escape from the demand occurred contingent on emission of the response. A hierarchy of potential negative reinforcers was created based on the mean latency for each demand. However, Zarcone et al. evaluated the results of the negative reinforcement assessment within a functional analysis for only 1 participant, and it is unclear which negative reinforcer was used in the functional analysis. In addition, teaching an arbitrary response prior to conducting a functional analysis may not always be feasible due to time constraints.

The purpose of the current study was to expand the findings of Zarcone et al. (1999) by using latency to the first instance of problem behavior, rather than an arbitrary response, as the dependent variable. In addition, results of the demand assessment were evaluated by including multiple escape conditions within a functional analysis to examine whether demands identified as more or less aversive would produce different outcomes when included in a functional analysis.

METHOD

Participants and Setting

The participants attended a day treatment program for the assessment and treatment of destructive behavior. Kenny was a 6-year-old boy who had been diagnosed with autism and exhibited aggression, self-injurious behavior (SIB),

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and disruptive behavior. Sarah was a 14-year-old girl who had been diagnosed with cerebral palsy and mental retardation (level unspecified) and exhibited aggression, SIB, disruptive behavior, and swearing. For both participants, *aggression* was defined as hitting, kicking, biting, or hair pulling. *SIB* was defined as head banging or self-pinching (Kenny) and self-biting or leg hitting (Sarah). *Disruptive behavior* was defined as hitting or kicking objects, throwing objects, or property destruction.

Sessions were conducted in fully padded therapy rooms (4 m by 5 m) equipped with one-way windows and an adjoining observation room. Therapy rooms contained various materials for different experimental conditions including a table, chairs, demand materials, and preferred items. Eight to 16 sessions were conducted daily.

Response Measurement and Interobserver Agreement

Latency to problem behavior was measured in seconds from the start of the session to the first occurrence of problem behavior following delivery of the demand. Data were collected using laptop computers equipped with software for collecting both frequency and duration of dependent variables. A second observer simultaneously but independently recorded data during 50% (range, 13% to 87%) of demand assessment sessions and 50% (range, 44% to 58%) of functional analysis sessions across participants. Each 10-min session was separated into 60 10-s intervals, and the larger number of responses was divided by the smaller number of responses and converted to a percentage. The mean agreements for latency to problem behavior during the demand assessments were 98% (range, 97% to 100%) for Kenny and 95% (range, 85% to 100%) for Sarah. During Kenny's functional analysis, the mean agreement for aggression was 99% (range, 82% to 100%) and for disruption was 99% (range, 90% to 100%). During Sarah's functional analysis, the mean agreement for aggression was 99% (range, 95% to 100%), for disruption was 98% (range, 87% to 100%), for SIB was 99% (range, 90% to 100%), and for swearing was 99% (range, 97% to 100%).

Demand Assessment

Caregivers completed the Negative Reinforcement Rating Scale (NRRS; Zarcone et al., 1999), a brief questionnaire that asks respondents to rate several broad categories of potential negative reinforcers on a 4-point Likert-type scale. The therapist and caregiver jointly selected 10 representative demands from the categories rated 3 (*often bothers child*) or 4 (*always bothers child*) on the NRRS. Each session included one type of demand and lasted a maximum of 10 min, but sessions were often shorter because they ended after the first occurrence of problem behavior. The order of demands was determined by random selection prior to a series of sessions. Three complete series were conducted with each participant.

The participant was seated at a table with the demand materials in front of him or her and the therapist standing beside him or her. The sessions started with the therapist saying, "[Participant's name], it's time to do some work." A trial consisted of a single instance of a task (e.g., placing one toy in a bucket), and all trials could be completed in 5 s. The therapist initiated trials of the demand using as many prompts as required in a three-step least-to-most prompting procedure (i.e., verbal instruction, model, physical guidance) with 5-s interprompt intervals. Compliance resulted in mild descriptive praise and another trial of the demand at 3-s intertrial intervals for the duration of the session. If the targeted problem behavior occurred, the demand materials were removed, and the session ended. If no problem behavior occurred, the assigned latency was the duration of the session (i.e., 600 s). Demands were ranked in order of mean latency to the first instance of problem behavior, and the demands with the shortest and longest mean latencies were included in the functional analysis. In case

of a tie for shortest or longest latency, one of the tied demands was randomly selected for inclusion in the functional analysis.

Functional Analysis

Functional analyses were based on procedures described by Iwata, Dorsey, Slifer, Bauman, and Richman (1982/1994) with sessions that were 10 min in duration. Each functional analysis included attention, tangible, ignore, and toy play (control) conditions. Based on the results of paired-stimulus preference assessments (Fisher et al., 1992), highly preferred items were included in the control and tangible conditions, and low-preference items were included in the attention condition.

In addition, two types of demand conditions were included: a highly aversive demand (HA) condition and a less aversive demand (LA) condition. Both demand conditions included three-step prompting and a 20-s break following problem behavior accompanied by the therapist's statement, ''Okay you don't have to [demand].'' The LA condition included the item with the longest mean latency (wipe the table for Kenny; receptive motor identification for Sarah) from the prior assessment. The HA condition included the item with the shortest latency (block in the bucket for Kenny; wipe the table for Sarah) from the prior assessment.

RESULTS AND DISCUSSION

Kenny's caregiver rated schoolwork and very difficult work of any type as aversive for Kenny. His caregiver nominated placing a block in a bucket, pointing to objects, receptive commands (i.e., ''do this''), drawing shapes, and folding paper as representative of schoolwork and completing a puzzle, stacking blocks, folding towels, and wiping the table as representative of very difficult work. Kenny's results (Figure 1, top) show that no demands resulted in problem behavior during the first series of sessions, and subsequent series of sessions resulted in a hierarchy of aversiveness. Placing a block in a bucket resulted in the shortest mean latency (242 s) and was subsequently used in the functional analysis HA condition. Folding a towel, stacking blocks, and wiping the table never resulted in problem behavior (i.e., mean latency was 600 s). Wiping the table was the randomly selected task included in the LA condition.

Sarah's caregiver rated very difficult work of any type, self-care tasks, and doing work around the house as aversive for Sarah. Her caregiver nominated drawing a line, receptively identifying shapes, and receptive motor skills as representative of very difficult work; wiping her face, dressing herself, and tooth brushing as representative of self-care tasks; and wiping a table, picking up trash, folding towels, and picking up toys as representative of work around the house. Sarah's results are shown in Figure 1 (bottom). Each series resulted in multiple sessions terminated due to problem behavior, with only one session with receptive motor tasks extending to the full 600 s. Wiping the table resulted in the shortest latency (M = 112 s) and was included in the HA condition, and completing receptive motor commands (M = 506 s) was included in the LA condition.

Kenny's functional analysis data (Figure 2, top) demonstrate that his problem behavior was maintained by positive reinforcement in the form of attention (M = 2.3 responses per minute) and negative reinforcement in the form of escape, but only from the HA demand (M = 1.5). By contrast, problem behavior occurred at low rates in the ignore (M = 0.46), tangible (M = 0.16), LA (M = .04), and toy play (M = .09) conditions. Sarah's functional analysis data (Figure 2, bottom) suggest that her problem behavior was maintained by negative reinforcement in the form of escape, with high rates of problem behavior in the HA condition (M = 2.5 responses per minute) and slightly lower but still elevated rates in the LA condition (M = 1.3). By contrast, no problem behavior was

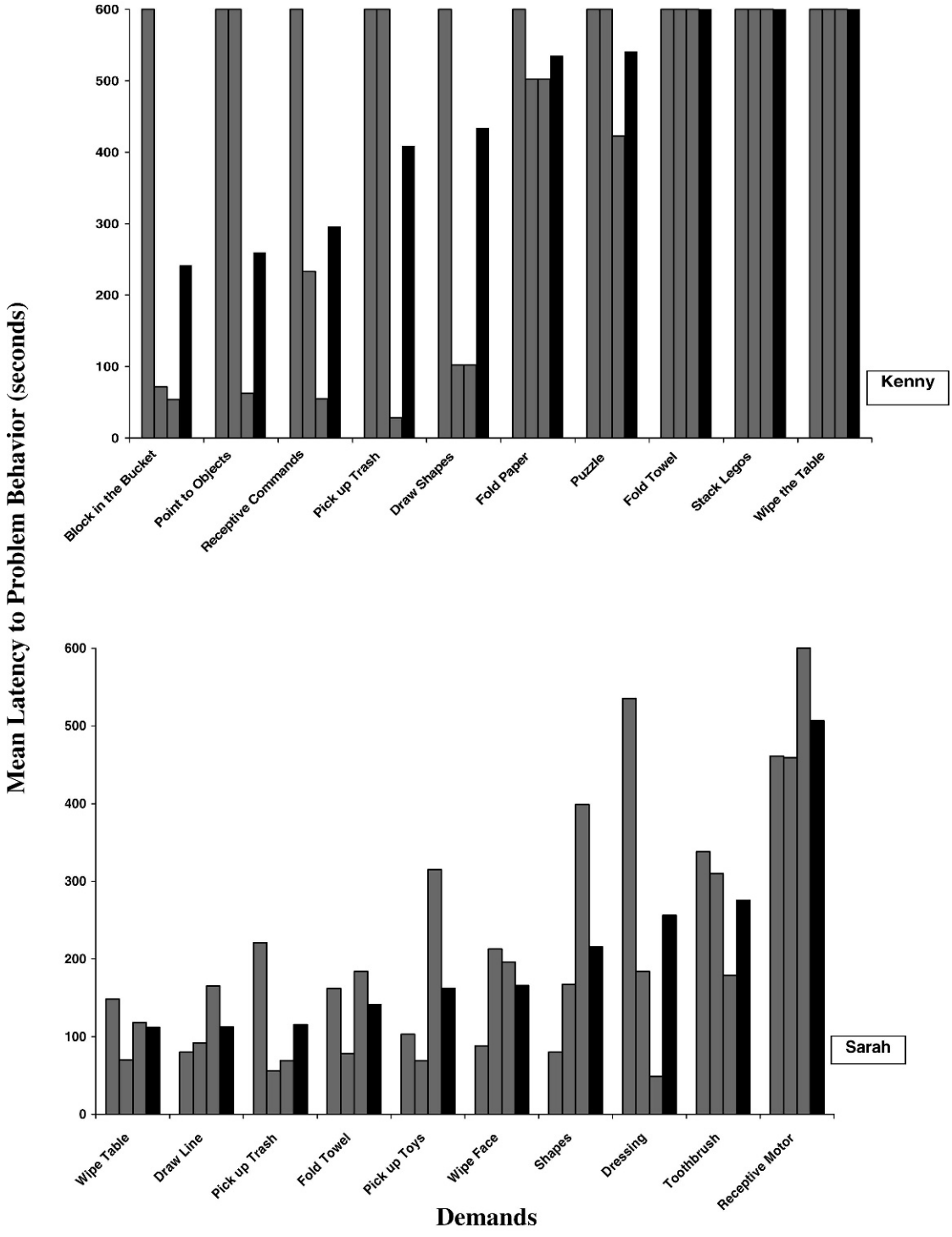

Figure 1. Demand assessments for Kenny (top) and Sarah (bottom) depicted as latency to problem behavior in seconds. Gray bars represent individual sessions in order of presentation from left to right. Black bars represent the mean of the three series.

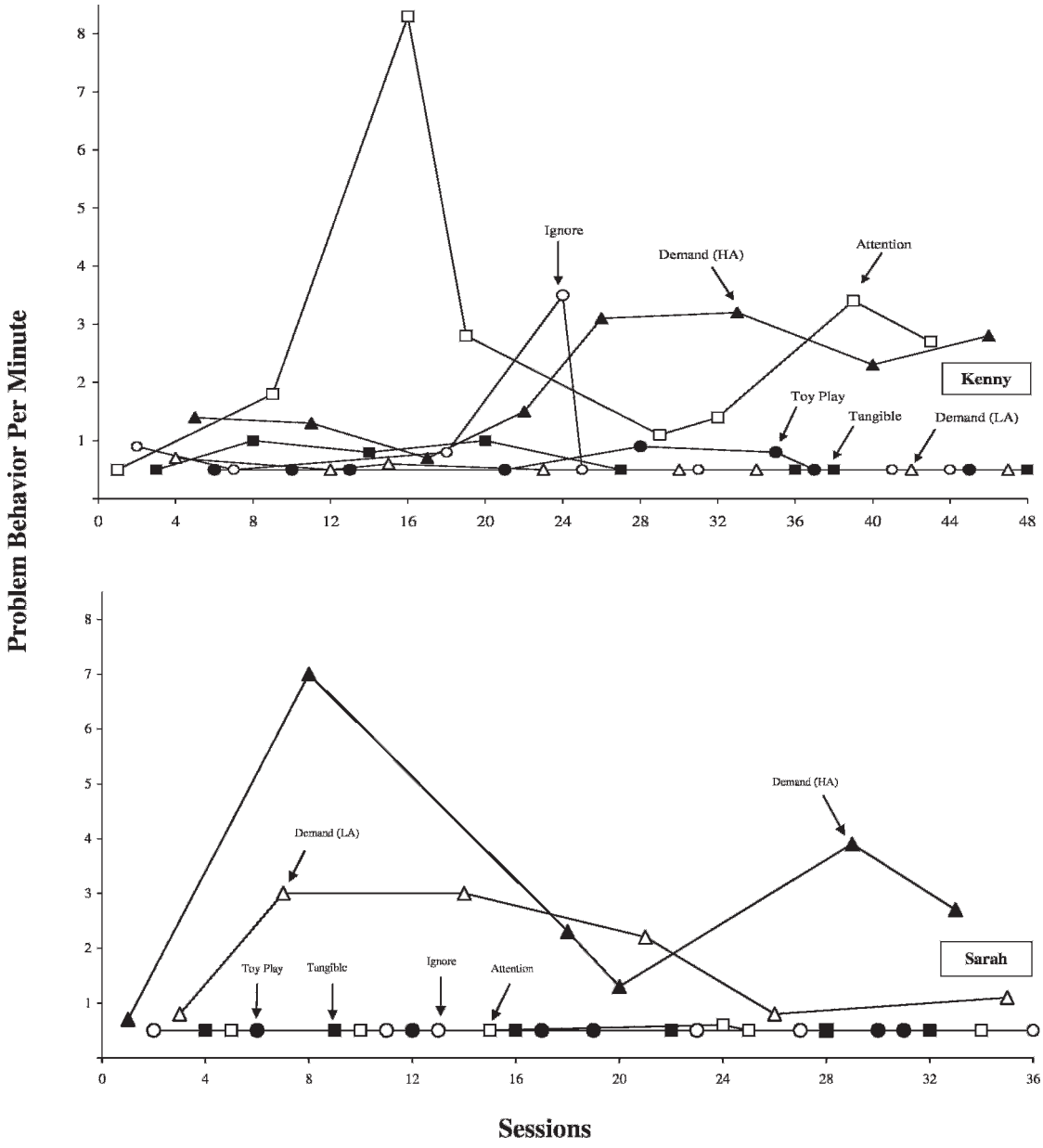

Figure 2. Problem behavior per minute during functional analysis for Kenny (top) and Sarah (bottom).

observed in the toy play, tangible, or ignore conditions, and only a single instance of problem behavior was observed in the attention condition.

In sum, the demand analysis resulted in a hierarchy of demand aversiveness. Both participants' problem behavior was elevated in the demand condition of a functional analysis relative to toy play and confirmed the result of the prior demand assessment, with HA demands producing higher rates of problem behavior in the functional analysis than those identified as LA demands. For Kenny, LA demands resulted in near-zero levels of problem

behavior in spite of positive parent nomination and would have resulted in a false-negative result if tested solely (i.e., no escape-maintained problem behavior when escape actually functioned as a reinforcer). Previous research has shown that varying the quality of potential positive reinforcers may affect functional analysis results (Kodak, Northup, & Kelley, 2007), and the current study extends that finding to negative reinforcement and demands. Thus, the demand assessment appeared to be a useful clinical tool for selecting demands for inclusion in the functional analysis based on likely task aversiveness.

A few limitations are worthy of note. First, preceding the functional analysis with a demand assessment that included an escape contingency for problem behavior may have influenced the subsequent functional analysis results. Kenny demonstrated progressively shorter latencies to problem behavior, suggesting that just three exposures to the contingency could influence problem behavior. Contingent session termination was used as an alternative to extinction for problem behavior, which might also have skewed functional analysis results. The effects of escape and extinction during this type of assessment on subsequent functional analyses are worthy of experimental examination. Second, the use of the rating scale to select demands for inclusion in the demand assessment was indirect. The NRRS did not identify specific demands, but rather domains of stimuli or events. Although we endeavored to identify specific demands that fell within the categories endorsed by caregivers, there was some interpretation and subjectivity in task selection. Future research could elaborate on methods that produce the best indirect assessments of demand aversiveness and examine the concordance between indirect and observation-based measures. Finally, no data were collected on compliance with the tasks during the demand assessment. Future research may examine whether the level of prompting required to obtain compliance is also predictive of demand aversiveness.

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