

*THE EFFECTS OF PRESESSION ATTENTION ON
PROBLEM BEHAVIOR MAINTAINED BY
DIFFERENT REINFORCERS*

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The effect of pre-session attention on the later occurrence of problem behavior was examined with elementary-school children with a range of disabilities. Results of analogue functional analyses suggested an escape function, an attention function, or both. Following the analogue functional analyses, the effects of two antecedent conditions (10-min ignore vs. 10-min attention) were compared on problem behavior in subsequent test conditions. For participants who displayed attention-maintained problem behavior, the test condition involved contingent attention for problem behavior. For participants who displayed escape-maintained problem behavior, the test condition involved contingent escape for problem behavior. Results indicated that participants who displayed attention-maintained problem behavior displayed less problem behavior following pre-session exposure to attention than when ignored. No such effect was found for pre-session attention on escape-maintained problem behavior. We discuss matching antecedent-based interventions to the results of functional analysis.

DESCRIPTORS: abolishing operations, academic settings, antecedent interventions, establishing operations, problem behavior

Establishing operations (EOs) alter both the reinforcing effectiveness of specific consequences and the momentary probability of occurrence of responding maintained by those consequences (Michael, 1982). For example, deprivation of water might be expected to establish water as a reinforcer, thereby increasing the momentary likelihood of responses that have previously produced water. In an investigation of the effects of EOs on negatively reinforced self-injurious behavior (SIB), Smith, Iwata, Goh, and Shore (1995) demonstrated that altering certain dimensions of task demands (e.g., duration) while continuing to provide negative reinforcement contingent on SIB resulted in

idiosyncratic but predictable changes in the occurrence of SIB of individuals with developmental disabilities. These findings were extended in an examination of the effects of altering certain dimensions of academic tasks on the problem behavior of students with autism (McComas, Hoch, Paone, & El-Roy, 2000). McComas et al. arranged escape from demands contingent on destructive behavior across conditions and manipulated the presence or absence of individualized instructional arrangements during academic task demands in classrooms. The results indicated that idiosyncratic but predictable changes in the likelihood of negatively reinforced destructive behavior occurred as a function of EOs. Although these two studies were consistent in their findings, they were limited to the effects of idiosyncratic establishing operations on negatively reinforced behavior.

A small number of studies have examined the effects of attention as an EO. Early experiments evaluating the effects of social approval and social isolation on subsequent responsiveness to social attention as a positive

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reinforcer indicated that children were more responsive following social isolation than following social approval (Gewirtz & Baer, 1958a, 1958b). The findings of Gewirtz and Baer indicated that social isolation appeared to establish attention as a positive reinforcer, whereas social attention appeared to decrease the reinforcing effectiveness of attention. Similarly, Berg *et al.* (2000) found that pre-session exposure to attention during analogue functional analyses can result in predictable changes in the likelihood of particular responses.

Despite the findings of these prior studies, there is still much to learn regarding EOs. For example, (a) the nature of the influence of antecedent (*i.e.*, pre-session) attention on attention-maintained behavior, (b) how various durations of pre-session attention affect problem behavior, and (c) the nature of the influence of pre-session attention on escape-maintained behavior are all unknown. The purpose of this investigation was to examine the influence of pre-session attention on the subsequent occurrence of attention-maintained and escape-maintained problem behavior in a classroom setting. In Study 1, we conducted experimental analyses to identify the reinforcers for problem behavior of 5 students. In Study 2, we analyzed the effect of (a) 10-min periods of continuous attention preceding an ignore condition on attention-maintained problem behavior and (b) 5-min periods of continuous attention preceding an ignore condition on attention-maintained problem behavior. In Study 3, we analyzed the effect of 10-min periods of continuous attention preceding independent academic work time on escape-maintained problem behavior.

GENERAL METHOD

Participants and Settings

Participants were 5 children who had been diagnosed with developmental and

learning disorders who received public school special education services. Dan was an 11-year-old boy who had been diagnosed with Down syndrome and mild to moderate mental retardation. Stan was a 10-year-old boy who had been diagnosed with vision and hearing impairments, mild to moderate mental retardation, and language impairments. LuAnn was an 8-year-old girl who had been diagnosed with a language delay and emotional behavior disorders. Abe was an 11-year-old boy who had been diagnosed with autism and moderate to severe developmental disabilities. Ari was a 12-year-old boy who had been diagnosed with Down syndrome and moderate mental retardation. Graduate research assistants and paraprofessionals conducted all analyses in the participants' special education classrooms.

Target Behavior

The dependent variable was the occurrence of problem behavior. For Dan, problem behavior was defined as throwing materials, hitting, and spitting. For Stan, problem behavior was defined as tearing or destroying materials, pounding on the table, kicking furniture, spitting, and climbing on furniture. For LuAnn, problem behavior was defined as crying. For Abe, problem behavior was defined as hitting, pinching, scratching, and kicking. For Ari, problem behavior was defined as hitting, pinching, kicking, and throwing items at others.

Independent Variables

Independent variables recorded for Dan, Stan, Abe, and Ari were (a) attention provided by adults or peers, (b) verbal instructions delivered by adult, (c) termination of task demands, and (d) access to preferred materials. For LuAnn, data were collected on attention provided by adult and peers and the level of task demand (low-demand tasks were defined as those that she independently completed with $\geq 90\%$ accuracy, and high-

demand tasks were those that she independently completed with $\leq 70\%$ accuracy).

Data Collection and Interobserver Agreement

All sessions were videotaped and later scored by trained observers who recorded data using a 10-s partial-interval sampling procedure. With the exception of LuAnn, all sessions lasted 10 min (15 min for LuAnn). The percentage of intervals with problem behavior was calculated by dividing the number of intervals with problem behavior by the total number of intervals for each session. Two observers simultaneously but independently recorded data on all dependent and independent variables for at least 35% of sessions across each experimental condition for all participants. Point-by-point interobserver agreement data were computed and reported for dependent and independent variables. The number of intervals with agreement was divided by the number of intervals with agreement plus disagreement, then multiplied by 100%. The overall mean agreements for the dependent variables were 98% for Dan (range, 94% to 100%), 96% for Stan (range, 92% to 100%), 99% for LuAnn (range, 84% to 100%), 97% for Abe (range, 84% to 100%), and 96% for Ari (range, 87% to 100%). Overall mean agreements for independent variables were for 97% Dan (range, 88% to 100%), 95% for Stan (range, 91% to 100%), 96% for LuAnn (range, 79% to 100%), 95% for Abe (range, 79% to 100%), and 95% for Ari (range, 83% to 100%).

Experimental Design

Multielement designs were conducted with all participants to assess possible social reinforcers for problem behavior and the effects of the presence versus absence of pre-session attention on the subsequent occurrence of problem behavior.

STUDY 1: ANALOGUE FUNCTIONAL ANALYSIS

METHOD

Participants and Procedure

Analogue functional analyses were conducted with all 5 participants. These analyses were conducted with all participants except LuAnn using procedures outlined by Iwata, Dorsey, Slifer, Bauman, and Richman (1982/1994). Four analogue conditions were conducted: (a) play, (b) escape, (c) attention, and (d) materials. Two to six sessions were conducted each day and were presented in quasirandom sequence. During the play condition, all participants had unlimited access to leisure materials and continuous adult attention, and were not required to perform academic tasks. The following procedures were used with Dan, Stan, Abe, and Ari. During the escape condition, an adult instructed the participant to complete an academic task and repeated instructions every 10 s if the participant was not working to complete the task. Contingent on each occurrence of problem behavior, escape was provided for 30 s. A general praise statement was provided for compliance at the end of the session. During the attention condition, the participant had access to leisure materials, but access to adult attention was not available unless problem behavior occurred. Adult attention was presented for 30 s contingent on each occurrence of problem behavior. During the materials condition, the participant had unlimited access to continuous adult attention, but only "neutral" items were available (e.g., hand lotion). Access to play items (e.g., books, figurines, or cars) was provided for 30 s contingent on each occurrence of problem behavior.

With LuAnn, antecedent manipulations were conducted using easy versus difficult tasks and high versus low levels of adult attention (i.e., high demand/high attention,

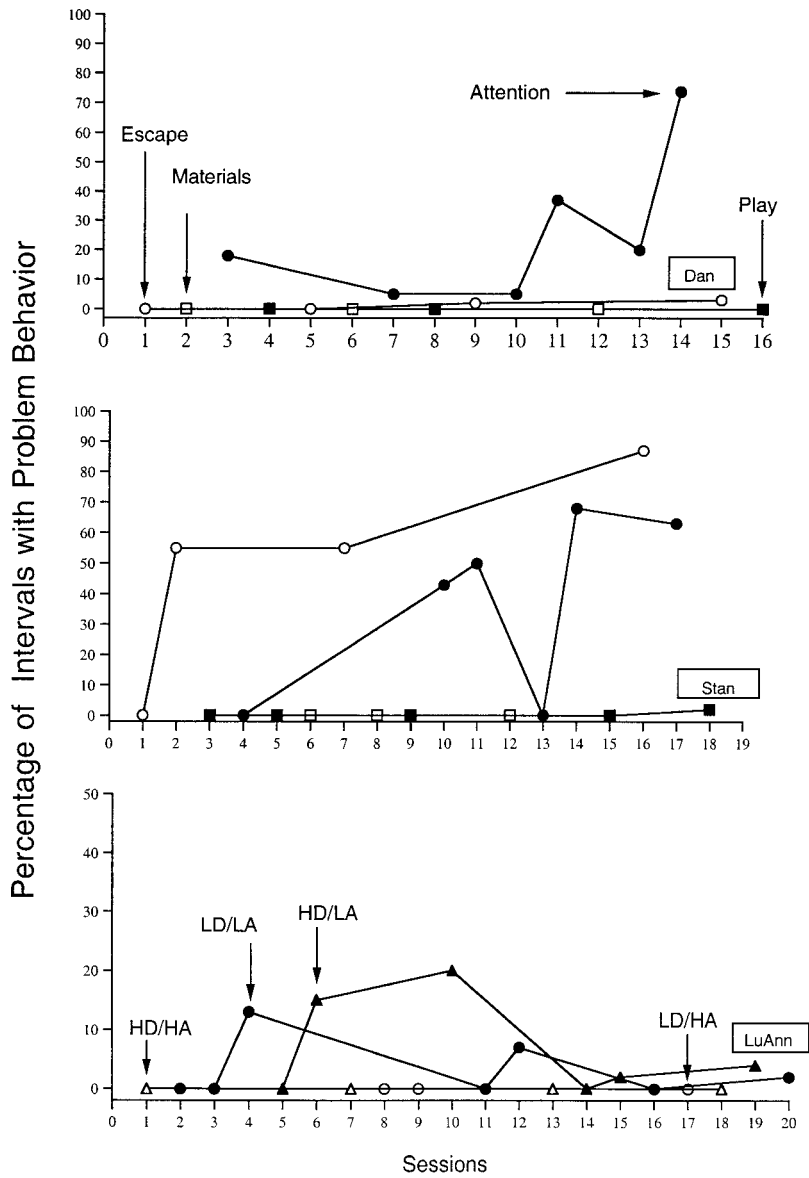


Figure 1. The results of the analogue functional analyses of problem behavior in Study 1 for Dan (top panel), Stan (middle panel), and LuAnn (bottom panel).

low demand/low attention, high demand/low attention, and low demand/high attention). During the low-attention conditions, the adult provided attention in the form of encouraging statements (e.g., “Keep up the good work”) on a variable-time (VT) 7-min schedule. During the high-attention conditions, the adult provided the same encouraging statements on a VT 2-min schedule.

The adult did not deliver any consequences for LuAnn’s problem behavior in any condition. Two sessions were conducted in a quasirandom sequence each day.

RESULTS AND DISCUSSION

The results of the analogue functional analyses for Dan, Stan, and LuAnn are depicted in Figure 1. Dan’s problem behavior

was observed almost exclusively in the attention condition. It should be noted that although virtually all problem behavior occurred in the attention condition, variability was observed across sessions within that condition, with near-zero rates of problem behavior in two of the six sessions. Stan displayed problem behavior in both the attention and escape conditions but not in the materials or free-play conditions. His problem behavior in the attention condition was somewhat variable, with no problem behavior observed in two of the seven sessions. LuAnn's problem behavior occurred exclusively in low-attention conditions, regardless of level of task difficulty. Although the only elevations in problem behavior occurred in low-attention conditions, there was variability within those conditions, with several low-attention sessions in which no problem behavior was observed. The results of the analyses with Dan, Stan, and LuAnn suggested a functional relation between problem behavior and attention for all 3 participants. In addition, Stan's problem behavior appeared to be determined by multiple reinforcers.

The results of the analogue functional analyses with Abe and Ari are depicted in Figure 2. Abe's problem behavior occurred exclusively in the escape condition. Ari's problem behavior never occurred in the attention condition, occurred in 5% or fewer of the intervals in one of the free-play and materials sessions, and was highest in the escape condition. The results of the analogue functional analyses with Abe and Ari were consistent in demonstrating a functional relation between problem behavior and escape.

Overall, the results suggested functional relations between problem behavior and attention for 2 participants (Dan and LuAnn), escape for 2 participants (Abe and Ari), and both attention and escape for 1 participant (Stan).

STUDY 2: PROBLEM BEHAVIOR MAINTAINED BY ATTENTION

METHOD

Participants and Procedure

Dan, Stan, and LuAnn participated in Study 2.

Experimental sessions consisted of a dyad of 10-min analogues: a pre-session condition followed by an attention condition. Two such dyads were conducted each day in a quasirandom sequence.

Pre-session conditions. Prior to all attention conditions, one of two 10-min pre-session conditions was conducted. In one, (10 min ignore), the adult instructed the participant to independently work on his or her choice of homework, leisure reading, or other seatwork or preferred activities. No social attention was provided during the pre-session ignore conditions. In the other pre-session condition (10-min attention), an adult engaged in 10 min of continuous social interaction with the participant. To control the amount of attention provided in the pre-session conditions, no consequences were arranged for problem behavior in either pre-session condition.

To test the influence of different durations of pre-session attention, an additional pre-session condition was conducted with LuAnn. In this condition, the adult told LuAnn to independently engage in homework or other preferred activities for 5 min and then engaged in 5 min of social interaction with her. This condition represented 5 min of pre-session attention and was directly compared to conditions of 10-min pre-session attention and 10-min pre-session ignore.

Attention condition. The attention condition consisted of 10 min periods during which the adult instructed Dan, Stan, and LuAnn to engage in their choice of independent seatwork or preferred activities (the

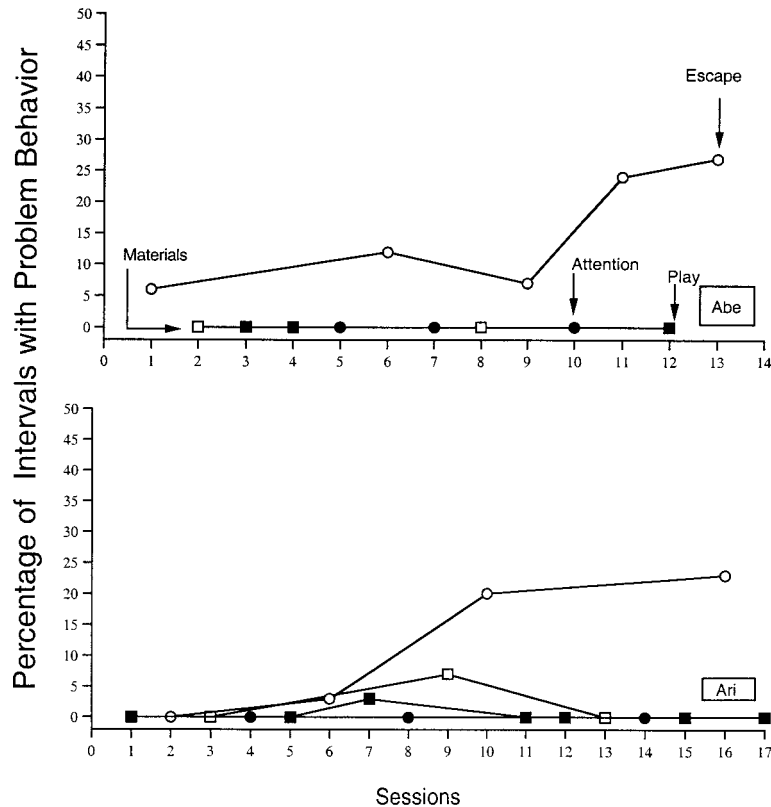


Figure 2. The results of the analogue functional analyses of problem behavior in Study 1 for Abe (top panel) and Ari (bottom panel).

same activities as those in the pre-session conditions). The adult provided attention only following problem behavior. Contingent on each occurrence of problem behavior, the adult provided 10-s attention in the form of a mild reprimand (e.g., “Please don’t throw those. Play nicely with them.”). Following the final test condition of each day, the participant joined his or her classmates in regularly scheduled instructional activities.

RESULTS AND DISCUSSION

Figure 3 shows the results of pre-session attention on problem behavior in the subsequent attention condition with Dan, Stan, and LuAnn. Dan engaged in problem behavior almost exclusively in the sessions that were preceded by the absence of attention (10-min ignore). By contrast, he rarely engaged in problem behavior during sessions

that were preceded by 10 min of continuous attention. Further, there was little variability in his behavior following continuous attention, whereas his behavior was variable following the ignore condition. Finally, the range of variability in responding during sessions following the ignore condition was greater in the first half of the analysis than in the second half. Similarly, Stan engaged in problem behavior more often during sessions that followed the pre-session ignore condition. During sessions that followed 10 min of continuous attention, he displayed little problem behavior. Stan’s behavior was more variable in the sessions following ignore than in those following attention. Finally, problem behavior was low in the last six sessions, regardless of pre-session condition. LuAnn’s pattern of responding was similar to that of Dan and Stan in that she

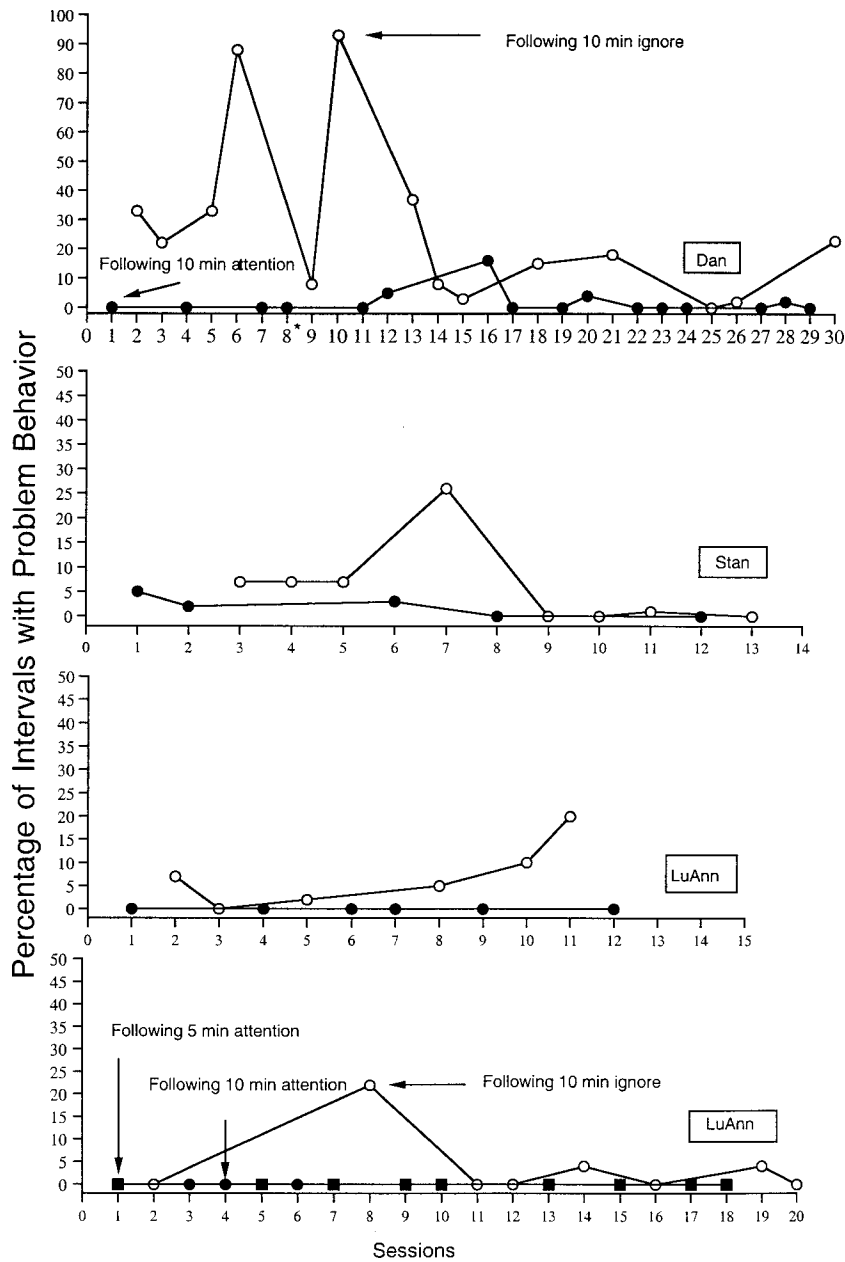


Figure 3. The results of pre-session attention on attention-maintained behavior in Study 2 with Dan (top panel), Stan (middle panel), and LuAnn (third panel). Data from sessions following 10-min continuous attention are depicted with filled circles, and data from sessions following 10-min ignore are depicted with open circles. The results of the parametric analysis of pre-session attention with LuAnn are depicted in the bottom panel. Data from sessions following 5-min continuous attention are depicted with filled squares.

never engaged in problem behavior during sessions that followed 10-min continuous attention, whereas she did engage in problem behavior in all but one session following the

pre-session ignore condition. Further, the occurrence of problem behavior in the sessions following ignore was variable. The findings for all 3 participants were consistent in two

ways. First, all 3 participants showed almost no problem behavior during sessions that followed continuous attention. Second, the data from sessions following ignore were variable, particularly relative to the stable responding in the sessions following continuous attention. Finally, it should be noted that problem behavior following ignore for both Dan and Stan appeared to occur at lower rates in the second half of the analysis.

The bottom panel of Figure 3 shows the results of the analysis comparing the effects of 10-min ignore with 5- and 10-min continuous pre-session attention with LuAnn. LuAnn did not engage in any problem behavior in any of the sessions that followed either 5- or 10-min continuous attention. By contrast, she displayed problem behavior in the sessions that followed 10-min ignore. Although the only occurrences of problem behavior were in the sessions following ignore, these data were quite variable, with no problem behavior observed in five of the eight sessions. Further, similar to the data patterns observed with Dan and Stan, the occurrence of LuAnn's problem behavior appeared to decrease in the second half of the analysis.

STUDY 3: PROBLEM BEHAVIOR MAINTAINED BY ESCAPE

METHOD

Participants and Procedure

Abe, Stan, and Ari participated in Study 3.

Experimental sessions consisted of a dyad of 10-min analogues: a pre-session condition followed by an escape condition. Two such sessions were conducted each day in a quasirandom sequence.

Pre-session conditions. Procedures nearly identical to those used in Study 2 were used in the pre-session conditions. The only exception was that the adult instructed the participant to complete an academic assign-

ment. During the ignore condition, the adult did not provide any attention or additional task prompts; during the attention condition, the adult provided continuous attention in the form of social interaction and encouragement regarding the completion of the assigned task.

Escape condition. Procedures were nearly identical to those used in Study 2. The only difference involved the contingency for problem behavior. During 10-min test conditions, the adult directed Abe, Stan, and Ari to complete independent seatwork in the form of specific task assignments; contingent on each occurrence of problem behavior, the adult provided 10-s escape from the task. Following the final escape condition of each day, the participant joined his or her classmates in regularly scheduled instructional activities.

RESULTS AND DISCUSSION

The effects of pre-session attention on problem behavior in the subsequent escape condition are depicted in Figure 4 for Abe, Stan, and Ari. Abe engaged in problem behavior in escape sessions following both antecedent conditions; thus, the two data series are undifferentiated. Similarly, Stan's problem behavior occurred in escape sessions following both continuous attention and ignore, with near 100% overlap in the two data series. The results for Ari are similar to those of Abe and Stan. Ari engaged in problem behavior in escape conditions following both continuous attention and ignore. Given the severity of his problem behavior, Ari's teacher requested that we terminate the analysis and identify an effective treatment. Following completion of these analyses, Abe, Stan, and Ari received an unrelated intervention based on negative reinforcement.

GENERAL DISCUSSION

Our results suggest differential effects of pre-session attention depending on the op-

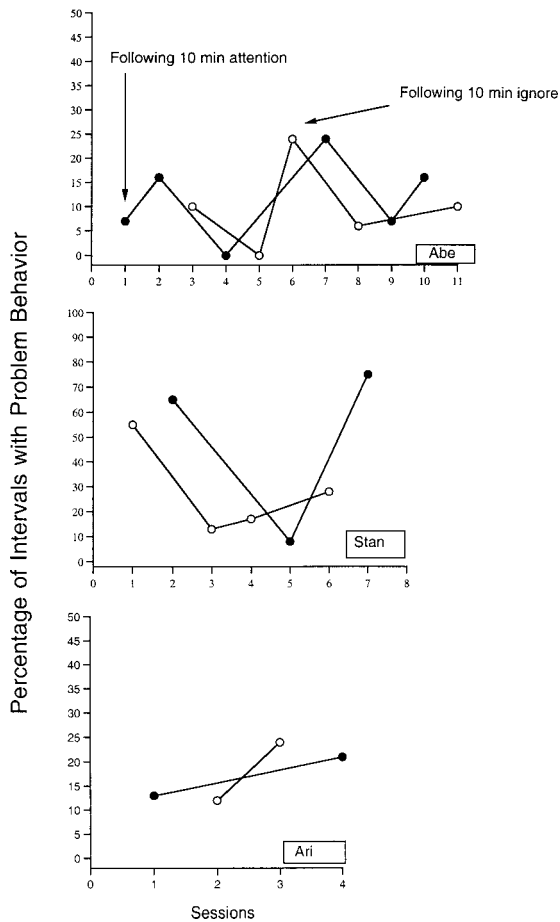


Figure 4. The results of pre-session attention on subsequent escape-maintained behavior in Study 3 with Abe (top panel), Stan (middle panel), and Ari (bottom panel). Data from sessions following 10-min continuous attention are depicted with filled circles, and data from sessions following 10-min ignore are depicted with open circles.

erant function of problem behavior. Specifically, pre-session attention appeared to decrease the likelihood of attention-maintained problem behavior (Dan, Stan, and LuAnn) but did not influence the subsequent occurrence of escape-maintained problem behavior (Abe, Stan, and Ari). By keeping reinforcement constant for problem behavior across all conditions and systematically manipulating antecedent attention, we were able to show the effects of pre-session attention. Our findings provide a preliminary

demonstration of the types of response-reinforcer relations that are likely to be influenced by the absence or presence of pre-session attention.

On a practical level, although 10 min of continuous attention appears to decrease the likelihood of the occurrence of attention-maintained problem behavior in subsequent 10-min ignore sessions, the durability of this effect remains unknown. Also, the amount of pre-session exposure needed to produce a reduction in subsequent attention-maintained behavior is unclear. We provided preliminary evidence that 5 min may be sufficient for LuAnn. However, additional individualized parametric analyses are warranted.

On a conceptual level, all 3 participants in Study 2 (Dan, Stan, and LuAnn) displayed fewer instances of problem behavior during the second half of the pre-session attention analysis (for LuAnn, this was observed in the parametric analysis). It is unclear whether this pattern is a result of an extinction process (problem behavior did not produce consequences in the antecedent conditions) or whether the adult acquired discriminative properties over time.

Finally, the findings of Study 2 could be interpreted as a stronger demonstration of abolishing operations than EOs. If we assume that restricted access or deprivation of social attention functions as an establishing operation for attention-maintained behavior, exposure to attention should function as an abolishing operation for attention-maintained behavior (Michael, 2000). Pre-session attention conditions were associated with almost nonexistent rates of problem behavior in subsequent attention conditions for Dan, Stan, and LuAnn. Conversely, pre-session ignore conditions were associated with elevated and variable rates of responding during subsequent attention conditions. These initial patterns of responding appear to be more demonstrative of an abolishing operation effect than an establishing operation ef-

fect, although it has been posited that the two lie on different points of the same continuum (Michael, 2000). Additional analyses designed to describe the nature of that continuum for individuals appears warranted.

A number of limitations to the present investigation should be noted. First, the data were variable within particular conditions of the analogue functional analyses and pre-session attention analyses. Second, the absence of data on the occurrence of problem behavior during the pre-session attention and ignore conditions precludes an analysis of the patterns of behavior in both dyads. Third, it would have been preferable to extend Ari's pre-session attention analysis to be comparable to those of Abe and Stan with respect to the number of sessions. Given the preliminary nature of this investigation, future research is needed to demonstrate the robustness of these findings across (a) other populations, (b) variations in adult attention, including length of deprivation and the effects of other forms of social positive reinforcement (e.g., peer attention), and (c) other settings (e.g., brief analyses in outpatient clinical settings). These findings add to our understanding of the nature of the influence of pre-session attention on problem behavior.

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STUDY QUESTIONS

1. Functional analysis is typically used as a basis for developing treatment procedures. What was the purpose of the functional analysis conducted in this study?
2. What variables were manipulated in LuAnn's initial functional analysis (Study 1), and what results were obtained?
3. Describe the general strategy used to examine the potential effects of establishing operations in Studies 2 and 3.
4. What was the difference between the pre-session conditions in Studies 2 and 3?
5. Why were no consequences delivered for problem behavior during pre-session conditions?
6. Briefly summarize the results of Studies 2 and 3.
7. Describe some implications of the current results for the assessment of problem behavior.
8. Summarize the authors' distinction between establishing and abolishing operations and comment on whether it appears to be a useful one.

Questions prepared by Stephen North and David Wilson, The University of Florida

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