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AN ANALYSIS OF STIMULI THAT INFLUENCE COMPLIANCE DURING THE HIGH-PROBABILITY INSTRUCTION SEQUENCE

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When we evaluated variables that influence the effectiveness of the high-probability (high-*p*) instruction sequence, the sequence was associated with a precipitous decrease in compliance with high-*p* instructions for 1 participant, thereby precluding continued use of the sequence. We investigated the reasons for this decrease. Stimuli associated with the low-*p* instruction were systematically added and removed in the context of the high-*p* instructions, and results suggest that the stimuli associated with the low-*p* instruction influenced compliance with the high-*p* instructions.

Key words: compliance, high-probability sequence, noncompliance, preschool children

The high-probability (high-*p*) instruction sequence (Mace et al., 1988) is an intervention for increasing compliance involving the delivery of several instructions with which an individual is likely to comply just prior to delivering an instruction with which the individual typically is unlikely to comply (a low-probability or low-*p* instruction). Typically, the high-*p* instructions are delivered in quick succession just prior to the delivery of the low-*p* instruction. Following all instances of compliance, praise or some other form of reinforcement is provided.

The high-*p* procedure has been demonstrated to be effective across a variety of populations and situations, but it also has been demonstrated to be ineffective in some circumstances (e.g., Ardoin, Martens, & Wolfe, 1999; Rortvedt & Miltenberger, 1994; Zarcone, Iwata, Mazaleski, & Smith, 1994; Zuluaga & Normand, 2008). The original purpose of this study was to investigate procedural aspects of the high-*p* instruction sequence that produced greater or lesser treatment effects. However, soon after implementation, compliance with the high-*p* instructions decreased precipitously for one participant, thereby precluding continued use of the sequence. The focus of investigation then shifted to the variables that led to the decrease in compliance to the high-*p* instructions. Stimuli associated with the low-*p* instruction were systematically added and removed in the context of the high-*p* instructions to determine if they influenced compliance.

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METHOD

Participant and Setting

Ernest was a typically developing 3-year-old preschooler whose teacher reported a history of noncompliance when the instruction involved losing access to a preferred item or activity. All sessions took place at a table in the corner of an unoccupied room at Ernest's day care center, with the experimenter, Ernest, and one or two observers present during each experimental session.

Stimulus Preference Assessment

A multiple-stimulus without replacement preference assessment (DeLeon & Iwata, 1996) was used to identify preferred toys to be used during the low-*p* instruction task. The assessment was repeated three times, and the most preferred toys (Play-Doh and several related accessories) were used for the low-*p* task.

Response Definition and Measurement

The primary dependent measure was the percentage of trials per session for which

compliance was observed to a high-*p* instruction, with *compliance* defined as the participant initiating the response specified by the instruction within 10 s of the instruction being delivered. A trial consisted of the delivery of a high-*p* instruction and the resulting opportunity to comply, lasting from the start of the instruction until 10 s had elapsed from the end of the instruction or until completion of the instructed task. All trials were less than 20 s in duration. The total number of trials in which the participant complied with a high-*p* instruction was recorded and divided by the total number of opportunities to comply to yield a percentage.

Ernest's teacher nominated five high-*p* instructions and five low-*p* instructions and corresponding responses. Each instruction from the low-*p* nomination list was presented to Ernest five times during a prebaseline assessment, with each instruction separated by approximately 60 s. To qualify as a low-*p* instruction, noncompliance had to be observed on all five opportunities. "Put your toys away in the toy box" was the selected instruction based on the results of this assessment. Following the instruction, Ernest had to put a container of Play-Doh and several related toys (such as molds in the shape of fish) into a toy box.

Interobserver Agreement

During 31% of the sessions, a second observer recorded whether Ernest complied with the experimenter's instruction. Interobserver agreement was calculated by dividing the number of trials with agreement (both observers scored that the participant did or did not comply with the high-*p* instruction) by the total number of trials and converting this ratio to a percentage. Interobserver agreement was 100% across all sessions.

Procedure

The experimental conditions were introduced according to a reversal design. For all experimental conditions, Play-Doh and several related toys (e.g., molds and scissors) were present on a table at which Ernest was seated. He was allowed to manipulate the toys for 2 min prior to and throughout each session, including during the delivery of high-*p* and low-*p* instructions. In the analysis described below, the presence of the toy box was manipulated, but the toys were present in every condition. The experimenter remained within 1.5 m of Ernest at all times.

High-p *instruction analysis.* The experimenter presented each of the five teacher-nominated high-*p* instructions to Ernest 10 times, with each instruction separated by approximately 60 s. Those instructions resulting in compliance on at least 90% of the 10 opportunities provided were classified as high *p*. All five nominated instructions ("touch your nose," "clap your hands," "touch your ears," "give me high-five," "pat your tummy") met this criterion, and all were used throughout the study.

High-p *instruction sequence plus low*-p *instruction.* During this condition, the experimenter delivered three high-*p* instructions in quick succession, and praise followed each instance of compliance. A few seconds after Ernest complied with the final high-*p* instruction in the sequence, the experimenter delivered a low-*p* instruction. Compliance with the low-*p* instruction also resulted in praise. If Ernest failed to comply with one of the high-*p* instructions, the instructional sequence ended, the experimenter did not deliver a low-*p* instruction, and Ernest was allowed to continue playing with the toys. There were no programmed consequences for noncompliance with the low-*p* instruction. Because noncompliance with a high-*p* instruction terminated the trial, the number of high-*p* and low-*p* instructions delivered each session varied, with a range of 0 to 5 low-*p* instructions and 6 to 10 high-*p* instructions delivered across sessions.

High-p *instructions without low*-p *stimuli.* Because compliance with the high-*p* instruc-

tions decreased during the high-*p* instruction sequence, we arranged a condition in which the experimenter delivered high-*p* instructions, but the stimulus associated with the low-*p* instruction (i.e., the toy box) was not present, and the experimenter did not deliver the low-*p* instruction. This was done because the toy box was a salient feature of the environment during the original high-*p* instruction intervention and was the most notable difference between the high-*p* instruction analysis (when compliance with high-*p* instructions was high) and the high-*p* instruction intervention (when compliance with high-*p* instructions was low). The experimenter delivered five high-*p* instructions per session, with each instruction separated by approximately 60 s.

High-p *instructions with low*-p *stimuli.* To assess whether the stimuli associated with the low-*p* instruction influenced compliance with the high-*p* instructions, we repeated the high-*p* analysis with the toy box associated with the low-*p* task present. Although the toy box was present during this condition, the low-*p* instruction was never delivered. The experimenter delivered five high-*p* instructions per session, with each instruction separated by approximately 60 s.

RESULTS AND DISCUSSION

The percentage of trials with compliance with the high-*p* instructions during each session across all experimental phases is depicted in Figure 1. In the initial high-*p* instruction analysis, Ernest complied with every high-*p* instruction that was delivered. During the high-*p* instruction sequence plus low-*p* instruction, compliance decreased to 60% during the first session and eventually decreased to 0% and 20% during the final sessions. During the first high-*p* instructions without low-*p* stimuli condition, compliance immediately increased, ranging from 60% to 100% and stabilizing at 80% during the final four sessions. Compliance with high-*p* instructions decreased during the high-*p* instructions with low-*p* stimuli condition, with no compliance occurring during the last two sessions. Compliance returned to 100% during the second high-*p* instructions without low-*p* stimuli condition.

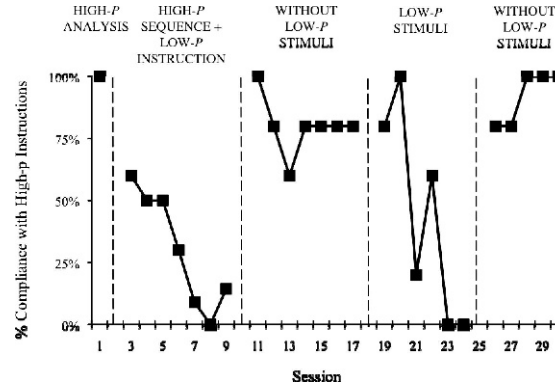

Figure 1. Ernest's percentage of compliance with high-*p* instructions during the high-*p* instruction analysis, the high-*p* instruction sequence plus low-*p* instructions, and conditions with and without stimuli associated with the low-*p* task.

These results suggest that the toy box associated with the low-*p* instruction suppressed compliance with the high-*p* instructions. Rortvedt and Miltenberger (1994) reported similar decreases in compliance with high-*p* instructions for one participant, but because the low-*p* instructions and tasks were not described in that report, the degree to which the findings of the present study might relate cannot be assessed (i.e., it is unclear whether there were salient stimuli associated with the low-*p* instructions). Zarcone et al. (1994) reported decreases in compliance with the high-*p* instruction sequence when escape-maintained behavior that interfered with compliance was not placed on extinction. The authors hypothesized that this occurred either because the high-*p* instructions evoked escape behavior as discriminative stimuli associated with the provision of escape or because the high-*p* instructions became aversive stimuli themselves. The present findings seem consistent with these hypotheses, although the degree to which the findings are similar cannot be established because behavior that might have

interfered with compliance was not systematically evaluated in the present study. Anecdotally, when noncompliant, Ernest typically continued to play with his toys without engaging in any other observable behavior except for occasionally making eye contact with the experimenter or saying "no."

One limitation of the current study is that, due to time constraints, the high-*p* instruction sequence was not reintroduced such that each sequence of high-*p* instructions was followed by the low-*p* instruction without the low-*p* stimuli. In this particular case, the presence of the low-*p* stimuli (the toy box) was required to occasion the target low-*p* task, so such a manipulation could not have been easily arranged, nor would it have been especially relevant. That is, the toy box had to be present to set the occasion to pick up the toys and, hence, to use the high-*p* instruction sequence with Ernest. Eliminating the toy box would eliminate the occasion for the instruction. Still, in some cases it might be possible to eliminate the salient stimuli associated with the low-*p* task until the low-*p* instruction is given to determine whether compliance with high-*p* instructions can be maintained and compliance with low-*p* instructions increased by doing so. Given the present findings, future research of this sort is warranted.

REFERENCES

Ardoin, S. P., Martens, B. K., & Wolfe, L. A. (1999). Using high-probability instruction sequences with fading to increase student compliance during transitions. *Journal of Applied Behavior Analysis*, *31*, 339–351.

DeLeon, I. G., & Iwata, B. A. (1996). Evaluation of a multiple-stimulus presentation format for assessing reinforcer preferences. *Journal of Applied Behavior Analysis*, *29*, 519–533.

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

Rortvedt, A. K., & Miltenberger, R. G. (1994). Analysis of a high-probability instructional sequence and time-out in the treatment of child noncompliance. *Journal of Applied Behavior Analysis*, *27*, 327–330.

Zarcone, J. R., Iwata, B. A., Mazaleski, J. L., & Smith, R. G. (1994). Momentum and extinction effects on self-injurious escape behavior and noncompliance. *Journal of Applied Behavior Analysis*, *27*, 649–658.

Zuluaga, C. A., & Normand, M. P. (2008). An evaluation of the high-probability instruction sequence with and without programmed reinforcement for compliance with high-probability instructions. *Journal of Applied Behavior Analysis*, *41*, 453–457.

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