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MOMENTUM AND EXTINCTION EFFECTS ON SELF-INJURIOUS ESCAPE BEHAVIOR AND NONCOMPLIANCE

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Previous research on applications of behavioral momentum has indicated that a high-probability (high-*p*) instructional sequence, in which a series of instructions for which there is a high probability of compliance is presented immediately before an instruction for which there is a low probability of compliance, is an effective method for increasing compliance. It is not clear, however, whether the procedure is effective when individuals actively attempt to escape from the instructional situation. In this study, we examined the effects of the high-*p* sequence, when implemented first alone and then later with an extinction component, as treatment for the self-injurious escape behavior of 2 individuals. Results showed that when the instructional sequence was implemented without extinction, rates of self-injury increased and percentage of compliance decreased. In addition, the percentage of trials occasioning escape behavior increased for both high- and low-probability instructions. When an extinction component was added to the high-*p* sequence, rates of self-injury and the percentage of trials containing self-injury decreased, and compliance increased. These findings suggest that extinction may be an important component of treatment when escape behavior such as self-injury accompanies noncompliance in instructional contexts and competes with compliant behavior.

DESCRIPTORS: behavioral momentum, escape behavior, extinction, functional analysis, negative reinforcement, noncompliance, self-injurious behavior

Negative reinforcement, often in the form of escape from ongoing task-related situations, accounts for a significant proportion of behavior disorders (e.g., aggression, disruption, and self-injury) exhibited by individuals with developmental disabilities (Iwata, 1987). One approach to treatment for such behavior involves eliminating the source of reinforcement. For example, extinction procedures, in which escape is no longer reinforced through task termination, have been found to be effective in a number of studies (Iwata, Pace, Cowdery, Kalsher, & Cataldo, 1990; Repp, Felce, & Barton, 1988; Steege, Wacker, Berg, Cigrand, & Cooper, 1989). Related interventions include altering some feature of the task situation to reduce its aversive characteristics (Pace, Ivancic, & Jefferson, 1994; Weeks & Gaylord-Ross, 1981; Zarcone, Iwata, Smith, Mazaleski, & Lerman, 1994) or strengthening alternative escape behaviors through negative reinforcement (Carr & Durand, 1985; Steege et al., 1990). All of these approaches are based on direct modification of the behavior's maintaining contingency or its establishing operation (Michael, 1982, 1993).

An alternative strategy involves indirect reduction of escape behavior through positive reinforcement. Although results from several studies (e.g., Carr & Durand, 1985; Iwata et al., 1990; Repp et al., 1988) suggest that positive reinforcement typically delivered for compliance with instructional tasks may not compete successfully with negative reinforcement for escape behavior, procedures that involve increasing either the magnitude or density of positive reinforcement for compliance may ef-

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fectively override the effects of an ongoing escape contingency. That is, enhanced positive reinforcement for compliance might reduce the frequency of escape behavior even though the latter response continues to be negatively reinforced.

A series of recent studies has reported an interesting method for increasing compliance that might be used as a treatment for competing escape behavior. Derived from basic research on behavioral momentum (Nevin, 1974; Nevin, Mandell, & Atak, 1983), which showed that responding maintained by a relatively higher rate of reinforcement showed greater resistance to change than responding maintained by less frequent reinforcement, Mace et al. (1988) first described the high-probability (high-*p*) instructional sequence to establish a momentum of compliant behavior. The procedure involved presenting three instructions with which subjects typically complied (high-*p* instructions) immediately preceding an instruction with which the subjects were not likely to comply (low-*p* instructions). This high-*p* sequence resulted in an increase in compliance with the low-*p* instructions and was attributed to the process of behavioral momentum, in which the increased probability of compliance established with the high-*p* instructions was maintained when the low-*p* instruction was presented.

Results of the Mace et al. (1988) experiment have been replicated in several subsequent studies focusing on a variety of performances, such as sorting silverware (Mace et al., 1990), taking medication (Harchik & Putzier, 1990), and following instructions (Davis, Brady, Williams, & Hamilton, 1992). Although responding was successfully strengthened in each of these studies, it is important to note that there was an absence of competing escape behavior. Thus, the extent to which the high-*p* sequence or other momentum-related interventions based on positive reinforcement would effectively decrease responding maintained by negative reinforcement was not demonstrated.

In a study most relevant to the present one, Mace and Belfiore (1990) extended the application of behavioral momentum to the treatment of escape behavior. The subject was an individual with developmental disabilities who exhibited a variety of responses, such as light-switch flipping, paper pushing, and kicking, that occurred most often during training sessions (indicating that the behaviors were maintained by escape from instructions). When the high-*p* sequence described above was implemented, the subject's escape behavior decreased and his compliance with low-*p* instructions increased. Concurrent with the implementation of treatment, an extinction procedure was introduced in which escape behavior no longer produced termination of instructional trials (as it had during baseline). Thus, it is possible that the observed reductions in escape responding could be attributed to the high-*p* sequence, extinction, or both components of the intervention. Zarcone, Iwata, Hughes, and Vollmer (1993) subsequently examined the separate effects of the high-*p* sequence and extinction to ascertain whether increasing reinforcement for compliance alone would be effective in reducing self-injurious escape behavior. Results showed little behavior change when the high-*p* sequence was implemented alone, but reductions in self-injurious behavior (SIB) and increases in compliance were observed when extinction was implemented either alone or in combination with the high-*p* sequence. Thus, although the high-*p* instructional sequence has been shown to be highly effective in establishing compliance when noncompliance is the only behavior of interest, effects of the sequence on competing escape behavior are less clear.

In this study, we examined more fully the effects of the high-*p* instructional sequence on escape-maintained SIB and compliance. The Zarcone et al. (1993) study included only 1 subject, used latency to SIB as the primary dependent variable (which may not have provided a very sensitive measure of changes in the frequency of SIB), and did not present session-by-session data on compliance. In the present study, a more complete analysis is provided by including data on the rate of SIB for 2 subjects and continuous supplementary measures (percentage of trials during which SIB occurred and percentage of compliance with both high-*p* and low-*p* instructions). Following a functional analysis assessment in which it was determined that subjects' SIB was maintained by negative reinforcement (escape from instructional tasks), the effects of the high-*p* sequence on SIB were evaluated when implemented either alone or in conjunction with extinction.

METHOD

Subjects and Setting

Two men residing in a state facility for persons with developmental disabilities participated. Both were diagnosed with profound mental retardation. Chris was a 38-year-old male whose SIB consisted of head banging against hard surfaces and hand biting. He wore a helmet throughout the day due to poor balance resulting from seizures, which placed him at risk for falling. The staff on Chris's residence noted that his SIB was most severe when he was required to ambulate, and that it interfered with daily training and leisure activities. Chris did not have any sensory impairments and could follow many simple instructions. His expressive language consisted of a single word ("no"), which he would sometimes utter when staff attempted to give him instructions. Lenny was a 45-year-old male whose SIB consisted of finger biting and face slapping. Lenny also wore a protective seizure helmet. In addition to SIB, he exhibited other behavior problems such as screaming and disruption. As a result of these behavior problems, his daily training activities had been significantly reduced, and he had been removed from participation at the facility workshop. Lenny did not have any sensory impairments. He had good receptive language skills, but was reported to follow very few instructions and did not have any expressive language. During the course of the study, both subjects received low doses of Dilantin® to control seizures.

The study was conducted on the grounds of the facility at a day program for the assessment and treatment of SIB. Three to five daily sessions were conducted with each subject, 4 to 5 days per week, in a therapy room either 6.8 by 12.5 m or 1.9 by 3.5 m. Sessions lasted for 15 min, separated by breaks lasting 10 to 15 min. Therapy rooms contained chairs and task materials. Neither subject wore his protective helmet during assessment and treatment. Because Chris often banged his head against the wall directly behind his chair, the area was padded to protect his head; Lenny did not bang his head and therefore did not need this form of protection. Sessions were terminated and all responses were blocked if the subject engaged in any response that produced an open injury (this rarely occurred). An experimenter, and an assistant when necessary, and one or two observers were present during all sessions.

Response Definitions, Measurement, and Interobserver Agreement

Self-injurious responses were defined as follows: *face/head hitting:* forceful contact of any part of the hand or arm with any part of the head, any part of the body, or any hard surface such as a wall or table; *head banging:* forceful contact of any part of the head with a hard surface; and *hand/finger biting:* closure of the teeth on any part of the skin from fingertips to wrist. Data were also collected on experimenters' presentation of (and subjects' compliance with) low-*p* and high-*p* instructions. An observer recorded subject and experimenter behavior on a hand-held computer (Assistant Model A 102) during continuous 10-s intervals. Session data were converted to responses per minute (SIB and instructions), percentage of trials with SIB, and percentage of compliance with low-*p* and high-*p* instructions.

Interobserver agreement was assessed by having a second observer simultaneously but independently collect data during 31.1% of all sessions. Agreement percentages were calculated based on interval-by-interval comparisons of observers' records, in which the smaller number of responses in each interval was divided by the larger number of responses. These fractions were summed across all intervals and divided by the total number of intervals in the session to yield the percentage agreement between the two observers. Mean agreement scores were 96.1% (range, 69.5% to 100%) for SIB and 97.3% (range, 78.8% to 100%) for com-

Table 1
High- and Low-Probability Instructions Used During Baseline and Treatment

Subject	High-probability instructions	Low-probability instructions
Chris	draw on paper	fold towel
	place piece in puzzle	take four steps
	touch knee	stand up for 5 s
Lenny	draw on paper	do three jumping jacks
	place piece in puzzle	walk over here
	put block in bucket	stand up for the count of 10

pliance. Instructions were presented correctly by the experimenters for both subjects 92.2% of the time.

Experimental Sequence and Designs

The first phase of the study consisted of a functional analysis assessment, in which subjects were exposed to a series of conditions presented in a multielement format (Sidman, 1960; Ulman & Sulzer-Azaroff, 1975). The purpose of this analysis was to identify the variable(s) maintaining their SIB. Following completion of the assessment, low-*p* and high-*p* instructions were identified for each subject. Baseline conditions were then implemented, followed by treatment conditions, whose effects were evaluated with a reversal design.

Assessment Conditions

Functional analysis of SIB. Chris and Lenny were exposed to four assessment conditions. A brief description of each condition is provided here; further details can be found in Iwata, Dorsey, Slifer, Bauman, and Richman (1982). During the attention condition, a variety of leisure materials were available to the subject. At the beginning of sessions, the experimenter entered the room, informed the subject, "I will be here if you need me," and then ignored the subject. Contingent on the occurrence of SIB, the experimenter approached the subject, provided attention in the form of concern and disapproval (e.g., "Stop that, you'll hurt yourself"), and briefly interrupted the SIB. During the demand condition, the experimenter presented learning trials on a fixed-time (FT) 30-s schedule using a three-prompt sequence. If the subject did not initiate compliance within 5 s, the experimenter repeated the instruction and modeled the correct response. If the subject did not initiate compliance within 5 s of the model, the experimenter again repeated the instruction while physically guiding the subject to complete the response. Praise was provided contingent on compliance to the initial request or the modeled prompt. If the subject exhibited SIB during any part of the sequence, the experimenter terminated the trial. During the alone condition, the subject was in the therapy room alone (except for the observer, who did not interact with the subject) without any leisure materials. The final condition, play, served as a control for the other three. Leisure materials were made available, and the experimenter provided attention (e.g., "You look nice today") to the subject every 30 s. Any SIB that occurred during the session was ignored by the experimenter.

Compliance assessment. A series of instructions was presented to each subject according to an FT 1-min schedule using the same three-prompt sequence described above. Subjects received 5 to 10 trials with each instruction, and trials were terminated if SIB occurred at any time. Based on the results of this assessment, a list of low-*p* and high-*p* instructions was developed for each subject. Low-*p* instructions were defined as those with which the subjects complied less than 50% of the time and were followed by SIB at least 25% of the time. High-*p* instructions were defined as those with which the subjects complied at least 80% of the time and were followed by SIB at most 10% of the time (both subjects exhibited SIB only once during one of the high-*p* instructions selected for use in the study). The instructions used for each subject are listed in Table 1.

Treatment Conditions

Baseline. This condition was identical to the demand condition during the functional analysis assessment except that the specific low-*p* instructions identified during the compliance assessment were presented according to an FT 1-min schedule (cf. Mace & Belfiore, 1990). As in the demand condition, praise was provided contingent on compliance, modeling and physical guidance were used if the subject did not comply, and SIB produced escape from the trial. Throughout baseline and treatment, physical guidance was provided in such a way that subjects were still able to engage in SIB (e.g., they were guided with just one hand to put the block in the bucket).

High-probability instructional sequence. According to an FT 1-min schedule, the experimenter delivered three high-*p* instructions in random order, followed by a randomly selected low-*p* instruction, at 15-s intervals. Thus, each 15-min session consisted of 45 high-*p* instructions and 15 low-*p* instructions. The same prompting sequence (instruction → model → physical guidance) was used during each trial, praise was delivered contingent on compliance, and escape from the task was provided contingent on SIB. This condition differed from that described by Mace and Belfiore (1990) in that escape behavior continued to be reinforced by terminating instructional trials.

*High-*p *instructional sequence plus extinction.* Sessions were identical to the previous condition, except that SIB no longer produced escape (termination of the trial). If the subject engaged in SIB at any time during the trial, the experimenter physically guided the subject through the task and continued the session according to schedule. This condition was similar to that described by Mace and Belfiore (1990) as the "high-probability request sequence" (p. 510), including both the high-*p* sequence and extinction of escape behavior (although it is possible that physical guidance by the experimenter, in addition to preventing escape, might also have served as punishment for SIB).

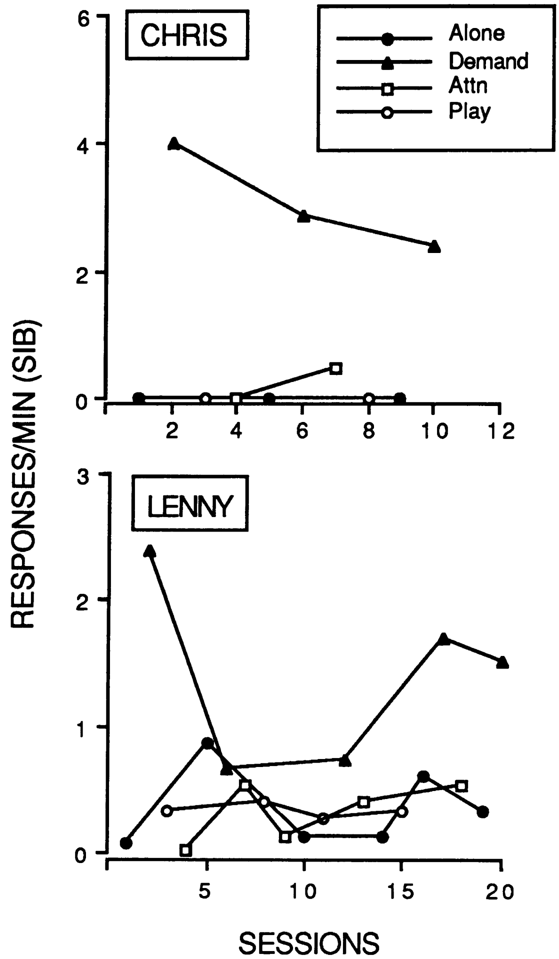

Figure 1. Responses per minute of SIB across assessment conditions.

RESULTS

Results of the functional analysis assessment for Chris and Lenny are shown in Figure 1. Both subjects exhibited the highest rates of SIB during the demand condition. Chris rarely engaged in SIB during any of the other assessment conditions, and Lenny's mean rate of SIB during the demand condition was 100% higher than that observed during any other condition. These results are consistent with assessment data from other research (e.g., Iwata et al., 1990) on SIB maintained by negative reinforcement, and verify that subjects were appropriate for inclusion in the subsequent analysis of momentum effects on escape behavior.

Figure 2 shows the effects of treatment for Chris. He exhibited SIB during 70% to 100% of the trials during baseline (upper panel). When the high-*p* sequence was implemented alone, SIB occurred during nearly 100% of the low-*p* trials and in-

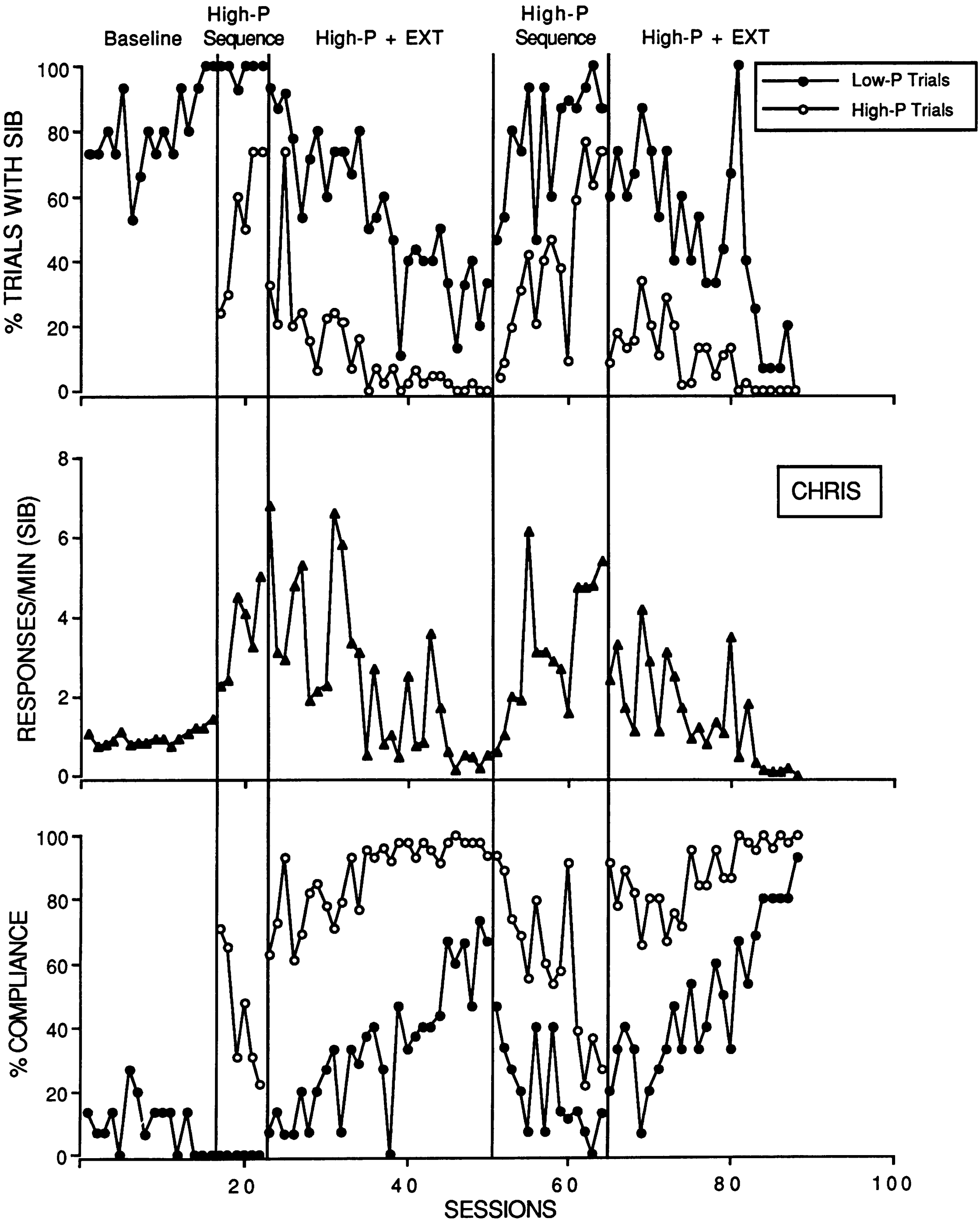

Figure 2. Percentage of trials with SIB, responses per minute of SIB, and percentage compliance during baseline and treatment for Chris.

creased during high-*p* trials throughout the condition. When extinction was added to the high-*p* sequence, SIB decreased during both low-*p* and high-*p* trials. By the end of this condition, SIB occurred during less than 20% of the low-*p* trials and almost none of the high-*p* trials. SIB increased again during both low-*p* and high-*p* trials when extinction was removed (escape was again available) and decreased again when extinction was reinstated during the final condition.

Chris's rate of SIB (middle panel) stabilized at about one response per minute during baseline, then increased sharply when treatment was initiated with the high-*p* sequence alone. This increase above baseline was a function of the increased rate of instructions (the high-*p* instructions, which occasioned a considerable amount of SIB). SIB decreased gradually when extinction was added to the instructional sequence, increased again when extinction was removed, and then gradually decreased to near-zero levels when extinction was reinstated.

Chris complied with very few low-*p* instructions during baseline (bottom panel); by the end of this condition, his percentage of compliance reached zero. When the high-*p* sequence was implemented without extinction, compliance with low-*p* instructions remained at zero. Compliance with high-*p* instructions, which was high during the initial assessment, was initially 75% during this condition but decreased steadily throughout the condition to approximately 20%. When extinction was added to the high-*p* sequence, compliance with high-*p* instructions was reestablished, and compliance with low-*p* instructions increased throughout the condition. Compliance with both high-*p* and low-*p* instructions decreased again when extinction was removed and increased again when extinction was reinstated during the final condition.

Figure 3 shows the results obtained for Lenny. His SIB during baseline varied widely between 20% and 80% of the instructional trials (upper panel). When the high-*p* sequence was implemented alone, Lenny continued to exhibit SIB during a high percentage of low-*p* trials (approximately 80%) and also during a considerable proportion of high-*p* trials (range, 8% to 58%). When extinction was added to the high-*p* sequence, SIB decreased during both low-*p* and high-*p* trials. During the final two conditions, when extinction was first removed and then reinstated, SIB increased and subsequently decreased during both low-*p* and high-*p* trials.

Lenny's rate of SIB (middle panel) showed results similar to those seen with the percentage of trials containing SIB. SIB increased above its baseline rate when the high-*p* sequence was implemented alone, gradually decreased to zero when extinction was added to the high-*p* sequence, increased again when extinction was removed, and then decreased gradually when extinction was reinstated during the final condition.

Lenny's compliance (bottom panel) showed somewhat different results than those seen for Chris. Lenny's compliance with low-*p* instructions was extremely low during baseline, occurring at 0% during all but two sessions. His compliance with low-*p* instructions remained low throughout the experiment until the final condition (high-*p* sequence plus extinction), when a small but noticeable increase in compliance was observed. Compliance with the high-*p* instructions was initially high when the high-*p* sequence was implemented alone but decreased throughout the condition. When extinction was added to the high-*p* sequence, compliance with high-*p* instructions increased and remained generally high during the final two conditions, when extinction was removed and then reinstated.

DISCUSSION

Previous research has shown that compliance with instructions can be increased by manipulating the sequence with which instructions are presented. One such manipulation, the high-*p* instructional sequence (Mace et al., 1988), accomplishes this outcome by establishing a "momentum" of compliance with instructions for which there is a high probability of compliance, resulting in a higher density of reinforcement. Thus established, momentum of compliance continues with instructions for which there previously was a low probability of compliance. In the present study, the high-*p*

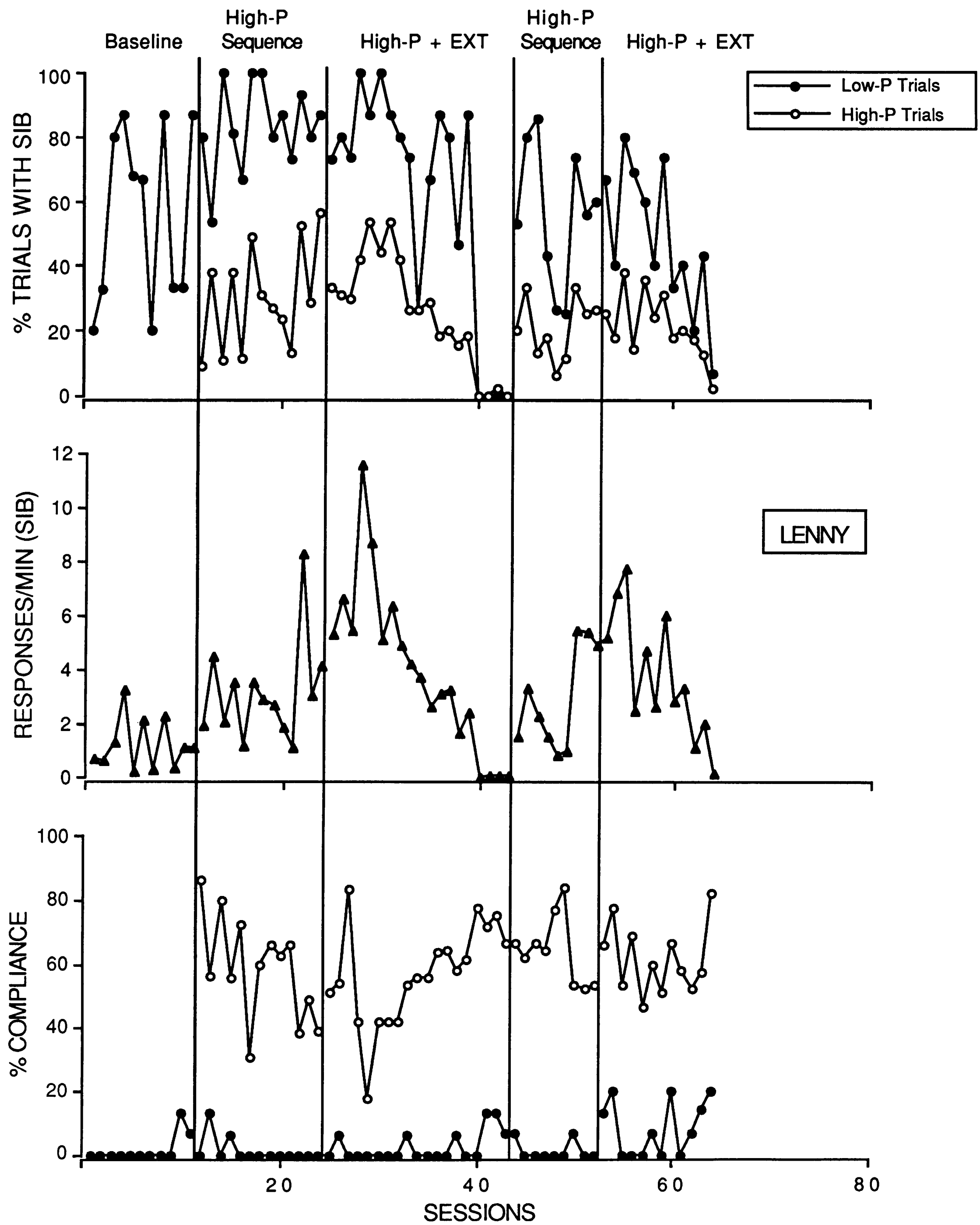

Figure 3. Percentage of trials with SIB, responses per minute of SIB, and percentage compliance during baseline and treatment for Lenny.

instructional sequence had no effect on either SIB or compliance with low-*p* instructions as long as SIB continued to be reinforced. Increases in compliance were seen only when the competing escape response (SIB in the present case) was extinguished. These results highlight an important distinction between compliance and escape with respect to the contingencies that maintain them.

Compliance with instructions may be increased in a number of ways and has been shown to be quite responsive to interventions that establish a momentum of compliance. However, when another response competes with compliance and is maintained by negative reinforcement in the form of escape, interventions based on the use of positive reinforcement alone may not be effective if the escape contingency remains in effect. This situation was illustrated in the present study. When the high-*p* instructional sequence was implemented with Chris and Lenny without extinction, SIB continued to produce escape and was maintained at or above its baseline level for both individuals. No change was seen in compliance with low-*p* instructions. In addition, the continued occurrence of SIB apparently disrupted compliance with high-*p* instructions, which originally occasioned a high rate of compliance during the initial task assessment. It is not entirely clear what accounted for the decrease in compliance with high-*p* instructions, although two possibilities are likely. First, when extinction was not in effect, the high-*p* instructions may have become discriminative stimuli for reinforced escape behavior. Second, it is possible that the high-*p* instructions acquired aversive properties due to repeated pairing with the low-*p* instructions.

When extinction was added to the high-*p* sequence, SIB decreased and eventually reached near-zero rates for both subjects. In addition, compliance with both high-*p* and low-*p* instructions increased (markedly for Chris and to a lesser extent for Lenny). Although reductions in escape behavior (SIB) can be directly attributed to extinction, the effects on compliance are not as clear and could be a function of (a) compliance becoming more sensitive to the high-*p* instructional sequence once escape behavior was extinguished or (b) compliance serving as an alternative escape response (i.e., when SIB was extinguished, learning trials and accompanying prompting procedures were terminated contingent upon compliance).

It is important to emphasize that the present results do not necessarily contradict those of previous research on establishing behavioral momentum as a means of increasing compliance. However, the present findings and those of both Mace and Belfiore (1990) and Zarcone et al. (1993) suggest that additional procedures may be necessary when noncompliance covaries with a competing behavior maintained by escape. All three studies included a specific component in which the competing escape response (stereotypy in the Mace & Belfiore study and SIB in the others) was no longer reinforced.

Although increasing the density of positive reinforcement for compliance via the high-*p* sequence may have limited effects on escape behavior, other treatment options might be explored in future research. For example, improving the "quality" of reinforcers (i.e., using more potent stimuli) or strengthening their motivational effects by limiting access to them before training sessions might enhance the effects of reinforcement for instruction-following behavior. Other possibilities include modification of task-related parameters such as rate of instructions, duration of instructional sessions, and response "effort" (assuming that effort could be quantified), all of which might decrease the occurrence of escape behavior independent of changes in reinforcement for either escape or compliance. The relationship between compliance and escape is a complex one, and further research on both response components will be needed to identify the necessary and sufficient strategies for producing therapeutic behavior change.

REFERENCES

Carr, E. G., & Durand, V. M. (1985). Reducing behavior problems through functional communication training. *Journal of Applied Behavior Analysis, 18,* 111–126.

Davis, C. A., Brady, M. P., Williams, R. E., & Hamilton, R. (1992). Effects of high-probability requests on the acquisition and generalization of responses to requests in young children with behavior disorders. *Journal of Applied Behavior Analysis, 25,* 905–916.

Harchik, A. E., & Putzier, V. S. (1990). The use of high-probability requests to increase compliance with instructions to take medication. *Journal of the Association for Persons with Severe Handicaps, 15,* 40–43.

Iwata, B. A. (1987). Negative reinforcement in applied behavior analysis: An emerging technology. *Journal of Applied Behavior Analysis, 20,* 361–387.

Iwata, B. A., Dorsey, M. F., Slifer, K. J., Bauman, K. E., & Richman, G. S. (1982). Toward a functional analysis of self-injury. *Analysis and Intervention in Developmental Disabilities, 3,* 1–20.

Iwata, B. A., Pace, G. M., Kalsher, M. J., Cowdery, G. E., & Cataldo, M. F. (1990). Experimental analysis and extinction of self-injurious escape behavior. *Journal of Applied Behavior Analysis, 23,* 11–27.

Mace, F. C., & Belfiore, P. (1990). Behavioral momentum in the treatment of escape-motivated stereotypy. *Journal of Applied Behavior Analysis, 23,* 507–514.

Mace, F. C., Hock, M. L., Lalli, J. S., Belfiore, P., Pinter, E., Brown, D. K., & West, B. (1988). Behavioral momentum in the treatment of noncompliance. *Journal of Applied Behavior Analysis, 21,* 123–141.

Mace, F. C., Lalli, J. S., Shea, M. C., Lalli, E. P., West, B. J., Roberts, M., & Nevin, J. A. (1990). The momentum of human behavior in a natural setting. *Journal of the Experimental Analysis of Behavior, 54,* 163–172.

Michael, J. (1982). Distinguishing between discriminative and motivational functions of stimuli. *Journal of the Experimental Analysis of Behavior, 37,* 149–155.

Michael, J. (1993). Establishing operations. *The Behavior Analyst, 16,* 191–206.

Nevin, J. A. (1974). Response strength in multiple schedules. *Journal of the Experimental Analysis of Behavior, 21,* 389–408.

Nevin, J. A., Mandell, C., & Atak, J. R. (1983). The analysis of behavioral momentum. *Journal of the Experimental Analysis of Behavior, 39,* 49–59.

Pace, G. M., Ivancic, M. T., & Jefferson, G. (1994). Stimulus fading as treatment for obscenity in a brain-injured adult. *Journal of Applied Behavior Analysis, 27,* 301–305.

Repp, A. C., Felce, D., & Barton, L. E. (1988). Basing the treatment of stereotypic and self-injurious behaviors on hypotheses of their causes. *Journal of Applied Behavior Analysis, 21,* 281–289.

Sidman, M. (1960). *Tactics of scientific research.* New York: Basic Books.

Steege, M. W., Wacker, D. P., Berg, W. K., Cigrand, K. C., & Cooper, L. J. (1989). The use of behavioral assessment to prescribe and evaluate treatments for severely handicapped children. *Journal of Applied Behavior Analysis, 22,* 23–33.

Steege, M. W., Wacker, D. P., Cigrand, K. C., Berg, W. K., Novak, C. G., Reimers, T. M., Sasso, G. M., & DeRaad, A. (1990). Use of negative reinforcement in the treatment of self-injurious behavior. *Journal of Applied Behavior Analysis, 23,* 459–467.

Ulman, J. D., & Sulzer-Azaroff, B. (1975). Multielement baseline design in educational research. In E. Ramp & G. Semb (Eds.), *Behavior analysis: Areas of research and application* (pp. 359–376). Englewood Cliffs, NJ: Prentice-Hall.

Weeks, M., & Gaylord-Ross, R. (1981). Task difficulty and aberrant behavior in severely handicapped students. *Journal of Applied Behavior Analysis, 14,* 449–463.

Zarcone, J. R., Iwata, B. A., Hughes, C. E., & Vollmer, T. R. (1993). Momentum versus extinction effects in the treatment of self-injurious escape behavior. *Journal of Applied Behavior Analysis, 26,* 135–136.

Zarcone, J. R., Iwata, B. A., Smith, R. G., Mazaleski, J. L., & Lerman, D. C. (1994). Reemergence and extinction of self-injurious escape behavior during stimulus (instructional) fading. *Journal of Applied Behavior Analysis, 27,* 307–316.

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