JOURNAL OF APPLIED BEHAVIOR ANALYSIS 2011, **44,** 925–929 NUMBER 4 (WINTER 2011)

EVALUATION OF RESPONSE BLOCKING AND RE-PRESENTATION IN A COMPETING STIMULUS ASSESSMENT

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Competing stimulus assessments (CSA) have been used to identify stimuli that are associated with reduced levels of problem behavior, presumably as a function of reinforcer competition. Following a standard CSA in which stimuli simply were made available, 2 more CSAs were conducted with additional components designed to enhance reinforcer competition: re-presentation of stimuli and response blocking for self-injury. The results obtained from each CSA were validated in an extended treatment analysis. The study illustrates how the effects of additional components designed to enhance reinforcer competition can be evaluated efficiently in the context of a CSA.

Key words: competing stimulus assessment, automatic reinforcement, self-injurious behavior, response blocking

One approach for treating problem behavior maintained by automatic reinforcement involves providing noncontingent access to alternative sources of reinforcement. Competing stimulus assessments (CSAs) have been used to identify stimuli that are associated with low levels of problem behavior (e.g., Piazza et al., 1998; Shore, Iwata, DeLeon, Kahng, & Smith, 1997). Typically, CSAs have involved the provision of brief access to each test stimulus and an examination of how it alters rates of problem behavior. Several studies have shown that simply allowing access to stimuli identified by a CSA can reduce problem behavior maintained by automatic reinforcement, either because those stimuli compete with sensory reinforcement (e.g., Fisher, O'Connor, Kurtz, DeLeon, & Gotjen, 2000; Ringdahl, Vollmer, Marcus, & Roane, 1997) or through substitution, whereby the stimuli generate stimulation that is similar to the problem behavior (e.g., Piazza, Adelinis, Hanley, Goh, & Delia, 2000). Regardless of the mechanism, these studies show that results from a CSA can predict how noncontingent access to those stimuli may affect problem behavior during extended treatment analyses. In some cases, however, additional treatment components, such as response blocking (Piazza et al., 1998), arm restraints (Zhou, Goff, & Iwata, 2000), or punishment (Ringdahl et al., 1997), were needed to reduce problem behavior to acceptable levels during extended treatment analyses.

The brief single-stimulus presentation format of the CSA also can be used to examine the effects of other procedures designed to enhance reinforcer competition. These procedures may include those that increase engagement with test stimuli (e.g., prompting, re-presentation) and

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doi: 10.1901/jaba.2011.44-925

those that attenuate reinforcement produced by problem behavior (e.g., response blocking). In the current study, a series of CSAs was conducted to examine the extent to which both self-injurious behavior (SIB) that was maintained by automatic reinforcement and engagement with stimuli were affected when (a) stimuli simply were made available, (b) stimuli were re-presented after engagement had ceased, and (c) stimuli were re-presented and SIB was blocked. Results from the CSAs were validated in an extended treatment analysis.

METHOD

Participant and Setting

Abigail was a 3-year-old girl who had been diagnosed with cerebral palsy, intellectual disability, and shunted hydrocephalus. She was admitted to an inpatient unit for the assessment and treatment of SIB. All sessions were conducted in a hospital bedroom. Functional analysis sessions were conducted in a wheelchair, and all CSAs and treatment analyses were conducted with Abigail sitting on a mat with adult support. Sessions were terminated if there was any noticeable bruising, swelling, or bleeding, or if injury was imminent.

Data Collection and Interobserver Agreement

Trained observers recorded the frequency of *SIB*, which was defined as successes or attempts at head hitting with open or closed hand or object, biting fingers or hand, and head banging. Frequency data for SIB were converted to rate (responses per minute) by dividing the total number of responses scored during each session by the session length in minutes. Observers also recorded the duration of *stimulus contact*, defined as contact between the palm of the hand or fingers and any portion of the stimulus. These data were converted to a percentage by dividing the total number of seconds of stimulus contact by the total seconds of session duration and then converting this ratio to a percentage.

Interobserver agreement was assessed by having a second observer simultaneously but independently record data during 44% of all sessions. Interval-by-interval agreement coefficients were calculated for SIB and stimulus contact by dividing the smaller number (frequency and seconds, respectively) by the larger number in each 10-s interval, and then converting this ratio to a percentage. The mean agreement for SIB was 95% (range, 91% to 100%) and for stimulus contact was 86% (range, 75% to 100%).

Procedure

Functional analysis. A functional analysis was conducted based on procedures described by Iwata, Dorsey, Slifer, Bauman, and Richman (1982/1994). Attention, tangible, ignore, and play conditions were conducted in a multielement design, followed by a series of extended ignore sessions. Levels of SIB were undifferentiated across conditions and persisted in a series of six extended ignore sessions, suggesting that this behavior was maintained by automatic reinforcement. (The functional analysis data are available from the first author.)

Competing stimulus assessments. A series of three CSAs were conducted. The initial CSA was based on the procedures described by Piazza et al. (1998). Fifteen stimuli plus a control condition (during which no stimuli or attention was present) were assessed during 2-min sessions. At the beginning of each session (with the exception of the control sessions), the therapist placed the stimulus in Abigail's hand. If she did not have contact with the stimulus, the therapist did not hand it back to her but ensured that it was kept within her reach. Next, a CSA with re-presentation was conducted. The procedures were similar as those described above except that if Abigail did not have contact with the stimulus for 5 s, the therapist put it back in her hand. Sessions were initially 2 min in duration and then were increased to 5 min to expose Abigail to the contingencies for a longer period of time. The CSA with

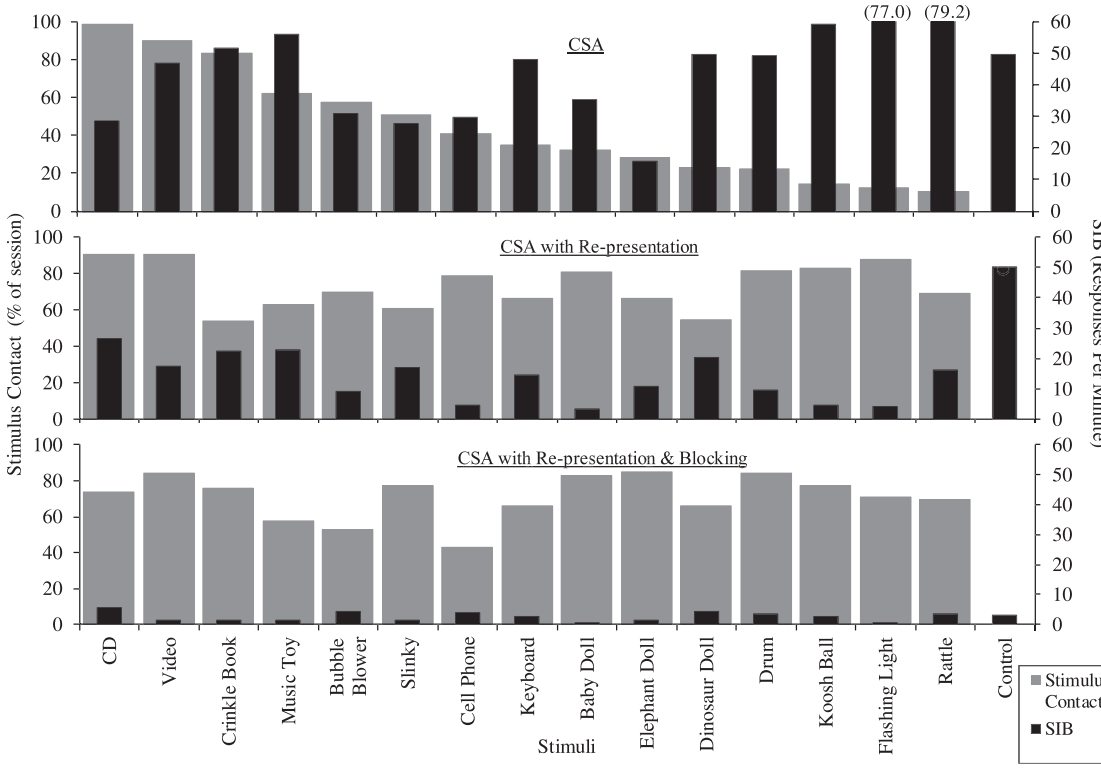

Figure 1. Percentage of session with stimulus contact, and SIB per minute for the CSA (top), CSA with re-presentation (middle), and CSA with re-presentation and blocking (bottom).

re-presentation and blocking was similar to the previous assessment; however, all topographies of SIB were blocked (including during the control). Blocking involved the therapist placing his or her hand near Abigail's head such that she was prevented from head hitting, hand biting, or head banging; thus, attempts to hit her head resulted in the therapist's arm or hand being hit, attempts to bite her hand resulted in the therapist placing his or her hand between Abigail's face and mouth and her hand, and attempts to bang her head resulted in the therapist placing a pillow or mat between her head and a hard surface.

Treatment analysis. Three stimuli identified by the CSA with re-presentation and blocking as being among those associated with the lowest level of SIB (elephant doll, baby doll, flashing light) were examined in a treatment analysis and kept constant through all conditions. The three stimuli were tethered together and evaluated across multiple sessions using a combined reversal and multielement design. Sessions were 5 min in duration. During baseline, the participant did not have access to stimuli and received no attention for SIB. In the CSA condition, the therapist placed the stimuli in Abigail's hand at the beginning of each session. Stimuli were not re-presented if she dropped or discarded them, and SIB was ignored. In the CSA with re-presentation condition, the therapist placed the same stimuli in Abigail's hand at the beginning of each session. If she dropped a stimulus or otherwise did not make contact with it for 5 s, the therapist placed it back in her hand. SIB was ignored. The CSA with re-presentation and blocking condition was

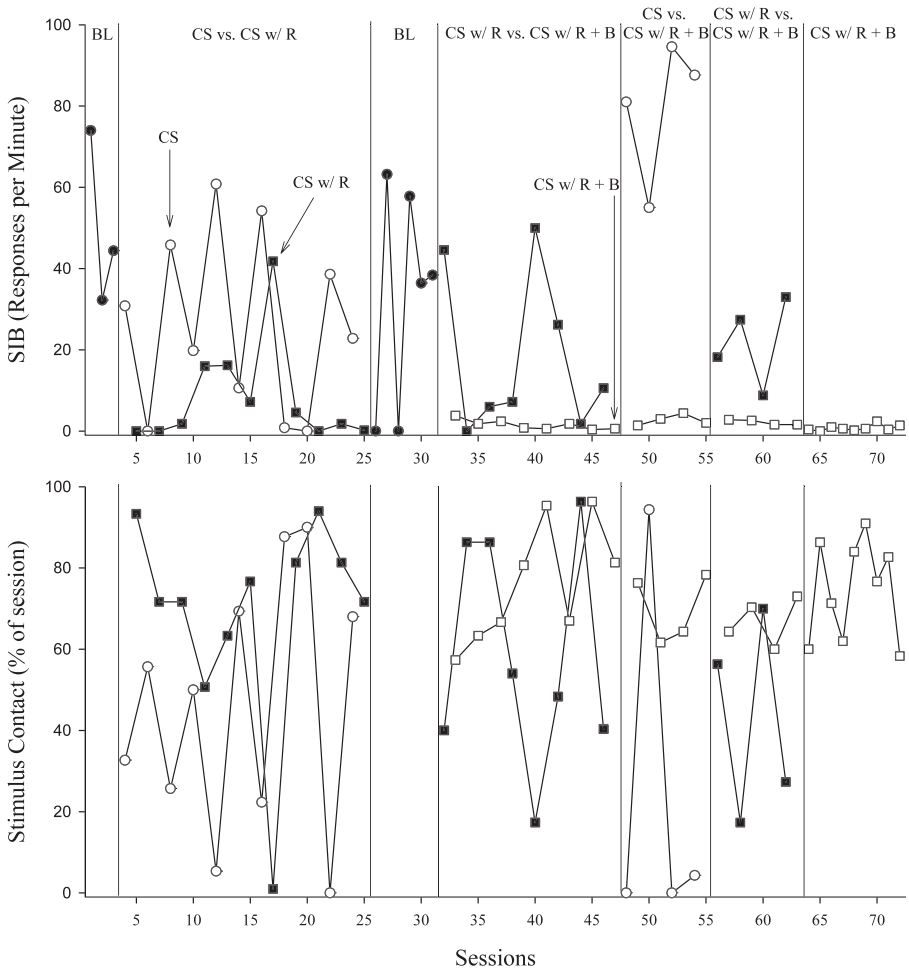

Figure 2. SIB (top) and stimulus contact (bottom) during the treatment analysis (CS = competing stimuli, CS w/ R = competing stimuli with re-presentation, and CS w/ R + B = competing stimuli with re-presentation and blocking).

conducted in a similar manner except that SIB was blocked as described above.

RESULTS AND DISCUSSION

Results of the three CSAs are presented in Figure 1. In the initial CSA, no stimuli were associated with clinically acceptable levels of SIB. In the CSA with re-presentation, SIB was lower and stimulus contact was higher across most stimuli compared to the CSA. In the CSA with re-presentation and blocking, SIB (including attempts) was lower across stimuli compared to the previous CSAs, and stimulus contact remained similar to the CSA with re-presentation.

Findings obtained during the CSAs were validated in the extended treatment analysis (Figure 2). Specifically, SIB was lowest and stimulus contact was highest and most stable during the CSA with re-presentation and blocking condition compared to the other conditions.

Research on CSAs generally have shown that briefly exposing individuals to stimuli and sampling their behavior can predict outcomes obtained over extended analyses (see DeLeon, Toole, Gutshall, & Bowman, 2005). These assessment procedures enable clinicians to

examine how various stimuli affect behavior. This study extends the literature by illustrating how CSAs can be modified to examine the contribution of other procedures designed to facilitate reinforcer competition and, more specifically, to examine the interaction between those procedures and the individual test stimuli. In the current case, none of the stimuli were associated with acceptable reductions in SIB during the initial CSA. The CSA with re-presentation was associated with higher levels of stimulus contact and lower levels of SIB across most stimuli. However, stimulus contact increased markedly with some stimuli but not others, and SIB decreased to low levels with only 4 of the 15 stimuli. The CSA with re-presentation and blocking was associated with a general reduction in SIB across all stimuli.

Response blocking has been shown to function as either punishment or extinction for problem behavior (Lerman & Iwata, 1996). Given the immediate reductions in SIB when response blocking was in place, it is possible that blocking functioned as a punisher in this case, and that it might have reduced SIB without the use of competing stimuli. Although response blocking generally is not used as a treatment in the absence of reinforcement, one limitation is that we did not evaluate the effects of response blocking alone.

The extended treatment analysis validated the findings of each CSA. That is, results showed that the contribution of other treatment procedures (re-presentation and response blocking) examined in the context of a brief CSA accurately predicted outcomes obtained in an extended treatment analysis. This approach may represent an efficient way to identify potentially effective treatment procedures to supplement competing stimuli in cases in which they do not reduce problem behavior to clinically significant levels when used alone. However, additional research is needed to show that it can accurately predict results obtained from more extended analyses before making this conclusion.

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Received January 11, 2010
Final acceptance January 6, 2011
Action Editor, Jennifer Zarcone