The Effect of Varying Durations of Noncontingent Access to a Preferred Item on Compliance

by

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Abstract

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The high-probability (high-p) sequence is frequently used to increase compliance. It involves presentation of a series of instructions with which a participant has historically complied immediately before the presentation of an instruction that has a lower probability of compliance (i.e., a low-p instruction). To date, the high-p sequence has received mixed support in the literature. Thus, researchers have begun to investigate alternatives to the sequence, one of which involves omission of the high-p instructions and noncontingent access to preferred items immediately before the delivery of the low-p instruction. In the current study, the effect of varying durations of noncontingent access to a preferred item prior to the delivery of a low-probability instruction was evaluated with three children with Autism Spectrum Disorder (ASD). A multielement design was used with three different durations: zero s, 30 s, and 3 min. The study ended on a choice phase. The results show a larger increase in compliance during the 3 min of noncontingent access to items for two participants and an increase in compliance during both the 30 s and 3 min for one participant. These results may suggest an alternative method for increasing compliance in children with ASD.
Keywords: high-probability (high-p) sequence; compliance; noncompliance; noncontingent access; duration
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Introduction

Compliance is defined as following an instruction to engage in a specific behavior within a specified amount of time. The inverse of compliance is noncompliance. Noncompliance occurs when a child does not follow an instruction that is within their response repertoire that has been requested by an adult figure within a specified period of time (Kalb & Leober, 2003; Wilder, Nicholson, & Allison, 2010). Compliance can be either passive, in which a child engages in an indirect response, or active, in which a child directly engages in a response, and is among the most common childhood behavior problems, with 25% to 65% of children between the ages of 2-16 engaging in noncompliance (Kalb & Leober, 2003). Although it is common for all children to be noncompliant on occasion, it becomes problematic when noncompliance is frequent and is seen across multiple environments. Persistent noncompliance can create problems in both social and academic endeavors (Taplin & Reid, 1977). Persistent noncompliance not only affects day to day interactions, but also affects the overall quality of relationships between a child and caregiver (Baer, Rowbury, & Baer, 1973; Kalb & Leober, 2003).

Complying with instructions is considered a behavioral cusp (Bosch & Fuqua, 2001) because compliance is a skill that makes it possible to learn other skills (Lipschultz & Wilder, 2017). In addition, an increase in compliance has been correlated with reductions in self-injurious behavior, tantrums, disruption, and aggression (Parrish et al., 1986; Russo, Cataldo & Cushing, 1981). Given the possible negative side effects of noncompliance, it is important to develop effective
interventions to decrease this problem behavior (Rodriguez, Thompson, and Baynham, 2010).

In order to determine the function of noncompliance, different types of assessments must be conducted. Assessments can be either indirect, direct, or experimental. Indirect assessments involve reports given by informants, such as parents, caregivers, or teachers, on the occurrence of the target behavior (Cone, 1978). To evaluate compliance, indirect assessments have been used individually, such as in the study conducted by Crowther, Bond, and Rolf (1981), and also along with other types of assessments, including direct assessments. Indirect assessments are easy to implement and provide information from the caregivers about the conditions under which noncompliance occurs (McMahon & Forehand, 2003). However, since indirect assessments consist of interviews or questionnaires given by another person and not the person engaging in the target behavior (e.g. noncompliance), the results produced do not provide definite conclusions about the environmental factors that may be causing noncompliance (McMahon & Forehand, 2003). The validity of indirect assessments may also be inaccurate due to the fact that there is an extended amount of time between the occurrence of noncompliance and data collection (Fagot & Leve, 1998).

Another type of assessment that is used to determine the function of noncompliance is direct assessment. Direct assessments involve observing a target behavior as it occurs and collecting data about the events that happen before (i.e., antecedents) and after (i.e., consequences) (Bijou, 1993). Two different types of direct assessment are unstructured, such as in a classroom setting (Ndoro et al., 2006) where there is little control over the interactions between the child and adult, and structured, where the environment is controlled and manipulated in order to determine the conditions which are most likely to be associated with an instance of noncompliance (Matas et al., 1978). However, direct assessments are unable to
determine causal relations between the environment and the target behavior (McMahon & Forehand, 2003).

Experimental analysis is a third type of assessment. It involves the systematic manipulation of environmental variables in order to determine links between the environment and behavior (Iwata et al., 1982/1994). Based on the results of an experimental analysis, function-based interventions can be designed in order to directly address the maintaining variables of the target behavior (e.g., noncompliance) (McMahon & Forehand, 2003). Some studies have used functional analyses to determine the variables maintaining noncompliance by manipulating antecedents. Reimers et al. (1993) used a brief functional analysis which identified that noncompliance was reinforced by attention for 5 of the 6 children in the study, and for the other participant noncompliance was reinforced by escape. A study conducted by Wilder et al. (2007) assessed the function of noncompliance in two preschoolers in order to develop a function-based intervention to increase compliance. The functional analysis conducted in this study evaluated noncompliance during the initiation of a nonpreferred activity (escape condition), the termination of a preferred activity (tangible condition), and the initiation of a preferred activity (control). The results expanded on the existing literature on noncompliance by demonstrating how the function of noncompliance can be determined through a functional analysis. McKerchar and Thompson (2004) focused on the prevalence of social consequences following problem behavior exhibited by preschoolers. Their results showed that attention was found to be the most common consequence, followed by material presentation, and then escape from demands. Ndoro et al. (2006) also found that the most common consequences for noncompliance among young children were attention and escape. Based on the assessment results, function-based interventions were developed in order to decrease noncompliance. Knowledge about the function of the behavior is particularly important when developing an intervention because the use of a
contraindicated consequence or antecedent may result in an increase in noncompliance. That is, using a contraindicated consequence could increase noncompliance. For example, if the behavior is maintained by escape, implementing a timeout procedure might increase noncompliance since the child is able to escape from the demand during timeout.

There are several interventions that can be used in the treatment of noncompliance. Interventions for noncompliance are typically antecedent based or consequence based. Antecedent based interventions occur prior to the target behavior and involve modifying the environmental stimuli in order to increase compliance. Consequence based interventions modify the environment following an occurrence of either compliance or noncompliance (Cooper et al., 2007). Some types of evidence-based antecedent interventions include advanced notice, manipulation of the way in which an instruction is delivered, and the high-probability instructional sequence (Radley & Dart, 2016). Antecedent interventions can be effective since they are implemented prior to the occurrence of the target behavior which prevents the behavior from ever occurring (Kern & Clemens, 2007). Antecedent interventions have been shown to not only be useful at increasing compliance, but they also may decrease time to learn a task, decrease transition time between tasks, decrease the amount of time it takes to complete a task, and minimize challenges in other academic areas (Ardoin, 1999; Belfiore, 2002; Lee, 2006; Mace, 1998).

Consequence strategies have also been used to increase compliance. Consequence interventions include differential reinforcement, time-out, and guided compliance. These interventions occur following the occurrence of noncompliance and are used to reduce future instances of the target behavior (Lipschultz & Wilder, 2017). Both types of interventions (antecedent and consequent) can be useful to increase compliance, and they are often combined. A detailed review of both consequence and antecedent based interventions is provided below.
**Consequence-based Interventions**

One of the most frequently used consequence-based interventions for decreasing noncompliance is guided compliance. Guided compliance involves the use of prompts that progressively become more intrusive following an occurrence of noncompliance (Wilder & Atwell, 2006). This evidence-based treatment has been shown to be effective in increasing compliance in both typically developing children and children with intellectual disabilities (Kern et al., 2002; Tarbox et al., 2007). It was first introduced by Horner and Keilitz (1975) to help teach adolescents with intellectual disabilities how to brush their teeth. The 3-step guided compliance procedure typically proceeds in a least to most intrusive fashion, where it involves an initial vocal prompt followed by a vocal plus model prompt and ending on a vocal prompt combined with physical guidance.

Wilder and Atwell (2006) used typically developing children to evaluate the effectiveness of a guided compliance procedure. During this study, the instructor followed a set of steps that were contingent on noncompliance. If noncompliance occurred after the first delivery of the instruction, a model prompt was given. In the model prompt, the instructor first obtained eye contact, then the instruction was re-presented followed by modeling the correct behavior. If noncompliance persisted, the instruction was re-presented a third time and the participant was guided to perform the activity correctly. The results of this study showed that guided compliance was effective in four out of the six participants, suggesting that this intervention can be effective for some, but not all children.

Another study by Wilder et al. (2012) evaluated two modifications of the guided compliance procedure with four preschool children who frequently engaged in noncompliance. Since guided compliance is not effective in all cases (Wilder & Atwell, 2006) or it requires a substantial number of trials to be effective, modifications to this procedure might be necessary. The modifications examined in this study were the omission of the model prompt and a decrease in the inter-
prompt interval. The results of this study showed that the modifications to the guided compliance procedure were effective for one participant. These results suggest that modifications can be incorporated if necessary, based on the participant.

Differential reinforcement is another consequence-based intervention backed by evidence that uses access to a preferred item as reinforcement contingent on compliance with the instruction (Wilder et al., 2012). Differential reinforcement involves the delivery of a functional reinforcer that has a history of maintaining noncompliance when compliance to an instruction occurs. Some types of differential reinforcement include praise and physical attention (Schutte & Hopkins, 1970), a point or token exchange system (Swiezy, Matson, & Box, 1992), a preferred edible item (Wilder et al., 2007), or a combination of reinforcers (Russo, Cataldo, & Cushing, 1981). For example, Wilder et al. (2007) increased compliance in two preschool children using differential reinforcement by providing coupons contingent upon instances of compliance. The coupons could then be exchanged for a preferred item or activity. Through the use of positive reinforcement for compliance, an increase in the likelihood of compliance has been shown to be effective. However, differential reinforcement often requires reinforcement of compliance and placing noncompliance on extinction, which has been proven to be difficult in some situations. For example, Ndoro et al. (2006) found that caregivers frequently provide more attention for noncompliant behavior, therefore strengthening that behavior. This also highlights the importance of using a functional analysis to identify the function of the target behavior prior to implementing an intervention.

Time-out is another type of consequence-based intervention that is frequently used to decrease noncompliance. Time-out is defined as a procedure that involves the removal of an individual from the reinforcing environment contingent on an instance of noncompliance in order to decrease the future probability of the
target behavior (Donaldson, Vollmet, & Malden, 2011). It is most commonly seen in schools and homes and has been proven to be effective across a variety of settings and topographies of behavior (Brantner & Doherty, 1983). The two main components that make time-out effective are that the procedure is implemented contingent on the occurrence of the target behavior, and that there is a salient difference between the time-out environment and the time-in environment (Cuenin & Harris, 1986).

There are three types of time-out procedures: nonexclusion, exclusion, and isolation. Nonexclusion time-out is the least intrusive type. It refers to situations in which the child still remains in the same environment, but is removed from the reinforcing activity, either through removal of the stimulus condition, contingent observation, or ignoring (Cuenin & Harris, 1986). Exclusion time-out is more restrictive than nonexclusion procedures because the child is removed from the reinforcing item or activity and is not permitted to observe the ongoing activity (Cuenin & Harris, 1985; Everett, 2005). Examples of exclusion time-out include standing in a corner or facing a wall (Everett, 2005). Comparing exclusion and nonexclusion time-out, Mace and Heller (1990) found that both procedures were effective in reducing disruptive behaviors in a 7-year-old boy with intellectual disabilities. However, they argue that the nonexclusion form may be preferable since it was just as effective as the exclusion procedures and is less restrictive.

The most restrictive type of time-out procedure is isolation. Isolation involves complete removal from the reinforcing environment (Harris, 1985). During this type of time-out, the child is removed not only from the reinforcing activity, but also from the environment. For example, a child is placed in a separate room instead of remaining in the room in the corner (exclusion). However, isolation is not used frequently in a school setting since it may present ethical issues involving the child’s safety (Turner & Watson, 1999). Due to these concerns, teachers are more likely to implement a less restrictive form of time-out.
Time-out is frequently added to other intervention packages when the initial treatment does not increase the target behavior (e.g., noncompliance). For example, Rortvedt and Miltenberger (1994) implemented a time-out procedure in order to increase compliance when the initial treatment of a high-probability sequence was ineffective. During this study, the child participant was removed from the room contingent on noncompliance and was required to sit for 1 minute and remain quiet for the last 10 s before being allowed to leave. With the implementation of the time-out procedure, the treatment package proved to be effective. However, like other consequence-based interventions, timeout can be contraindicated, particularly if the target behavior is maintained by escape. Therefore, practitioners should identify the function of noncompliance before deciding on the appropriate treatment package (Lipschultz & Wilder, 2017).

**Antecedent-Based Interventions**

There are several antecedent-based interventions that have been shown to be effective to increase compliance. One of these interventions focuses on the form of the delivered instruction. The two types of instruction that have been examined in the literature are alpha instructions, which are typically the most effective type of command, and beta instructions, which are less effective. When an alpha instruction is presented, it is a simple, specific, one-step instruction followed by a 5-s waiting interval (Roberts et al., 1978). Roberts et al. (1978) used alpha instructions given by trained parents to increase compliance. Beta instructions take a few forms. They are either chain directions, vague directions, question directions, “let’s directions”, or directions followed by a reason. Chain directions involve multiple steps given at one time. Vague directions are not entirely clear and can cause confusion. With question directions, the instruction is phrased so that the child can respond “no” even if the parent did not intend to give an option. If a parent gives a “let’s” direction, it allows for interpretation of assistance from the parents (e.g. “lets pick up your toys”, and the child assumes that the adult is going
to help complete the task). Directions followed by a reason, where a reason is given after the instruction, often cause more of a distraction than help (Forehand & Long, 2003). Forehand and Long (2003) found that alpha instructions are more effective than beta instructions.

There are several antecedent variables should be taken into consideration in order to make an alpha instruction effective. Mandal, Olmi, Edwards, Tingstrom, and Binoit (2000) evaluated antecedent variables, such as eye contact, praise for eye contact, directive statements, proximity to the child, and descriptive instructions on child compliance. The results of this study found that the antecedent variables increased compliance relative to baseline for four participants. Everett, Olmi, Edwards, and Tingstrom (2005) obtained similar results using the same antecedent variables, but in both studies the consequences between baseline and treatment were different (i.e., descriptive praise was only given for compliance in treatment and not during baseline); therefore, they were unable to determine if the antecedent variables independently influenced compliance. Stephenson and Hanley (2010) also found that eye contact is an important antecedent variable when it comes to compliance.

The topography of the instruction may also be important to the success of instructions delivered to increase compliance. Bouxsein, Tiger, and Fisher (2008) compared general statements and specific instructions in order to increase compliance by a young man with developmental disabilities. The results of this study were similar to those of Harding et al. (1994), who found that the child participants were more compliant with instructions that were specific versus general. According to a review of the literature on behavioral assessment and treatment of noncompliance (Lipschultz and Wilder, 2017), one practice guideline is to first establish eye contact prior to delivering an instruction, then deliver a specific instruction that is simple and only includes one task to complete.
Another type of antecedent intervention that is used to increase compliance is advance notice. Advance notice is information about an instruction that is presented to the child prior to the delivery of the instruction that necessitates a change in activity (Wilder, Nicholson, & Allison, 2010). An example of advance notice would be having the experimenter or adult present the instruction “in two minutes you need to put away your toys”. Advance notice has been evaluated with both individuals with disabilities (McCord, Thomson, & Iwata, 2001) and also with young, typically developing children (Wilder, Zonneveld, Harris, Marcus, & Regan, 2007). Tustin (1995) was one of the first people to examine advance notice. The results of this study compared advance notice to immediate change on stereotypy and found that advance notice did reduce this problem behavior. However, the research on the use of advanced notice to increase compliance has been inconclusive. Wilder, Nicholson, and Allison (2010) evaluated the effects of advance notice on compliance in children who were 4 to 5 yr old and found that it was not effective at increasing compliance. Advance notice had to be paired with physical guidance in order to increase compliance. However, it is still a popular method that is commonly recommended in parenting and teacher-preparation books (Forehand & Long, 2002; McMahon & Forehand, 2003).

A third antecedent-based intervention that is frequently used to increase compliance is the high-probability (high-p) instructional sequence. The high-p sequence involves a series of instructions with which a participant has historically complied immediately before the presentation of an instruction that has a lower probability of compliance (Mace et al., 1988). As described by Nevin, Mandell, and Atak (1983), the high-p sequence stems from behavior momentum theory. Behavioral momentum theory suggests that behavior which is repeatedly reinforced over a short time period will persist, even in the presence of disrupting events. Belfiore, Lee, Scheeler, and Klien (2002) suggest that the reinforcement of the high-p demand increases the overall reinforcement for the response class of
compliance, which increases compliance overall. According to Lipschultz and Wilder (2017), “the high-p instructional sequence is said to capitalize on behavioral momentum to increase the likelihood that compliant behavior maintains, even when a low-probability task is presented.”

The high-p sequence has been used across different populations, including children who are typically developing as well as those with varying disabilities (Lee, 2005). It also has been used for several different target behaviors. For example, Killu (1999) reviewed various applications of the high-p sequence beyond the use of treating compliance, such as treating challenging behavior, social skills, academics, and communication. In a meta-analysis by Lee (2005), it was determined that the high-p sequence was an effective intervention when used to treat noncompliance. However, there are inconsistencies in the literature. According to a review of the high-p sequence by Lipschultz and Wilder (2017), the effectiveness of the high-p instruction has shown mixed results. Lee (2005) also found in the meta-analysis that the high-p sequence was not as effective for adults as it was for children. This could be due to the fact that children have a shorter history of noncompliance, making adult noncompliance more resistant to the high-p sequence as well as other behavior change procedures. Furthermore, it is possible that prompting of adults, perhaps due to their comparatively larger size than children, makes consistent implementations of procedures more difficult.

There are several recommendations to consider when implementing the high-p sequence. Pitts and Dymond (2012) assessed the effects of the high-p sequence with and without reinforcement as well as whether a shorter inter-request interval would increase compliance with the target instruction. The results of this study suggested that the high-p sequence was more effective when it was paired with a programmed reinforcer. They also found that shorter inter-request intervals were more effective at not only increasing compliance with a low-p request, but also decreasing total task completion time and compliance latency. Wilder et al.
(2015) also suggested that a shorter inter-request time, no more than 5 s apart, may be more effective. Another recommendation that should be considered is to use three high-p requests prior to the presentation of the low-p request and then potentially fade to one high-p request (Belfiore et al., 2007).

Some research suggests that it is possible to increase compliance with a low-p instruction without actually delivering high-p instructions. Bullock and Normand (2006) used a fixed-time (FT) schedule of reinforcement to increase compliance with low-p instructions. That is, the authors evaluated whether the presentation of preferred items increased compliance without the use of the high-p instruction. In this study, a preferred edible was used in order to ensure quick delivery and consumption. These results showed that it was not necessary to implement the high-p sequence in order to increase compliance; delivering a preferred item on a FT schedule increased compliance on its own.

Normand and Beaulieu (2011) replicated this study with two young children with ASD. The FT schedule involved the delivery of edibles as the preferred item, and each item was delivered every 10s independent of responding. Three target instructions were used in a reversal design, with one participant having 2 target instructions. Using the FT schedule, compliance increased in 2 out of the 3 target instructions. Guided compliance and the high-p sequence were used for the target instruction that did not increase using the FT schedule, with guided compliance increasing compliance. The results of this study extended the findings of Bullock and Normand; however, their results were more varied. Compliance with the low-p instruction increased for only two of the three low-p instructions given.

Extending research on the high-probability sequence, Lipschultz, Wilder, and Enderli (2017) compared the effects of response independent reinforcement and the high-p sequence on compliance. Previous research had stated that response independent reinforcement may be as effective at increasing compliance as the high-p sequence. However, the results of this study were inconclusive. They
showed that neither the high-p sequence nor noncontingent reinforcement were effective at increasing compliance in two young children. However, the research showed that contingent access to a high preferred item did increase compliance among the two participants.

Since the results from Bullock and Normand (2006), Normand and Beaulieu (2011) and the Lipschultz et al. (2017) studies varied, additional research is needed to determine the conditions under which noncontingent access to a preferred item increases compliance. One reason for the variability in the results among these studies may be due to the duration of access to the reinforcer delivered. That is, longer access to a preferred item may increase the likelihood of compliance. Therefore, the purpose of this study was to determine if the duration of noncontingent access to a preferred item increases compliance in three young children with ASD.
Method

Participants and Setting

Three boys receiving services at a clinic within a children’s hospital in central Florida participated. Paul, 7 years old, Adam, 8 years old, and Matthew, 5 years old, each were diagnosed with ASD. All participants were able to follow simple vocal instructions and were able to speak in multiple-word sentences.

All sessions were conducted in a treatment room at a clinic within a children’s hospital in central Florida. Each room was equipped with a table and chairs for the participant and therapist. A therapist was present in the room during all sessions.

Materials

The materials needed for this study included the preferred items chosen by each participant via a preference assessment along with the materials needed for the task. Paul’s preferred item was an iPad™ and his low-p task was 4 step sequence cards. For this task, Paul had to put the four cards in the correct order. This particular sequence depicted feeding a dog (e.g., get the food, put the food in the bowl, put the water in the bowl, dog eating the food). Matthew’s preferred item was also an iPad™ and his low-p task was to say, “cheese” in the presence of a camera phone. Adam’s preferred item was a calculator and his low-p task was to get a board game. The therapist also used a red, blue, or green shirt depending on which condition was being conducted along with a poster board of the same color. Each poster board was correlated with a different condition (Conners et al., 2000). Visual timers were also used in order to help discriminate between the different conditions.

Response Measurement and Interobserver Agreement
During all sessions, trained observers recorded each target response (compliance). Compliance was defined as completing or initiating the task that the therapist instructed within 10 s. The dependent variable was the percentage of trials with compliance. A second dependent variable was the frequency of problem behavior in each condition. Each session consisted of 5 trials.

To determine interobserver agreement, a second observer simultaneously, but independently, observed 33% of sessions for Paul, 43% of sessions for Adam, and 39% of sessions for Matthew. An agreement was scored on a trial-by-trial basis. Interobserver agreement was calculated by dividing the number of agreements by the total number of trials in each session. This number was then multiplied by 100 in order to obtain a percentage. For both Adam and Matthew, mean IOA was 100%. For Paul, mean IOA was 98%.

Two independent observers also collected treatment integrity data on the duration of access to the preferred item in each condition. Total duration was calculated by dividing the smaller duration by the larger duration, multiplying by 100, and converting this number to a percentage. Treatment integrity was 100% during all observed sessions across all participants.

**Experimental Design**

A multielement design was used during the evaluation. The first condition (baseline) was associated with no color. That is, the therapist did not have any poster board or shirt associated with this condition. Following baseline, the three conditions were randomly presented five times each in each session. The second condition (B or the control condition) was associated with the color red. That is, the therapist placed a red poster board on the table and also wore a red shirt. In this condition, the preferred item was presented and immediately removed (i.e., 0 s of access). For the third condition, condition C, the color green was used, and the preferred item was given to the participant for 30 s. The last condition, condition D, was conducted using the color blue and included access to the preferred item for 3
min. A final condition, condition E, consisted of a choice condition in which each participant was given the option to choose which condition they most preferred based on the previously assigned color.

**Procedure**

Each participant was exposed to a paired-choice preference assessment as described by Fisher et al. (1992) in order to determine their highest preferred item. For Paul and Matthew, the preferred item was an iPad™, and for Adam the preferred item was a calculator. The participants also completed a low-preferred (low-p) instruction assessment. The therapist administered a questionnaire to the parents in order to collect a list of low-p instructions for each participant. Based on the list, the therapist conducted an assessment. During the low-p assessment, the therapist presented each instruction five times and collected data on compliance within 10 s. The instruction with the least amount of compliance was used during each session. Paul’s low-p task was to put 4 step sequence cards in order. Matthew’s low-p task was to say “Cheese” in the presence of a camera phone. Adam’s low-p task was to go get a board game. Each session included five trials with a 30 s break in between each instruction.

Prior to running baseline and the intervention, a brief training session was conducted. All participants had a history of compliance with the therapist due to years of ABA therapy. Thus, a training in which the experimenter did not require compliance to a task was conducted. This was conducted separately from the low-p task presentation. To train, the participant was presented with a task and the experimenter told the participant that if he did not want to complete the task, he could tell the experimenter “No thank you”. Again, this training was necessary due to the participants’ history with therapists delivering instructions.

During baseline, each participant was given the previously determined low-p instruction in order to assess compliance in the absence of the preferred item. In all conditions following baseline, each participant was given noncontingent access
to their preferred item for the set amount of time for that condition, immediately followed by the predetermined low-p instruction in order to test for compliance. Prior to the presentation of the preferred item, the therapist had the participant touch the colored card on the table, identify which color was being used, touch the picture of the clock associated with the condition being run, and identify what the visual timer said. The therapist then told the participant “you can play now,” then presented the item for either 0 s, 30 s, or 3 min, depending on the condition.

Each baseline trial consisted of the delivery of one low-p instruction. A session consisted of 5 trials. Each trial was randomized following baseline (e.g., CBCDBCDCBDBDC). Each session consisted of 5 trials of each of the different conditions. For the first condition (B), each participant was given noncontingent access to their preferred item for 0 s, immediately followed by the low-p instruction. During condition C, each participant had access to their preferred item for 30 s, followed by the low-p instruction. Condition D was conducted like the previous two conditions, but with access to the item for 3 min before the demand was delivered.

Once all conditions were completed, a choice phase was conducted. In the choice phase, the participants were given the option to choose which condition they most preferred based on the color that was previously assigned. The therapist also vocally reminded the participant what each color represented: red for condition B (0 s), green for condition C (30 s), and blue for condition C (3 min). Once reminded, the participant vocally selected which color they wanted while also simultaneously touching the corresponding colored poster board. Participants had access to the preferred item for the selected duration. If the participants vocal response differed from the color poster board presented, the experimenter restated the question and prompted the correct response.
Results

Paul (Figure 1) showed zero compliance with the low-p instruction during the baseline phase. In the 3 min condition, he complied with the low-p task during 91.1% of the instructions. During the 30 s condition, Paul’s compliance was 73.3%. In the 0 s condition, compliance with the low-p task was 13.3%. Paul complied with 100% of instructions in the choice phase, in which he chose the 3 min condition. Paul did engage in some problem behavior during each of the conditions (Figure 2). He engaged in problem behavior in 6.6% of the trials in both the 3 min condition and the 30 s condition and 11.11% in the 0 s condition. No problem behavior occurred during the baseline phase and the choice phase.

Adam (Figure 3) complied during a mean of 8% of sessions during baseline. In the 3 min condition, he engaged in 100% compliance with the task. For both the 30 s and the 0 s conditions Adam did not comply with the instruction. Adam did not engage in any problem behavior during any of the conditions (Figure 4).

Matthew (Figure 5) displayed 20% compliance with the low-p task in the baseline phase. In the 0 s condition, he complied with 4% of the low-p instructions. In the 30 s condition, Matthew complied with 92% of instructions. He displayed 100% compliance in the 3 min condition. He did not engage in any problem behavior during any of the conditions (Figure 6).

All participants exhibited most compliance during the 3 min condition. The lowest compliance was observed in the 0 s condition. The only participant who engaged in problem behavior during any of the sessions was Paul, though it was minimal. Compliance in the choice phase was 100%, and all participants chose the 3 min condition.
Discussion

We tested compliance with a low-p task following noncontingent access to a preferred item for three durations, 0 s, 30 s, and 3 min, as compared to baseline. Similar to the results reported by Bullock and Normand (2006), the data suggest that increased availability of a preferred item presented prior to issuing a low-p instruction can produce an increase in compliance. However, that may in part be a function of the duration of access to the preferred item.

During baseline, compliance for all participants was low. Compliance with low-p instructions increased the most following noncontingent access to the preferred item for a magnitude of 3 min for all participants. Compliance also increased for 2 out of 3 participants following access for 30 s. This suggests that for some children, noncontingent access to a preferred item for a shorter amount of time could be just as beneficial as longer durations of access. Future research should address this question and determine the lowest duration of noncontingent access to a preferred item that would still increase compliance with a low-p instruction.

In the 0 s condition and baseline, participants told the experimenter, “No thanks,” or, “No,” when presented with the low-p instruction. Paul engaged in some problem behavior during this condition by yelling, “No,” or, “No thanks.” He also would yell, “Not the red one,” when he saw the red shirt and poster board which indicated that this condition was being conducted. Neither Adam nor Matthew engaged in problem behavior during this phase; they just waited the 10 s after the initiation of the instruction was presented. Adam informed the experimenter that he would not go get the board game (his low-p task) except for when he had 3 min access to his calculator.
Due to all participants receiving ABA services for more than a year, a training component was included in this study. All participants had a history of complying with the therapist when presented with a demand, regardless of reinforcement before or after the response. The training focused on unpairing reinforcement following compliance with a task. Paul’s variability during the 0 s condition could have been due to this history of pairing. He had been in ABA therapy for 5 years and had an extensive history of accessing reinforcement when he complied with an instruction. He was also the only participant who engaged in problem behavior. His problem behavior occurred in all conditions, not just the 0 s condition. The topography of his problem behavior was yelling, “I’m finished.”

Future studies should compare noncontingent access to preferred items to increase compliance with reinforcement for compliance. Another future study should compare participants who have received ABA services for years to those who do not have a history of therapy.

Unlike Lipschultz et al. (2017), the results from the current study suggest that noncontingent access to a preferred item may increase compliance. All three participants showed increased compliance to their low-p task when they had noncontingent access to their preferred item. This is similar to the results from Bullock and Normand (2006) and Normand and Bullock (2011), whose results showed that compliance increased in both typically developing children and children with ASD. When Normand and Bullock (2011) replicated their original study with children with ASD, the results were not as clear as they were with typically developing children. However, in the current study, all participants showed clear differentiation in compliance with the low-p task across different durations.

When compared to the Bullock and Normand (2006) study that focused on a fixed time schedule of reinforcement to increase compliance with low-p instructions, the results of the current study are similar. The fixed time component
alone increased compliance in both participants which showed that it was not necessary to use the high-p sequence. However, Bullock and Normand’s (2006) results are not definitive, since the multielement design that was used could have made it difficult to clearly discriminate between conditions. This could have resulted in strengthening compliance across conditions. That is, in this study all three reinforcement conditions were presented in the same context which could have created a pattern of behavior. The current study eliminates this limitation by only using a fixed time noncontingent reinforcement to see the varying effects of different durations. Another limitation of the Bullock and Normand (2006) study was delivery of the preferred edible and praise delivered following compliance across all conditions. This could have potentially increased compliance independent of the fixed time schedule. The current study addressed this limitation by eliminating praise altogether as well as avoiding all consequence-based interventions.

Extending Bullock and Normand (2006) to children with ASD, Normand and Beaulieu (2011) replicated their original study using the same fixed time delivery of edibles. These results showed that compliance with 2 of the 3 target responses increased. The results of the current study are also similar to Normand and Beaulieu (2011), demonstrating that response-independent reinforcers can increase compliance. As with the current study, the participants were children with ASD. However, like the Bullock and Normand (2006) study, the Normand and Beaulieu (2011) study included potential carryover effects that could have increased compliance in the different conditions. The current study was able to avoid carryover effects by using distinct colors for each condition and using a multielement design that randomized presentation of each varying duration of access to the preferred item.

Lipschultz et al. (2017) extended the research of Bullock and Normand (2006) and Normand and Beaulieu (2011) by comparing different densities of FT
schedules as well as FT delivery and the high-p sequence with two different types of instructions. The results of this study were inconsistent with the previous studies. That is, Lipschultz et al. (2017) showed a failure to increase compliance with the two different schedule densities that were delivered noncontingently. The results of the current study suggest that longer durations of access might be important, and perhaps could account for the lack of effects in Lipschultz et al. (2017).

It should be noted that in the current study, noncompliance with the low-p task resulted in escape/avoidance of the task. The participants were able to avoid the low-p task in all conditions, regardless of whether or not they had access to their preferred item. This could potentially contribute to the lack of problem behavior exhibited by the participants even during baseline and the 0 s condition when there was no access to the preferred item. This may not be the case in some applied settings.

One limitation of this study was that access to the preferred item was not controlled for participants; therefore, the value of the preferred item may have varied. Both Adam and Paul had access to their preferred item throughout the day, potentially making it less valuable. Matthew only had access to his preferred item for less than an hour a day. This may have been important in contributing to compliance; even when access was only for 30 s, it was still effective at increasing compliance with a low-p task. Future studies should evaluate the durations of varying access to preferred items to see if duration alone increases compliance or if the value of the item has a larger effect.

The results of this study suggest an alternative method for increasing compliance in children with ASD. The results indicate that a longer duration of noncontingent access with a preferred item increases compliance; therapists and teachers might use this tactic in order to increase compliance with low-p instructions during sessions. This procedure might be especially beneficial to teachers when they have several children with whom they need to comply with
instructions. Future studies should examine this procedure across different settings, such as schools. Future research should also look at using noncontingent access with multiple children, such as in a classroom to see if this procedure can be beneficial to teachers with large classes. This procedure might also be paired with other procedures (e.g., guided compliance) in a treatment package in order to further increase compliance. Future research should assess the best pairings of antecedent and consequence interventions with the noncontingent access procedure.
References


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Figure 1: Comparison of baseline to noncontingent access for 0s, 30s, and 3 min, and the choice phase for Paul.
Figure 2: Problem behavior across baseline, noncontingent access for 0s, 30s, and 3 min, and the choice phase for Paul.
Figure 3: Comparison of baseline to noncontingent access for 0s, 30s, and 3 min, and the choice phase for Adam.
Figure 4: Problem behavior across baseline, noncontingent access for 0s, 30s, and 3 min, and the choice phase for Adam.
Figure 5: Comparison of baseline to noncontingent access for 0s, 30s, and 3 min, and the choice phase for Matthew.
Figure 6: Problem behavior across baseline, noncontingent access for 0s, 30s, and 3 min, and the choice phase for Matthew.