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ESCAPE BEHAVIOR DURING ACADEMIC TASKS: A PRELIMINARY ANALYSIS OF IDIOSYNCRATIC ESTABLISHING OPERATIONS

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The presence or absence of idiosyncratic stimuli has been demonstrated to predictably alter the occurrence of problem behavior. By specifying stimuli related to negatively reinforced behavior during academic tasks, it may be possible to identify methods of instruction that decrease the occurrence of problem behavior. The current study used a four-step procedure that involved a functional analysis, descriptive assessment, establishing operations (EO) analysis, and follow-up evaluation (a) to identify the operant function of destructive behavior and (b) to evaluate the effects of idiosyncratic features of academic task demands and related methods of instruction on the occurrence of negatively reinforced destructive behavior of 3 boys with developmental disabilities and autism in a classroom setting. The data suggest that the four-step procedure was effective in identifying methods of instruction that decreased the likelihood of destructive behavior without disrupting the maintaining contingencies for destructive behavior. Results are discussed in terms of establishing operations for negatively reinforced destructive behavior during academic tasks and related methods of instruction in classroom settings.

DESCRIPTORS: destructive behavior, establishing operations, functional analysis, academic tasks, negative reinforcement

Antecedent interventions can be highly effective means of treating problem behavior following a functional analysis (Horner, Day, & Day, 1997; Smith, Iwata, Goh, & Shore, 1995). There are at least two advantages to the use of antecedent procedures for reducing destructive behavior. First, by manipulating antecedent variables related to destructive behavior, it is possible to set the occasion for desirable rather than undesirable behavior. Second, by intervening at the antecedent level, it may be possible to avoid the use of extinction or punishment, thus avoiding more intrusive interventions that frequently have undesirable side effects (Goh & Iwata, 1994; Lerman, Iwata, & Wallace, 1999).

The influence that antecedent interventions have on behavior is derived from their relationship with reinforcement (Halle & Spradlin, 1993). One way that antecedent variables affect responding is by altering the value of available reinforcement. In the presence of a behavior–consequence contingency, the probability of a response may be increased or decreased by establishing operations (EOs) that momentarily alter the reinforcing effectiveness of that consequence (Michael, 1982). For example, negatively reinforced destructive behavior may be less likely to occur during tasks that can be completed easily or successfully than during

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those that cannot be completed with a high level of accuracy or success (e.g., Cameron, Ainsleigh, & Bird, 1992).

Academic task demands can take many forms, including but not limited to drill-type repetitive tasks, extremely easy tasks, or extremely difficult tasks. For any given individual, the presentation of a particular type of academic task can increase the probability of destructive behavior that has been previously negatively reinforced through the termination of such tasks (Michael, 1993). However, these effects are highly idiosyncratic (e.g., Carr, Yarbrough, & Langdon, 1997). For example, escape-maintained destructive behavior may be likely to occur for one individual given an extremely difficult task, whereas for another individual, escape-maintained destructive behavior may be likely to occur given an extremely easy task. For both of these individuals, a change in instructional methods or curriculum might diminish the reinforcing effects of escape to a point at which undesirable escape behavior is not evoked (Smith & Iwata, 1997). Thus, systematic specification of the effects of idiosyncratic properties of academic task demands and methods of instruction for an individual might lead to identification of appropriate antecedent-based interventions that decrease the likelihood of the occurrence of negatively reinforced behavior.

This investigation was conducted with 3 boys with developmental disabilities and autism (a) to identify the behavioral function of destructive behavior and (b) to evaluate the effects of idiosyncratic features of academic task demands and related methods of instruction on the occurrence of negatively reinforced destructive behavior.

METHOD

Participants and Setting

Three boys who had been diagnosed with developmental disabilities and autism participated in this investigation. All participants attended a small private school for children with autism and had been referred for evaluation of severe destructive behavior at school. All 3 participants had limited expressive language vocabularies and rarely initiated verbal interactions. Eli was 8 years old, typically communicated using four- to five-word sentences, and followed three-step directions. At the time of the investigation, he was working on first-grade math tasks and typically completed academic tasks in one-to-one or small-group instruction. Charlie was 8 years old, typically communicated using four- to five-word sentences, and followed two-step directions. He was also working on first-grade academic tasks and typically completed academic tasks in one-to-one or small-group instruction. Ben was 9 years old, typically communicated using five- to seven-word sentences, and followed three-step directions. He was working on first- and second-grade academic tasks and completed a large proportion of his academic tasks during independent seat-work time. Classroom-based behavior management procedures for Ben's aggression involved a 60-s time-out.

All sessions were conducted by an instructor who was affiliated with the school and who was trained in applied behavior analysis. For each participant, all sessions were conducted by the same instructor until follow-up, when additional instructors were involved. Analyses were conducted in the participants' classrooms with the exception of Charlie's functional analysis and the initial sessions of the EO analyses for Eli and Charlie, which were conducted in a campus-based laboratory. The classroom was fully equipped with academic task materials, leisure activities, and exercise equipment. Approximately six students and four teachers were present in the classrooms. The laboratory consisted of a room (2.5 m square) with a table, two chairs, and a one-way mirror.

Sessions in both settings were conducted at the table.

Tasks and Materials

Leisure materials used during the functional analyses included cars, trucks, computer games, and musical instruments. Tasks were suggested by the teachers because they were listed for completion in each participant's individualized education plan but seemed to pose problems in class. Eli's tasks during both the functional analysis and the EO analysis consisted of math problems that he did not independently complete with 80% or better accuracy. These included single-digit addition problems that summed to less than 20. The novel tasks used in follow-up sessions with Eli consisted of worksheets with number sequences that required him to fill in the missing numbers (e.g., 5, —, —, 20). During the 1-year follow-up probes, two-digit addition problems that summed to less than 30 were used. Charlie's and Ben's tasks were those that they were able to complete independently with 80% or better accuracy and included sorting tasks, reading books, labeling pictures, a time-telling task, and addition and spelling worksheets.

During Eli's EO analysis, he was given a set of checkers that served as a visual representation of the numbers he was adding. During 1-month follow-up sessions with novel number-sequencing tasks, he used a number line; during the 1-year follow-up probes, he used a calculator. During the EO analysis, Charlie's "choice board" was a piece of paper with the list of assigned tasks printed on it. In Charlie's 1-year follow-up probes, the choice board was a Velcro® board with printed names of assigned tasks. During Ben's EO analysis, a written list of tasks to be completed was used in all task sessions.

Target Behavior

Destructive behavior was the primary dependent variable for all 3 participants. Eli's destructive behavior was *shirt biting,* defined as placing part of his shirt between his top and bottom teeth and closing his teeth on his shirt. Charlie's destructive behavior was *chin pressing,* which was defined as pushing or pressing his chin against his arm or against any part of another person's body. Ben's destructive behavior was *aggression,* consisting of hitting and pinching. The second dependent variable measured for all participants was *compliance with task demands,* which was defined as writing, counting, or otherwise visibly working towards completion of a task. In addition, data were collected on Charlie's choice-making responses, defined as reaching toward, pointing to, or verbally naming one of the tasks. Also, for Eli, data on accurate problem completion were recorded to document his task performance. These additional data are not presented graphically and are available from the first author upon request.

Independent Variables

Procedural fidelity data were collected for all primary independent variables. Results indicated that all procedures were conducted with acceptable fidelity. Specific data are available from the first author upon request.

Data Collection and Interobserver Agreement

Experimental sessions were 10 min for Eli and Charlie and 15 min for Ben. Occasionally, EO analysis sessions for Charlie lasted just over 9 min or just under 11 min. No sessions were shorter than 9 min or longer than 11 min, and examination of the raw data indicated that these variations occurred irrespective of experimental condition. In all cases, data were collected and calculated for the entire session. Data on destructive behavior were collected on a 10-s count-within-interval system. Eli's data were expressed as percentage of 10-s intervals, and data for Charlie and Ben were expressed as number of responses per minute. For each session

with Eli, the number of problems completed accurately was divided by 10 (the session duration in minutes) to indicate the number of responses per minute of accurate problem completion (data are available from the first author upon request). Data on all other dependent and independent variables were recorded with a 10-s partial-interval recording procedure.

A second independent observer recorded data for purposes of determining interobserver agreement. Agreement data were collected during at least 44% of the sessions for each participant and were calculated separately for each dependent and independent variable. Agreement was defined as an interval in which both observers recorded the occurrence or nonoccurrence of an event. The number of intervals with agreement was divided by the number of intervals with agreement plus the number of intervals with disagreement, then multiplied by 100%. The overall mean interobserver agreement across dependent and independent variables and participants was 98% (range, 87% to 100%).

Design

A multielement design was used to compare the effects of free play, contingent attention, contingent escape, and contingent access to toys on destructive behavior during a functional analysis with Eli. A brief multielement design was used with Charlie and Ben to identify the reinforcer for destructive behavior. During the EO analyses, multielement designs were used to evaluate the effects of the presence and absence of specified properties of the tasks for each individual participant.

Procedure

A four-step procedure was used (a) to identify the behavioral function of the participants' destructive behavior; (b) to collect descriptive information and generate hypotheses regarding the EOs for their behavior and relevant instructional methods; (c) to evaluate the effects of the presence versus absence of specified methods of instruction on their destructive behavior and compliance; and (d) to assess their performance in follow-up sessions. Tasks, methods of instruction, and duration of reinforcement were individually selected based on ongoing instructional practices reported and observed for each participant. Thus, minor procedural variations occurred across participants.

Functional analysis. Experimental analyses were conducted with each participant using procedures similar to those described by Iwata, Dorsey, Slifer, Bauman, and Richman (1982/1994) and Northup et al. (1994) to identify the maintaining contingencies for destructive behavior. Four analogue conditions were conducted with Eli: free play (control), escape, attention, and tangible. Sessions were presented in a random sequence in a multielement design, and at least four sessions of each condition were conducted. For Charlie and Ben, three conditions were alternated: free play, escape, and attention. During the free-play condition, all participants had unlimited access to leisure materials and teacher attention, and they were not required to perform any academic tasks. During the escape condition, academic responses were required, and contingent on every destructive response, the response requirements were terminated for 20 s (60 s for Ben). A general praise statement was provided for compliance. During the attention condition, the participants had access to leisure materials, but access to teacher attention was restricted. Teacher attention was presented for 20 s (60 s for Ben) contingent on each occurrence of destructive behavior. During the tangible condition, the participants had unlimited access to teacher attention but limited access to tangible items. Access to tangible items was restricted and only

allowed for 20 s (60 s for Ben) contingent on each occurrence of destructive behavior.

The results for all 3 participants indicated that destructive behavior was maintained by negative reinforcement in the form of escape from task demands.

Descriptive assessment and hypothesis generation. Following the functional analyses, informal direct observations were conducted during daily academic tasks in the participants' classrooms, and narrative descriptions of antecedent-behavior-consequence sequences were recorded. In addition, an informal interview was conducted with the teachers and parents of the participants to identify specific types of demand situations in which destructive behavior did and did not typically occur. The information collected in the narrative observations and interviews was used to develop hypotheses about the EOs for destructive behavior and methods of instruction that could be changed to decrease the likelihood of escape-maintained destructive behavior.

The results of the interview and direct observation of Eli suggested that destructive behavior occurred most frequently when he was required to complete a novel or difficult task (defined as one that he could not complete independently with 80% or better accuracy). Based on this information, an instructional strategy was identified to aid Eli to complete math problems accurately.

The results of the interview and direct observation of Charlie suggested that destructive behavior occurred least often when he was given a choice regarding the sequence of his activities. Based on this information, we hypothesized that giving him control over the sequence of tasks might lead to decreases in destructive behavior.

The results of the interview and direct observation of Ben suggested that aggression was more likely to occur when Ben was asked to complete the same task, or set of academic tasks, repeatedly. The practice of re-presenting tasks was typical in Ben's classroom, where students who failed to complete a worksheet with 100% accuracy were required to complete it again until they mastered it with 100% accuracy. Ben typically performed tasks with ≥90% accuracy, but was frequently required to repeat a worksheet on which he completed one or two items incorrectly. Based on this information, we hypothesized that providing task demands that were not identical to those Ben had already completed would lead to decreases in aggression.

EO analysis. The antecedents and consequences arranged for each participant's behavior are depicted in Table 1. The same tasks that were used in the functional analysis were used in the EO analysis. Throughout all sessions for all 3 participants, each occurrence of destructive behavior produced 20 s (60 s for Ben) of escape from task demands. Task compliance resulted in a general praise statement on a variable-ratio (VR) 5 (VR 15 for Ben) schedule. This schedule was selected because it was similar to the schedule observed during the descriptive assessment phase.

For Eli, the EO analysis consisted of a comparison of the effects of the presence versus the absence of an instructional strategy on destructive and compliant behavior. In both conditions, each occurrence of Eli's destructive behavior produced 20-s escape from task demands.

During instructional strategy sessions, a pile of checkers was available on the table for Eli to use in completing his math tasks. The instructor gave him math worksheets of addition problems and said, "Do your work." A three-step prompt hierarchy was used, with 10 s between prompts. If after 10 s Eli did not begin the task, the instructor used a verbal prompt combined with a gestural prompt (e.g., "6 plus 5 equals what?" and pointed to the worksheet). If after 10 s Eli did not begin the task, the instructor ges-

Table 1

Participant	Hypothesized EO	Method of Instruction	EO Analysis Condition	Antecedents	Behavior	Consequence
Eli	Difficult tasks	Instructional strategy	Instructional strategy	"Do your work," worksheets, strategy (manipulatives, number line, or calculator)	Destructive behavior	FR 1 escape
					Compliance	VR 5 praise
			No instructional strategy	"Do your work," worksheets	Destructive behavior	FR 1 escape
					Compliance	VR 5 praise
Charlie	Adult-determined task sequences	Choice of sequence of tasks	Choice of task sequence	"Do your work," worksheets choice board	Destructive behavior	FR 1 escape
					Compliance	VR 5 praise
			No choice of task sequence	"Do your work," worksheets	Destructive behavior	FR 1 escape
					Compliance	VR 5 praise
Ben	Repetition of tasks	Nonrepeated tasks	Nonrepeated tasks	"Do your work," nonrepeated worksheets	Destructive behavior	FR 1 escape
					Compliance	VR 15 praise
			Repeated tasks	"Do your work," worksheets completed earlier in work session	Destructive behavior	FR 1 escape
					Compliance	VR 15 praise

tured to the checkers. If Eli still did not begin the task, physical assistance was provided to complete the addition problem using the checkers (e.g., the instructor counted out 6 checkers, then 5 checkers, then added them up to 11). The same procedure was used with the number line and calculator during follow-up probes.

During the no-instructional-strategy sessions, the procedures were identical to the instructional strategy condition, except that no checkers were available. If Eli did not respond after the instructor provided the verbal prompt combined with the gestural prompt, the instructor used a physical prompt, in the form of hand-over-hand assistance, to complete the problem.

For Charlie, the EO analysis consisted of a comparison of the effects of the presence versus absence of choice of sequence of tasks on destructive and compliant behavior. In both conditions, the same pool of 10 tasks (including math, spelling, reading, time-telling, money skills, and writing worksheets, sequencing and sorting tasks, and labeling body parts and emotions) was used, and no session was terminated until Charlie completed all 10 tasks. In both conditions, each occurrence of destructive behavior produced 20-s escape from task demands.

During sequence choice sessions, the instructor presented Charlie with a board containing a list of his tasks. The instructor told him that he had to do all of his work, but he could choose the order in which to do it. The instructor first read through the list with Charlie, then told him to choose an activity. If he pointed to a task on the list or said the name of a task within 10 s, he was directed to complete the task. If he did not choose a task within 10 s, the teacher held up two activities and told him to choose one. After Charlie chose a task, the instructor said, "Do your work." A three-step prompt hierarchy was used, with 10 s between prompts. When Charlie completed a task, the instructor placed the materials out of sight, said, "All done with that task," and directed him to cross it off the list. The instructor repeated these steps until all 10 tasks were complete.

The procedures used in the no-sequence-choice condition were identical to those used in the choice conditions except that no choice board was present and no choices of task sequence were offered. Instead, the teacher randomly selected tasks from the same pool of 10 tasks and presented them to Charlie one after the other without offering any choice. The session ended after all 10 tasks were complete.

Ben's EO analysis consisted of a comparison of the presence versus absence of repeated tasks on destructive and compliant behavior. In all sessions, Ben was required to complete a set of 15 worksheets (including spelling, reading comprehension, addition, writing, and time-telling tasks). In both conditions, the consequence for each instance of aggression was 60-s escape from task demands.

During no-repeated-tasks sessions, Ben was not required to repeat any worksheets that he had previously completed during the 90-min independent work period. During all sessions, a list of tasks to be completed was written on the blackboard. Ben's instructor said, "Do your work," and directed Ben to complete the list of tasks. If Ben did not begin to work within 10 s, the instructor used a three-step prompt hierarchy to direct him to complete the tasks.

The procedures for the repeated tasks condition were identical to those used in the no-repeated-tasks condition, except that the list of tasks that Ben was required to complete was identical to those he had completed in the previous work period.

Follow-up. Follow-up sessions were conducted to evaluate the effects over time and under different conditions. Procedures were identical to those used in the condition with the lower occurrence of destructive behavior during the EO analysis, with one and two probes of the comparison condition for Eli and Charlie, respectively. Probes with novel people, who consisted of different classroom instructors, were conducted with all 3 participants. For Eli and Charlie, probes were conducted in a novel setting (a different classroom), and for Eli, novel materials (a number line) and a different math task (number sequencing) were also evaluated.

RESULTS

Eli's functional analysis data are displayed in the top panel of Figure 1. Destructive behavior occurred almost exclusively during escape sessions, suggesting that it was maintained by negative reinforcement in the form of escape from academic tasks. The results of the EO analysis and follow-up for destructive behavior are shown in the middle panel of Figure 1. Virtually no negatively reinforced destructive behavior occurred when the instructional strategy was present, but ranged from 20% to 40% of the intervals when it was absent. During follow-up sessions (beginning with Session 5), the effects of the instructional strategy were examined in a novel setting, with a novel person, and

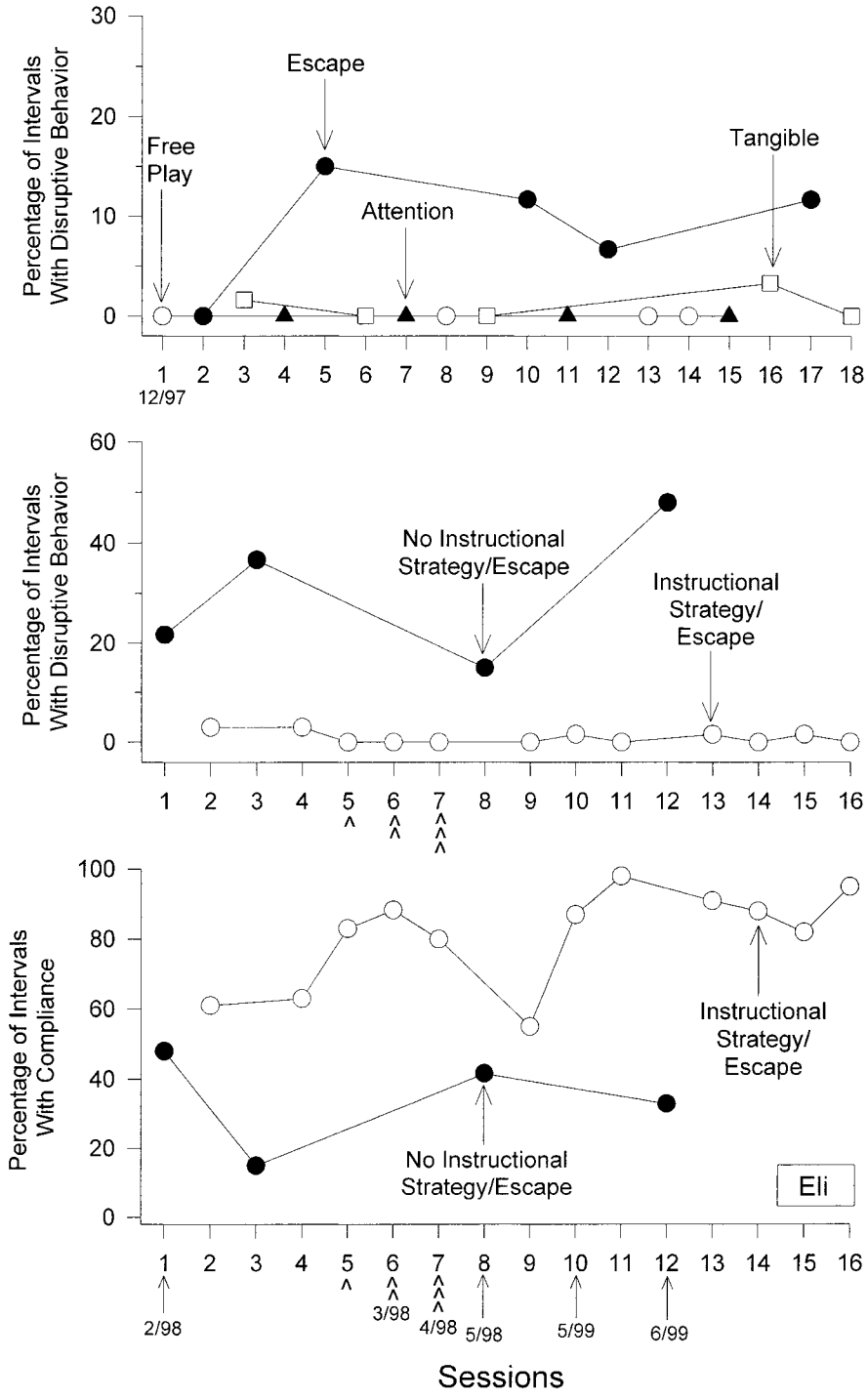

Figure 1. Percentage of intervals with shirt biting for Eli in the functional analysis (top panel) and EO analysis and follow-up (middle panel). Percentage of intervals with compliance is depicted in the bottom panel. Follow-up sessions begin in Session 5. The single carat indicates probe in novel setting, the double carat indicates probe with novel instructor, and the triple carat indicates probe with novel materials.

with novel tasks 1 month and 1 year after the initial sessions of the EO analysis. When an instructional strategy was available, destructive behavior did not occur in seven of the ten sessions and occurred in less than 7% of the intervals in each of the remaining three sessions. However, when the instructional strategy was unavailable in Sessions 8 and 12, destructive behavior increased to levels similar to those exhibited in the functional analysis and EO analysis when an instructional strategy was not available.

The data for Eli's compliance (bottom panel) show similar results; he demonstrated greater compliance when the instructional strategy was available (M = 81%) than when it was not (M = 34%). Finally, data on accuracy and rate of accurate problem completion indicated that without the instructional strategy, Eli consistently completed the tasks with less than 70% accuracy with an average of 0.125 problems per minute. By contrast, with the instructional strategy, he consistently completed the same tasks with greater than 80% accuracy with an average of 2.75 problems per minute.

The results of Charlie's analyses are displayed in Figure 2. The results of the brief functional analysis (top panel) suggested that his destructive behavior was maintained by negative reinforcement in the form of escape from academic tasks. Destructive behavior occurred at least 0.4 times per minute in the escape sessions, whereas it occurred fewer than 0.2 times per minute in all other sessions. The first three sessions of the EO analysis (middle panel) are the escape data taken from the brief functional analysis. During the EO analysis negatively reinforced destructive behavior ranged from 0.1 to 0.7 times per minute (M = 0.2) when Charlie was permitted to choose the task sequence but ranged from 0.4 to 1.0 times per minute (M = 0.6) when he was not permitted to sequence his tasks. In the follow-up sessions (beginning with Session 7), the effects of choice of task sequence were examined in a novel setting and with a novel person 1 month and then intermittently 1 year after the initial EO analysis. In all but two of the follow-up sessions, destructive behavior occurred fewer than 0.25 times per minute. During one session (Session 9), Charlie went home with a fever following the session. Later that day, he was diagnosed with otitis media in both ears. We cannot know, however, whether the elevation in destructive behavior was functionally related to his illness. Finally, between Sessions 13 and 14, Charlie's classroom teacher implemented differential reinforcement of other behavior (DRO) that involved the delivery of tokens contingent on approximately every 30 s of omission of destructive behavior. After Charlie earned five tokens, he was allowed to take a 60-s break. Probes of Charlie's destructive behavior (beginning with Session 16) show that he did not engage in any destructive behavior, despite removing the choice of sequences and the DRO. Similarly, the data on Charlie's compliance (bottom panel) show that there was little difference in compliance when he was given a choice of task sequence (M = 83%) than when he was not (M = 78%).

The data from Ben's analysis are displayed in Figure 3. In the brief functional analysis (top panel), aggression occurred only during the escape condition, suggesting that it was maintained by negative reinforcement in the form of escape from academic tasks. The first three sessions of the EO analysis (middle panel) are the escape data taken from the brief functional analysis. In the EO analysis, virtually no negatively reinforced destructive behavior occurred when tasks were not repeated. However, destructive behavior consistently occurred at a rate of 0.10 per minute when tasks were repeated. Furthermore, during eight of the ten follow-up sessions (begin-

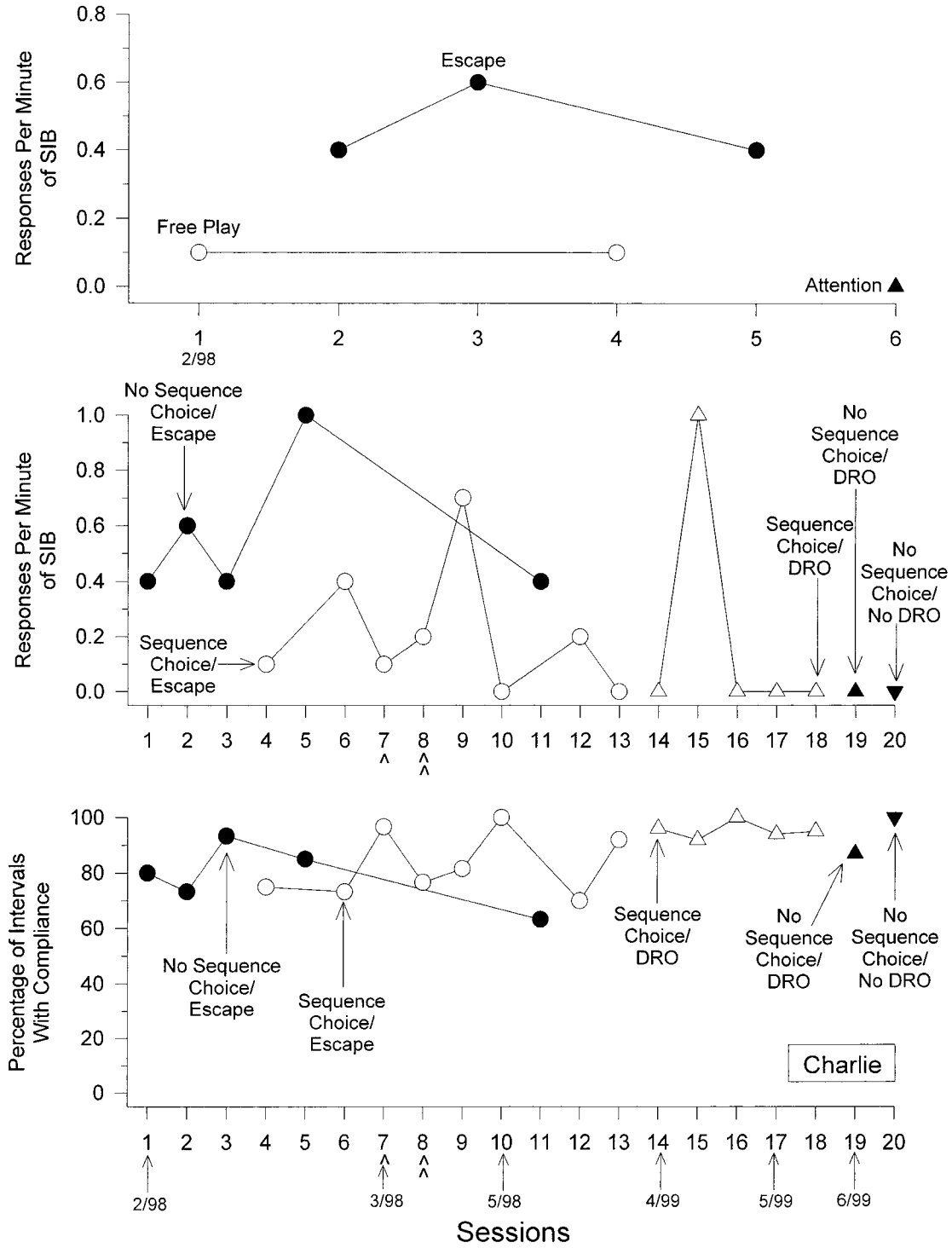

Figure 2. Number of responses per minute of Charlie's self-injury in the functional analysis (top panel), the EO analysis and follow-up (middle panel), and percentage of intervals with compliance (bottom panel). Follow-up sessions begin in Session 7. The single carat indicates probe in novel setting, and the double carat indicates probe with novel instructor.

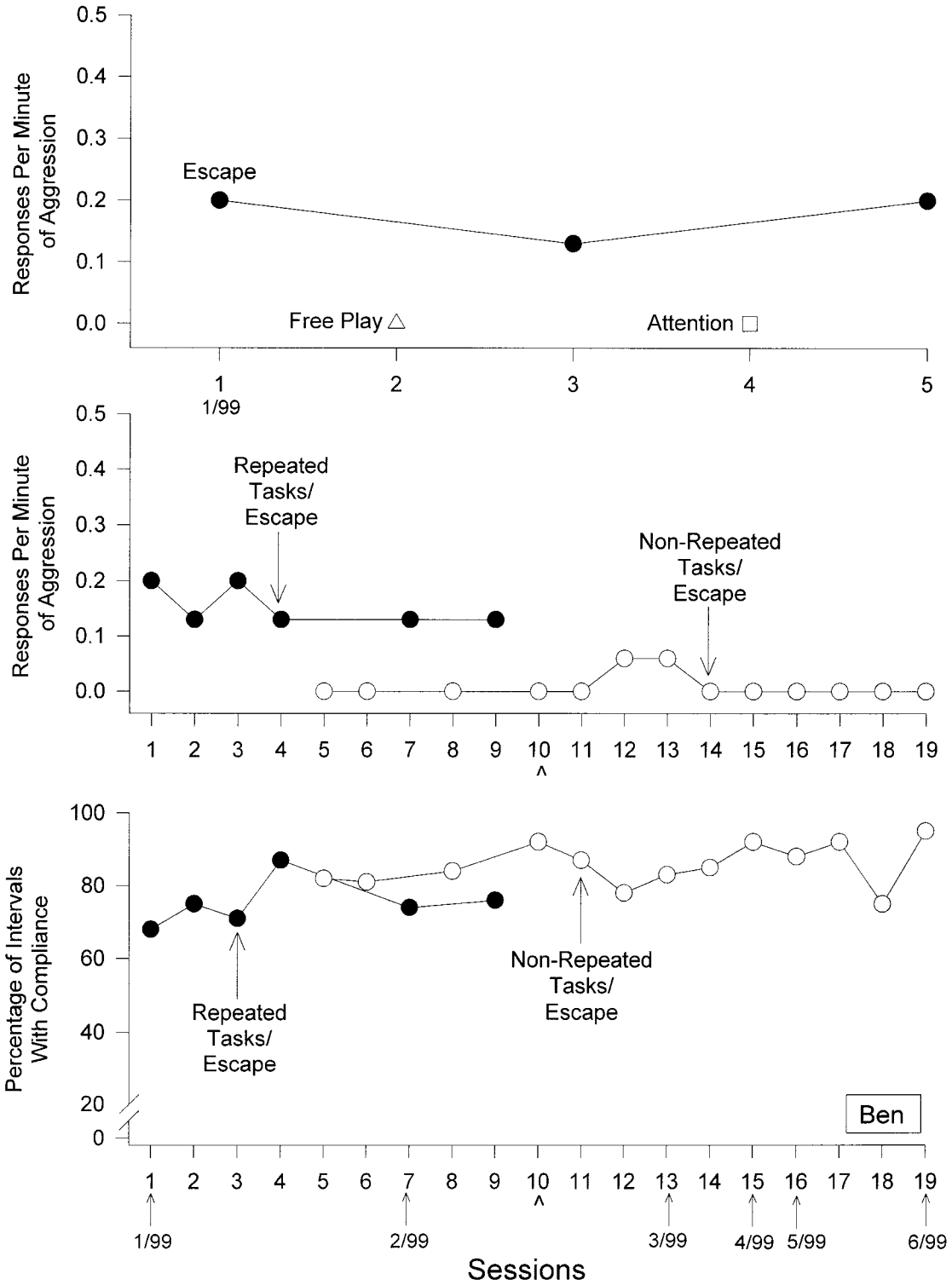

Figure 3. Number of responses per minute of Ben's aggression in the functional analysis (top panel), EO analysis and follow-up (middle panel), and percentage of intervals with compliance (bottom panel). Follow-up sessions begin in Session 10. The single carat indicates probe with novel instructor.

ning in Session 10), no destructive behavior occurred. Finally, Ben's task compliance (bottom panel) was slightly higher when tasks were not repeated (M = 86%) than when they were repeated (M = 75%).

DISCUSSION

The results of this investigation demonstrate that the effects of idiosyncratic features of academic task demands can be experimentally isolated from the effects of consequences of responding. Further, alterations in instructional methods decreased the occurrence of destructive behavior maintained by negative reinforcement without decreasing the instructional level of task demands, eliminating task demands, or disrupting the consequences for destructive behavior. This study extends the work of Smith et al. (1995) by demonstrating the effects of specific antecedents or methods of instruction on self-injury, disruption, and aggression maintained by negative reinforcement.

Our interpretation of these results involves establishing operations (Keller & Schoenfeld, 1950; Michael, 1982). One distinguishing characteristic of the effect of establishing operations is that nonresponding in the absence of aversive stimulation is due to a lack of motivation to respond and escape the stimulation (Michael, 1993). These effects are distinct from those of discriminative control, in which nonresponding is due to extinction. Extinction was not arranged in either condition of the present investigation, yet the occurrence of destructive behavior was functionally related to the presence or absence of the specified method of instruction. If the contingency between behavior and its maintaining consequences is intact and behavior is altered by the presence or absence of antecedent variables, then the antecedent variables may be classified as EOs (Smith & Iwata, 1997). Thus, because negative reinforcement was always available for destructive behavior but not for compliance, the most parsimonious explanation is that the results of the present investigation represent a preliminary analysis of the effects of EO manipulations.

Although the overall findings are consistent with an interpretation that EO manipulations influenced the occurrence of negatively reinforced behavior, the specific reasons for the changes in destructive behavior across students remain idiosyncratic and complex. Stimuli can function as establishing operations when they alter the probability of behavior that has been previously negatively reinforced through the contingent termination of such stimulation (Michael, 1993). For each participant, different properties of the complex stimulus array involved in academic task demands functioned as EOs for negatively reinforced destructive behavior. Specific to these findings, it is plausible that difficult tasks, adult-determined task sequences, and repetition of tasks established escape as a reinforcer for Eli's, Charlie's, and Ben's destructive behavior, respectively, and that for each, a specific method of instruction diminished those effects.

Eli's analysis demonstrated the effects of an instructional strategy on destructive behavior. Specifically, Eli's data indicate that, in some cases, instructional strategies can produce not only improvements in academic performance but also reductions in destructive behavior in the classroom. The results suggest that the instructional strategy facilitated successful completion of problems, diminishing the effects of negative reinforcement and therefore decreasing the occurrence of Eli's negatively reinforced destructive behavior. Previous research has demonstrated the effects of instructional strategies on accurate academic performance (Daly, Martens, Hamler, Dool, & Eckert, 1999; Jolivette, Wehby, & Hirsch, 1999; McComas, Wacker, & Cooper, 1996; McComas, Wacker, Cooper, Asmus, et al.,

1996) but has neither systematically examined the effects of instructional strategies on negatively reinforced destructive behavior nor demonstrated that difficult tasks can establish escape as a reinforcer (i.e., functions as an EO) for destructive behavior.

Charlie's analysis demonstrated the effects of choice of task sequence on destructive behavior. These results extended previous research on choice making as an antecedent procedure for decreasing destructive behavior (Daly et al., 1997; Dunlap et al., 1994; Vaughn & Horner, 1997) by eliminating the issue of preference from the analysis, thus isolating the effects of choice. Specifically, this was done by allowing a choice of sequence of tasks in one condition but requiring completion of the same tasks in both conditions. Because the consequences for destructive behavior and the assigned tasks were constant across conditions, changes in the occurrence of destructive behavior can be attributed to choice of task sequence. The data suggest that when Charlie was permitted to choose the sequence of his tasks, destructive behavior was less likely to occur. Thus, it is plausible that adult-determined task sequences can establish escape as a reinforcer (i.e., functions as an EO) for destructive behavior.

The results of Ben's analysis suggest that destructive behavior was related to repeated presentation of the same task demand. Specifically, the presentation of an identical worksheet for the second time during a 90-min work period was consistently related to destructive behavior. These data represent a promising alteration in instructional methods for preventing Ben's destructive behavior. Further, Ben's data demonstrate that repetition of tasks established escape as a reinforcer (i.e., served as an EO) for destructive behavior.

There are a number of limitations to this investigation that warrant consideration. First, the procedures in this investigation failed to completely isolate related antecedent variables (e.g., the availability of a choice and presence of the choice board). Future researchers may want to isolate and manipulate the presence and absence of each of these variables while keeping the consequences constant across conditions, to determine their individual influence on responding. Second, we were able to identify antecedent variables that, when present, reliably led to the nonoccurrence (i.e., prevention) of destructive behavior for only 2 of the 3 participants. The remaining participant (Charlie) continued to engage in low rates of destructive behavior during the initial EO analysis. The occurrence of destructive behavior during those sessions suggests that complex or multiple EOs that were not identified in this investigation were in place for negatively reinforced destructive behavior during academic tasks. In addition, an overall decrease was observed in Charlie's self-injury data with and without the DRO procedure during the final months of data collection; thus, caution is warranted in interpreting Charlie's follow-up data. Finally, the overall results should be viewed cautiously due to limited number of sessions conducted in some conditions, perhaps most notably in the functional analysis. It is plausible that if more sessions had been conducted in the functional analyses, other functions would have appeared. This seems unlikely because, for Charlie and Ben, there was no overlap in the escape data series with the other data series, and because there was only one overlapping data point in the series of escape sessions for Eli. Moreover, the maintenance of treatment effects seen during follow-up sessions for up to 1 year supports the robustness of the treatment and provides indirect confirmation of the assessment methods.

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STUDY QUESTIONS

1. What aspect of Ben's preassessment treatment plan may have served to increase the probability of his aggression? How did the authors verify this hypothesis?

2. Summarize the results of the functional and descriptive analyses for the 3 participants.

3. What were the dependent and independent variables in the establishing operation (EO) analysis?

4. Briefly summarize the results of the EO analysis.

5. Based on the manipulations of antecedent and consequent variables during each participant's EO analysis, what general model for assessing the influence of antecedent events on behavior is illustrated?

6. How did the authors insure that differences in responding during Charlie's analysis could be attributed to the opportunity to choose independent of access to more highly preferred instructions?

7. What features of the analysis lend support to the authors' classification of the antecedent events in this study as EOs?

8. What do Charlie's data suggest about treatment integrity with interventions based exclusively on the alteration of antecedent events? How might the effects of such interventions be enhanced?

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