

*THE EFFECTS OF NONCONTINGENT ACCESS TO
SINGLE- VERSUS MULTIPLE-STIMULUS SETS ON
SELF-INJURIOUS BEHAVIOR*

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The automatically reinforced self-injury of a girl with autism was treated by providing noncontingent access to a single set of preferred toys during 30-min sessions. The reductive effects of the intervention waned as the session progressed. Rotating toy sets after 10 min or providing access to multiple toy sets resulted in reductions that lasted the entire 30 min.

DESCRIPTORS: self-injurious behavior, noncontingent reinforcement, environmental enrichment, satiation

A number of studies have examined the effects of providing noncontingent access to preferred stimuli on problem behavior that is seemingly maintained by its sensory consequences (e.g., Ringdahl, Vollmer, Marcus, & Roane, 1997). Results have shown that the noncontingent provision of preferred stimuli can reduce problem behavior, at least during brief periods (e.g., 10 min). However, such brief samples of behavior may fail to capture changes in preference for the available items or the effects of satiation and, thus, may not accurately predict the longer term effects of the intervention. If preferences change or satiation occurs, stimuli may cease to compete with problem behavior, and high rates of problem behavior may re-emerge.

One method of avoiding potential satiation effects is to periodically alternate avail-

able stimuli. For example, Green and Reid (1996) changed items or activities contingent on displays of negative affect to successfully maintain positive affect in children with disabilities. In the present study, we provided a single, highly preferred set of toys to a girl whose self-injurious behavior (SIB) persisted in the absence of social consequences and examined within-session patterns of SIB and toy contact to check for possible satiation effects. We then evaluated the effects of alternating preferred stimuli or providing multiple preferred stimuli on SIB.

METHOD

Participant and Setting

Gina was an 11-year-old girl who had been diagnosed with autism and moderate mental retardation. She could understand complex sentences, but communicated in three- to four-word utterances. Sessions were conducted on a hospital unit specializing in the treatment of behavior disorders. The session room contained tables, chairs, and toys or academic materials as required in the conditions described below.

This investigation was supported in part by Grant MCJ249149-02 from the Maternal and Child Health Service and Grant 1 R01 HD37837-01 from the National Institute of Child Health and Human Development within the U.S. Department of Health and Human Services. Pamela Neidert is now at the Marcus Institute in Atlanta.

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Response Measurement and Interobserver Agreement

Gina's SIB consisted of self-scratching and skin picking, defined as rubbing any part of the skin with her fingernails. Toy contact was defined as contact of the hands with any part of a set of toys. Data were collected on frequency of SIB and duration of toy contact by trained observers using laptop computers. Data were subsequently expressed as responses per minute and cumulative frequency of SIB, and as the percentage of session time during which Gina maintained toy contact. A second observer simultaneously collected data on all target behaviors during 51% of the functional analysis sessions and on SIB and toy contact during 60% of the treatment analysis sessions. Interobserver agreement was calculated on an interval-by-interval basis by dividing the lower number of responses (SIB) or the lower duration (toy contact) per 10-s interval by the higher number or duration, and multiplying the average across intervals by 100%. Interobserver agreement averaged 97.1% and 99.5% for SIB and toy play, respectively.

Procedure and Experimental Design

A list of preferred stimuli was initially identified through parent interview. Fifteen of these stimuli were then included in a paired-choice preference assessment (Fisher *et al.*, 1992) to determine a hierarchy of preferred stimuli. The two most highly preferred items were a set of crayons with a coloring book and a set of dolls.

The functional analysis of SIB included an ignore condition, a toy play condition, and two variations of a demand condition ("do" and "don't" request conditions; see Adelinis & Hagopian, 1999, for session descriptions), alternated in a multielement design. All sessions lasted 10 min. During the ignore condition, the room was devoid of toys, and a therapist was present but did not

interact with Gina. During toy play, Gina had access to various toys, and the therapist provided continuous interaction while ignoring SIB.

All subsequent sessions lasted 30 min and were conducted once or twice per day with no less than 15 min between sessions. SIB was ignored while a therapist remained in the room with Gina. Rates of SIB during baseline and treatment conditions were compared using multielement designs embedded in a reversal design. Baseline sessions were identical to the ignore condition of the functional analysis. During the single-set condition, a single set of toys (crayons and a coloring book) was continuously available. During the rotating-set condition, Gina had continuous access to one of two sets of toys (crayons and a coloring book or the dolls). The toy set delivered at the beginning of the session was randomized across sessions. Every 10 min, a therapist would bring in the second set and remove the first set of toys. The 10-min rotation schedule was based on the shortest latency to the cessation of toy contact during the initial single-set phase. During the multiple-set condition, both sets of toys were available continuously.

RESULTS AND DISCUSSION

During the functional analysis, SIB occurred at high rates in the ignore condition ($M = 0.8$ responses per minute), at low rates during the "do" and "don't" conditions ($M = 0.04$ responses per minute in each condition), and at zero in the toy play condition. These results suggested that SIB was maintained by automatic reinforcement and that access to toys could effectively reduce the behavior.

The top panel of Figure 1 displays rates of SIB across baseline and treatment sessions. Moderate levels of SIB were observed during baseline sessions ($M = 1.9$ responses per minute), and it decreased only slightly

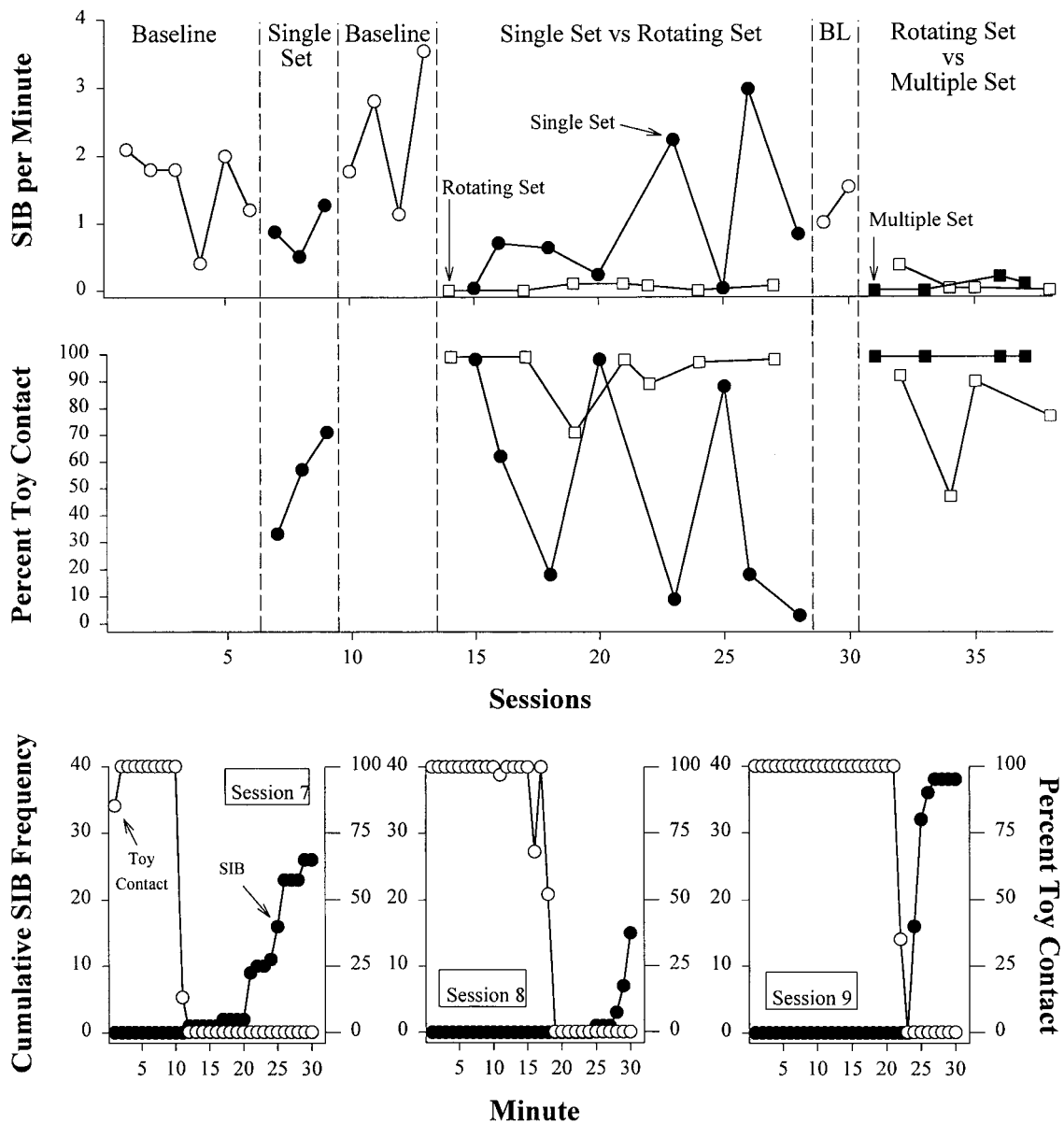


Figure 1. Rates of self-injury (top panel) and session percentages of toy contact (middle panel) during baseline and treatment conditions. The bottom panel depicts the cumulative frequency of SIB and within-session percentages of toy contact during the first three sessions of the single-set condition.

during the single-set condition ($M = 0.9$ responses per minute). The rotating-set and multiple-set conditions both produced substantially lower levels of SIB ($M = 0.07$ responses per minute and $M = 0.1$ responses per minute, respectively). The middle panel displays levels of toy contact during the

treatment analysis. Toy contact was highest in the multiple-set condition ($M = 99\%$), followed by the rotating-set condition ($M = 87\%$) and the single-set condition ($M = 50\%$). The bottom panel depicts the cumulative frequency of SIB and the percentage of toy contact across successive minutes

of the first three single-set sessions (Sessions 7, 8, and 9). These data show decreasing levels of toy contact and corresponding increases in SIB as each session progressed.

The presentation of a single set of highly preferred items ceased to compete with SIB over the course of 30-min sessions, possibly due to satiation for these items. This possibility was strengthened by the observation that Gina rarely returned to the items once she ceased playing with them during the single-set condition. By contrast, results suggested that either rotating toy sets or providing multiple toy sets extended the reductive effects of treatment.

Some limitations of the study should be noted. First, because the effects of the multiple-set condition were evaluated in an AB design, conclusions regarding these effects must be interpreted cautiously. Also, all effects were demonstrated over a relatively brief period (30 min). Thus, the viability of the intervention over longer periods is unknown. However, it is important to note that treatment evaluations of this sort are often conducted during even shorter sessions (e.g., 10 min). If treatment had been evaluated using 10-min sessions, the single-set condition would have appeared to be effective. That is, the within-session data analysis revealed that limiting the initial single-set sessions to 10 min would have resulted in

zero rates of SIB. These data suggest that caution must be taken when extrapolating the long-term effects of these and similar interventions from brief samples. Finally, although they were limited to a single subject, these findings suggest a potentially useful method for estimating when preferred items should be rotated (i.e., just prior to the shortest latency to the cessation of toy play) and also highlight the importance of identifying multiple preferred stimuli for individuals with developmental disabilities.

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Received January 20, 2000

Final acceptance August 20, 2000

Action Editor, Dorothea C. Lerman