THE EFFECTS OF A HIGH-PROBABILITY INSTRUCTION SEQUENCE AND RESPONSE-INDEPENDENT REINFORCER DELIVERY ON CHILD COMPLIANCE

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We compared the effects of a high-probability (high-*p*) instruction sequence and a fixed-time (FT) schedule of reinforcement on the compliance of 2 typically developing children. A multielement experimental design with a reversal component was implemented according to a multiple baseline across participants arrangement. Both the high-*p* and FT conditions resulted in increased compliance for both participants during the multielement sessions. These results suggest that it may be possible to increase compliance without a response requirement of the type arranged in the high-*p* instruction sequence.

DESCRIPTORS: behavioral momentum, compliance, high-probability instruction sequence, fixed-time schedule

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In 1988, Mace et al. reported a series of five experiments that evaluated the effects of a high probability (high-*p*) instruction sequence on compliance to low-probability (low-*p*) instructions. A high-*p* instruction sequence involves the issuance of several instructions with which a participant is likely to comply immediately prior to the issuance of an instruction with which the participant is unlikely to comply. Praise or some other potential reinforcer is delivered following each instance of compliance. One major advantage of the high-*p* procedure is that physical contact with the learner is unnecessary. This is especially beneficial when working with individuals whose size or strength makes physical contact dangerous or in situations in which formal restrictions exist with respect to the use of physical contact. Mace et al. reported that the high-*p* instruction sequence improved compliance rates, latency to task initiation, and total task duration across all five experiments, and subsequent research has mostly supported these findings (e.g., Mace & Belfiore, 1990).

However, it is possible that compliance to low-*p* instructions can be increased without a response requirement like the one in the high-*p* instruction sequence. Although Mace et al. (1988) did not report increased compliance following conditions in which positive statements were delivered independent of participant responding, other researchers have reported such increases using similar procedures. For example, E. G. Carr, Newsom, and Binkoff (1976) reported increased compliance following the reading of humorous stories during therapy sessions, and Kennedy, Itkonen, and Lindquist (1995) increased compliance by making pleasant comments prior to the issuance of low-*p* instructions.

The present study was designed to assess whether compliance could be increased via the delivery of preferred stimuli prior to the issuance of a low-*p* instruction. In doing so, a fixed-ratio (FR) schedule of reinforcement (with no antecedent manipulation), a high-*p* instruction sequence, and a fixed-time (FT) schedule of reinforcement that signaled the onset of an FR 1 schedule of reinforcement for compliance were evaluated.

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Table 1
High-*p* and Low-*p* Instructions Used for Each Participant

Participant	Low *p*	High *p*
Joey	Put away your toy. Come here. Put down the [item]. Sit down. What's your name?	Do this [clap hands, arms up, tap leg]. Touch [body part]. Give me [color]. What color?
Ashton	Take a bite of [food]. Sit down. Go to your room.	Do this [clap hands, arms up, tap leg]. Touch [body part]. Give me [color]. What color? Give me five.

METHOD

Participants and Setting

Two typically developing boys, Joey (age 2 years) and Ashton (age 3 years), were selected based on their ability to follow vocal instructions, parent permission, and their prebaseline responses to a variety of simple instructions. Each participant was observed to comply with at least 15 instructions that required a simple and discrete response and not to comply with at least five other similar instructions. All sessions took place in designated areas of the participants' homes. The experimenter, the participant, and one observer were present during the experimental sessions.

Response Definitions and Measurement

The dependent measure was the percentage of low-*p* instructions with which each participant complied (see Table 1). The low-*p* instructions were defined as instructions issued by the experimenter with which participants never complied during a 20-trial prebaseline assessment. This assessment involved presenting each instruction from a parent-generated list of potential low-*p* and high-*p* instructions a total of 20 times. The high-*p* instructions were those that resulted in compliance on every trial. Compliance was defined as the initiation of a response within 10 s of the stated instruction and total task completion within 60 s of task initiation. Percentage compliance was calculated by dividing the number of compliant responses to low-*p* instructions by the total number of low-*p* instructions issued and multiplying by 100%.

Interobserver Agreement and Integrity of the Independent Variable

For 33% of all sessions, a second observer independently scored the percentage of compliance to low-*p* instructions. Interobserver agreement was calculated by dividing the number of agreements by the number of agreements plus disagreements for all trials and multiplying by 100%. Agreements were 100% across all conditions for both participants. In addition, an independent observer scored experimenter behavior for 33% of randomly selected sessions during the high-*p* instruction sequence and the FT components. Correct performance of the high-*p* instruction sequence required the delivery of the reinforcer following each instance of compliance to a high-*p* instruction. For the FT condition, correct performance required the delivery of three reinforcers approximately once every 10 s. Integrity ratings were 100% across all conditions for both participants.

Experimental Design

The experimental conditions were presented according to a multielement design and were introduced across participants in a multiple baseline arrangement. The conditions were as follows: baseline; multielement, which consisted of (a) a baseline condition, (b) a high-*p* instruction sequence, and (c) an FT condition;

and an FT condition. An extinction condition was included following the FT sessions, in which reinforcement was withheld for compliance; after this, the FT condition was reintroduced.

Procedure

Stimulus preference assessment. Prior to the start of baseline sessions, a brief stimulus preference assessment (J. E. Carr, Nicolson, & Higbee, 2000) was conducted to determine a pool of potential edible reinforcers that could be used. Edible items were selected because they could be easily delivered and quickly consumed. The use of edible items also made the removal of a preferred item unnecessary, thereby increasing the efficiency of the procedure and minimizing the likelihood of problem behavior resulting from the removal of a preferred item or termination of a preferred activity. Each trial of each condition began by asking the child to choose between two of the edible items identified as most preferred during the stimulus preference assessment.

Baseline. The experimenter was present in the room with the participant at a distance of approximately 1.5 m. A timer sounded every 30 s, prompting the experimenter to issue an instruction. The experimenter first established eye contact with the participant and then issued a low-*p* instruction. If the participant complied with the instruction, a small food item was delivered along with praise.

High-p instruction sequence. The high-*p* instruction sequence involved the issuance of three high-*p* instructions (one every 10 s) followed by a low-*p* instruction approximately 10 s after the last high-*p* instruction. Compliance to each of the high-*p* instructions was followed by the delivery of a preferred edible item and praise. If the low-*p* instruction resulted in compliance, a preferred edible item was immediately delivered along with praise. If at any time the participant failed to comply with a high-*p* instruction, the trial was ended.

FT condition. An FT 10-s reinforcement schedule was arranged that was comparable to the average schedule of food delivery in the high-*p* condition. The completion of the FT schedule signaled the onset of an FR 1 schedule for compliance to the low-*p* instruction. The edible item was the same or similar to that which had been delivered in the momentum phase. The experimenter said "here," "here you go," or a similar phrase to gain the participant's attention prior to delivering the preferred item and to counterbalance the attention given in issuing the high-*p* instructions in the high-*p* condition. A preferred edible item and praise followed each instance of compliance.

Extinction. This condition was identical to the baseline condition except that there were no programmed consequences for compliance.

RESULTS AND DISCUSSION

Figure 1 depicts the percentage of compliance to low-*p* instructions for the 2 participants during each session across all phases of the study. For both participants, overall compliance to low-*p* instructions increased relative to the initial baseline performance in the FT component of the multielement condition and was maintained during the FT-alone condition. For Ashton, compliance to low-*p* instructions during the initial baseline sessions averaged 4%. During the multielement phase, his compliance averaged 58% during the baseline condition, 81% in the high-*p* condition, and 85% in the FT condition. When the FT condition was implemented alone, compliance to low-*p* instructions was 100%. During extinction, Ashton's percentage of compliance fell to an average of 19%. When the FT condition was reinstated, Ashton's percentage of compliance to low-*p* instructions was 100%.

Joey's initial baseline averaged 5% compliance to the low-*p* instructions. During the multielement phase, the baseline condition averaged 15% compliance, the high-*p* condition averaged 40% compliance, and the FT condi-

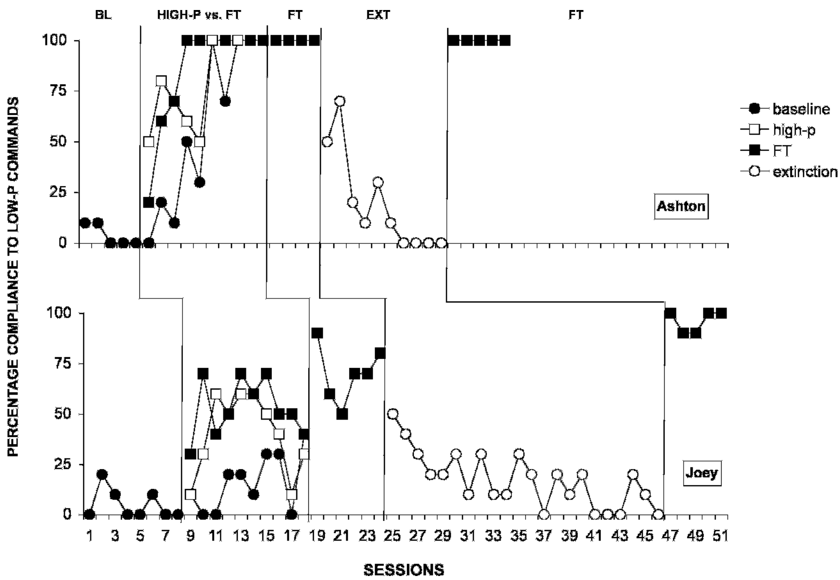

Figure 1. Percentage of compliance with low-*p* instructions for Joey and Ashton during baseline, multielement, FT, extinction, and FT conditions.

tion averaged 53% compliance. When the FT condition was implemented alone, compliance averaged 84%. During extinction, Joey's overall compliance was 17%. After extinction, the FT condition was reintroduced, and compliance increased to 96%. Overall, the results suggest that the antecedent manipulations increased compliance to low-*p* instructions relative to initial baseline levels, although the FT condition produced the greatest increase, and this increase persisted when the FT condition was implemented alone. Two potential explanations are suggested for this finding.

First, in both the high-*p* instruction sequence and the FT schedule, several potential reinforcers are introduced immediately prior to the issuance of a low-*p* instruction. The increased presence of preferred items might act as an abolishing operation whereby the effectiveness of escape as a reinforcer is lessened and all behavior that has produced such escape in the past is abated (e.g., Lalli et al., 1999). Second, the frequent delivery of reinforcers by the experimenter in a common setting across all conditions could have increased the persistence of compliance in the presence of the experimenter (e.g., Nevin, 1996).

Although it appears that compliance can be increased without the response requirement of the high-*p* instruction sequence, a definitive conclusion cannot be drawn for two reasons. First, the multielement arrangement failed to yield clear discriminations among the experimental conditions. Second, increasing reinforcement in the presence of a given stimulus should increase the resistance to change of any behavior that has been reinforced in the presence of that stimulus, even if reinforcement is independent of the behavior (Nevin, Tota, Torquato, & Shull, 1990). In the present study, all three reinforcement conditions occurred in the same context; this could have strengthened compliance in all three conditions, thereby producing the pattern of behavior obtained in the multielement phase.

Several other limitations of the current study should be noted. First, the preferred edible items and praise were delivered following all instances of compliance in all conditions. As such, repeated contact with these potential reinforcers could have produced the increase in compliance independent of the antecedent manipulations. However, because compliance failed to improve during the initial baseline conditions and did improve following the introduction of the antecedent manipulation conditions (including the FT condition following the extinction phase), it is likely that the antecedent manipulations were causally related to compliance.

Second, the low-*p* instructions involved simple and fairly discrete responses. It is possible that a procedure involving an FT schedule of reinforcement prior to the issuance of a low-*p* instruction would be ineffective for behaviors with a higher response requirement. For example, complying with the instruction "make your bed" involves the completion of multiple steps in a behavior chain and involves some amount of physical effort, whereas "tell me your name" requires a response involving fewer steps and little physical effort. Finally, in the extinction component the antecedent delivery of preferred edible items and programmed reinforcement for compliance were discontinued simultaneously, thereby weakening experimental control.

Future research could address these limitations in several ways. The effects of the FT schedule could be evaluated in isolation so as to account for possible carryover effects among conditions arranged in a multielement format. Also, different physical settings could be used for the various experimental conditions to control for the increased rate of reinforcement in similar settings across experimental conditions. Further analysis of the effects of antecedent manipulations (e.g., the high-*p* sequence and FT schedules) on more complex responses also is warranted.

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