

*EVALUATION OF COMBINED-ANTECEDENT VARIABLES ON
FUNCTIONAL ANALYSIS RESULTS AND TREATMENT OF PROBLEM
BEHAVIOR IN A SCHOOL SETTING*

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Call, Wacker, Ringdahl, and Boelter (2005) conducted an analysis in which a single-antecedent condition was compared to a multiple-antecedent condition. The present study extended Call et al. by conducting a structured descriptive assessment (SDA) to identify the antecedent variables most associated with problem behavior in a student with traumatic brain injury and intellectual disabilities. Results indicated that the SDA was effective in identifying relevant antecedent variables that led to the development of an effective intervention in the classroom.

Key words: combined-antecedent variables, functional communication training, motivating operations, problem behavior, structured descriptive assessment

Functional analyses (Lang et al., 2009) rely primarily on manipulation of single antecedent variables within test conditions; however, conditions in the natural environment often have multiple antecedents that combine to function as a compound motivating operation for problem behavior. Call, Wacker, Ringdahl, and Boelter (2005) compared outcomes from single-antecedent and combined-antecedent functional analyses with 2 children and showed that only the combined-antecedent conditions occasioned problem behavior.

In cases in which problem behavior is evoked by a combination of antecedents, a false negative result may occur if only one antecedent variable is tested (Call et al., 2005; Mueller, Sterling-Turner, & Moore, 2005). In natural settings such as classrooms, there may be a myriad of variables that could combine to occasion problem behavior, and analysis of each

combination would be impractical. One way to identify the most relevant antecedent variables may be to complete a structured descriptive assessment (SDA) prior to the functional analysis. An SDA manipulates functionally relevant antecedent variables while observing naturally occurring consequences, using an experimental design to identify hypotheses regarding maintaining reinforcers for problem behavior (Anderson & Long, 2002).

The purposes of the current study were fourfold: (a) to use an SDA to identify relevant antecedents with a child with traumatic brain injury, (b) to replicate and extend Call et al. (2005) by using SDA procedures to identify antecedent variable combinations that occasioned problem behavior by employing a combined-antecedent condition as part of the functional analysis, (c) to develop an intervention based on the modified assessment, and (d) to evaluate the efficacy of this approach in a classroom setting.

METHOD

Participant and Setting

Kyle was a 13-year-old boy with a traumatic brain injury and moderate mental retardation. He attended a special education classroom and

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was provided one-on-one supervision by a classroom aide. All assessment and treatment sessions were conducted in Kyle's classroom during ongoing instruction using school staff (teacher and aide) as therapists.

Response Definitions

Frequency data were collected on Kyle's problem behavior, which consisted of aggression (scratching, hitting, biting, kicking, spitting at others, and pulling hair) and destruction and disruption (throwing and breaking objects, tipping over furniture, pounding fists on objects, and spitting). Data also were collected on the frequency of communicative requests (verbal requests or card exchange) during treatment. During the SDA, frequency data were collected on school staff responses that occurred within 3 s to 5 s of each instance of problem behavior. Target responses for school staff were (a) attention (providing brief verbal or physical interaction), (b) presentation of preferred items, and (c) removal of task demands (physically removing the academic materials or telling Kyle, "you can have a break").

Data Collection and Interobserver Agreement

Trained observers collected data during all SDA, functional analysis, and treatment sessions. Rate of problem behavior for the functional analysis and treatment sessions was not adjusted for the reinforcement intervals (i.e., reinforcement time was not taken out of total time). A second observer independently collected data during 38% of SDA sessions and 44% of functional analysis and treatment sessions. During the SDA, interobserver agreement for occurrences of problem behavior and school staff consequences was calculated by dividing the number of agreements by the number of agreements plus disagreements and converting the ratio to a percentage for each session. Mean agreement was 94% (range, 82% to 100%) for problem behavior and 93% (range, 80% to 100%) for school staff conse-

quences. During functional analysis and treatment sessions, mean interobserver agreement was 98% (range, 68% to 100%) for problem behavior and 96% (range, 89% to 100%) for communication.

Procedure and Experimental Design

Structured descriptive assessment. SDA procedures were similar to those described by Anderson and Long (2002). Using a multielement design, school staff conducted demand and toy-play conditions when such conditions naturally occurred in Kyle's daily school schedule. An attention condition was not conducted due to reports that problem behavior occurred only during demand contexts. Prior to each session, the observer explained the antecedent condition and instructed school staff to respond to problem behavior as he or she typically would. In the demand condition, the staff member presented requests to complete academic work every 30 s. The observer provided immediate prompts to the staff member if a demand had not been presented in 30 s to ensure integrity of the antecedent condition. In the toy-play condition, the staff member did not present demands, and Kyle had access to preferred items and staff attention. Data collected on problem behavior and staff consequences were used to calculate event-based probabilities. For example, the conditional probability of each consequent event following the occurrence of problem behavior was calculated by dividing the number of events in which problem behavior occurred that were followed by a specific consequent event (e.g., attention, escape, or tangible) by the total frequency of problem behavior (Anderson & Long).

Functional analysis. Based on SDA results, a functional analysis was conducted in which single-antecedent conditions (attention and escape) were compared to a combined-antecedent condition and a control condition (toy play) using a multielement design. A school staff member served as therapist. During the control

condition, Kyle had continuous access to preferred activities and staff attention, and the staff member ignored problem behavior. In the attention condition, low-preference activities were available, and staff attention was diverted to other activities; the staff member provided attention (15-s verbal reprimand) following problem behavior. In the escape condition, the staff member sat next to Kyle and instructed him to work independently on low-preference academic tasks (identified via a preference assessment). The staff member provided non-contingent positive attention and praise for task completion while Kyle was working. Following problem behavior, the staff member removed the task and provided Kyle with a 15-s break with no attention. The staff member prompted him to begin working following the break. In the demand and diverted-attention (combined-antecedent) condition, the staff member instructed him to work on the same independent work task (demand antecedent) and moved approximately 1 m away to do paperwork (diverted-attention antecedent). The staff member delivered attention (15-s verbal reprimand) following problem behavior (contingent attention consequence). Academic materials remained present; following 15 s of attention, the staff member prompted Kyle to continue to work.

Treatment evaluation. Based on the results of the functional analysis, a treatment package that included functional communication training (FCT) in the form of verbal requests or touching cards, choice, extinction for both positive and negative reinforcement (i.e., attention and escape), and response cost for problem behavior was evaluated. Treatment was evaluated in a concurrent multiple baseline design across the two different antecedent demand conditions from the functional analysis. The data from the escape (single-antecedent) and demand and diverted-attention (combined-antecedent) conditions from the functional analysis served as the baselines. Across both

antecedent conditions, the staff member gave Kyle a choice between the “break” and “work and attention” cards. He could either request verbally or touch the picture card for 30 s of either a break (e.g., removal of the work task) or attention (e.g., positive verbal statements from school staff). The cards remained available throughout the condition. The staff member reminded Kyle of the choices available at 30-s intervals. The consequences for problem behavior remained consistent across the two antecedent conditions. The staff member removed attention following problem behavior and resumed the work task across both conditions (e.g., placed the worksheet in front of Kyle and instructed him to complete it). If problem behavior occurred during the reinforcement interval, the staff member resumed the work task.

Demand (single-antecedent) condition. The antecedent conditions were identical to the demand (single-antecedent) functional analysis condition. At the beginning of each session, Kyle was provided with a choice between taking a break (break card) or completing work (i.e., completion of worksheets). If he chose to work (work and attention card), he simultaneously gained access to attention from the staff member contingent on engagement in the task and praise for task completion. If he chose the break, he gained access to a break, during which work materials were removed and access to preferred stimuli (books) was provided. Attention was not provided during the break. While he worked, the break card was continuously available; while he was on break, the work and attention card was available. Every 30 s throughout each session, regardless of whether Kyle was on break or at work, the staff member presented him with the choice of cards. Thus, he was offered a choice between a break and work and attention every 30 s. Following each choice, he maintained continuous access to the choice option he did not choose (e.g., he would maintain access to the break card if he chose to

work). At any time during the 30-s interval, he could mand for the other choice (e.g., mand for a break 10 s after manding to work). However, if he did not choose a card when presented with the choice, the work task was presented.

Demand and diverted-attention (combined-antecedent) condition. The antecedent conditions were identical to the demand and diverted-attention (combined-antecedent) functional analysis condition. At the beginning of each session, Kyle was required to work independently on worksheets without staff attention. While he worked, he had continuous access to both cards. If he manded for work and attention, the staff member provided 30-s of attention and praise for task completion, but the demands were not removed. If he manded for a break, the staff member removed work materials and provided access to preferred books for 30 s, but no attention was available. As in the single-antecedent condition, both cards were available continuously, and prompts to choose occurred every 30 s. If no request was made, the work task continued without attention.

RESULTS AND DISCUSSION

During Kyle's SDA, problem behavior occurred only in the demand condition (Figure 1, top left), suggesting that his problem behavior was maintained by escape from academic demands. Data on staff responses to problem behavior during the SDA indicated that the conditional probability of attention following problem behavior across the three demand sessions in which problem behavior occurred was .76 (range, .5 to 1.0), and the probability of escape was zero. Thus, SDA results suggested that problem behavior was preceded by multiple antecedents (demands and diverted attention) and that the probability that staff delivered attention following problem behavior was high in this situation.

During the functional analysis (Figure 1, top right), problem behavior was observed most

often during the combined-antecedent (demand and diverted attention) condition and less frequently during the single-antecedent (demand) condition, suggesting that problem behavior was occasioned by multiple antecedents (presence of demands and diverted attention) and was potentially maintained by access to both attention and escape from tasks.

Results of the FCT choice intervention across the single-antecedent and combined-antecedent conditions (Figure 1, bottom) indicated that during treatment in the demand condition, problem behavior decreased to zero, mean rate of break requests was 0.29 per minute, and mean rate of work requests was 0.41 per minute. These data suggest that attention continued to serve as the primary reinforcer even if it meant that he had to continue working. During FCT treatment in the demand and diverted-attention condition, rate of problem behavior decreased to a mean of 0.05 per minute and was not observed during the last two treatment sessions. Mean rate of requests for attention was 0.93 per minute, and mean rate of requests for breaks was 0.13 per minute.

The current study replicated and extended that of Call et al. (2005) by using SDA to identify possible antecedent variables that occasioned and maintained problem behavior in a natural setting (classroom) and then formally evaluating those variables with a functional analysis using single- and combined-antecedent conditions. An additional extension included incorporating choice between function-based reinforcers into the intervention. The results of the SDA permitted rapid identification of combined motivating operations that occasioned problem behavior to inform the conditions of the functional analysis. A more detailed analysis of combined antecedents was critical in identifying the variables that occasioned Kyle's problem behavior. Next, an effective intervention that incorporated choice between the two functional reinforcers (i.e.,

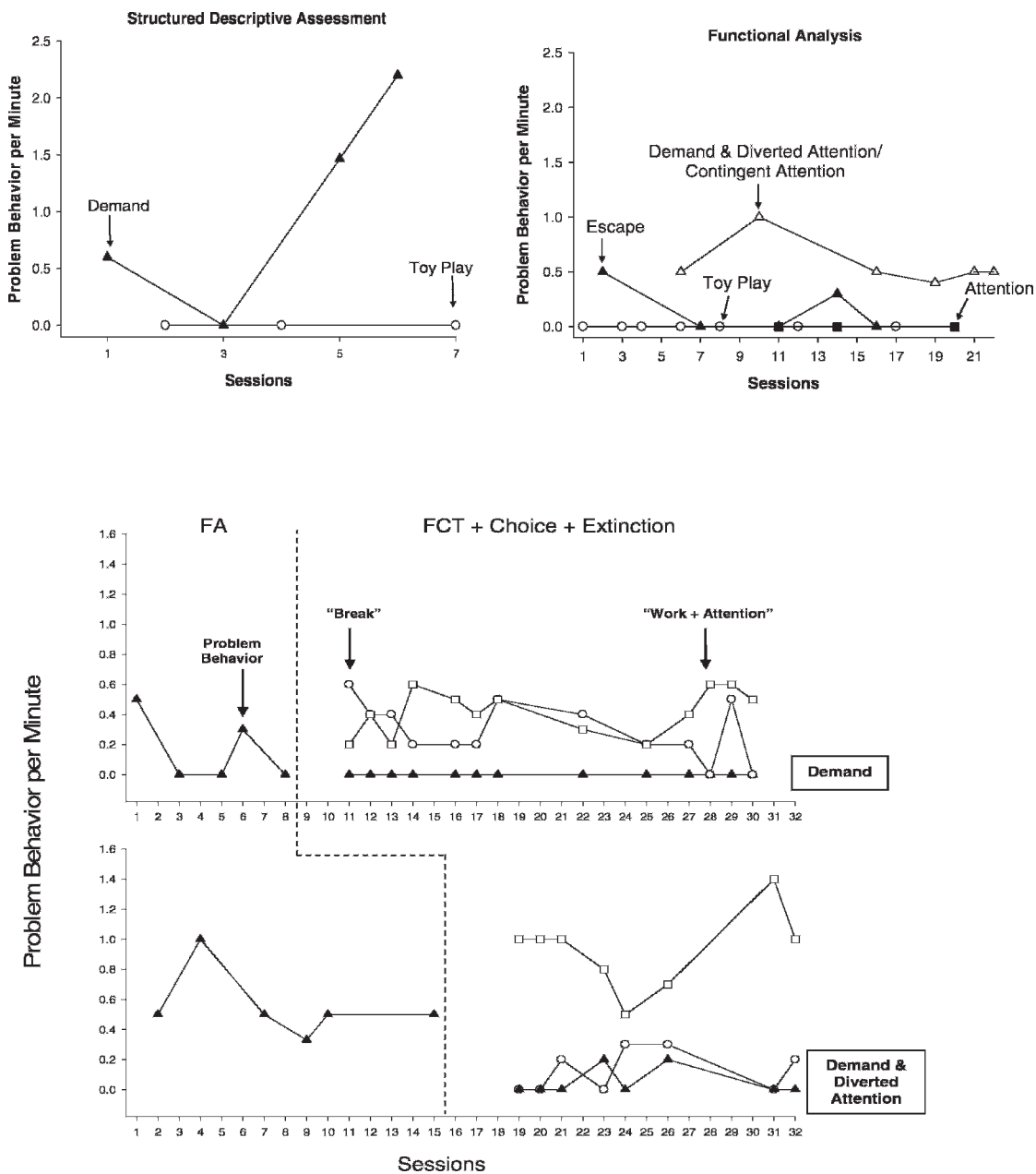


Figure 1. Responses per minute of problem behavior during the structured descriptive assessment in the classroom (top left). Responses per minute of problem behavior during the functional analysis in the classroom (top right). Responses per minute of problem behavior and communication during functional communication training plus choice plus extinction (bottom).

escape and attention) was evaluated; this intervention may have better accounted for fluctuating motivating operations in effect in the classroom when attention during work times was not always available. The intervention allowed the student to mand for the stimulus that was functioning as the most potent reinforcer at any particular time (e.g., escape or attention) and provided the teachers with structure to make multiple reinforcers available to Kyle.

A limitation of the current study is that a second combined-antecedent condition was not conducted (i.e., demand and diverted attention/contingent escape). Future studies could evaluate whether or not escape was also a maintaining variable under the same antecedent context. A second limitation was that books were available contingent on requesting a break during FCT. Therefore, it is unknown whether Kyle was requesting positive reinforcement (tangible reinforcement in the form of books), negative reinforcement (escape), or a combination of both when he manded for a break (Golonka et al., 2000; Zarcone, Fisher, & Piazza, 1996). Future studies should examine other interacting motivating operations and discriminative stimuli during descriptive and functional analyses that

may lead to more fine-grained interventions for problem behavior.

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