THE EFFECT OF HIGH-PROBABILITY REQUEST SEQUENCES ON LATENCY TO COMPLY WITH INSTRUCTIONS TO TRANSITION IN A CHILD WITH SEVERE MENTAL RETARDATION

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Thesis Prepared for the Degree of

MASTER OF SCIENCE

UNIVERSITY OF NORTH TEXAS

December 2010

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Carpentieri, Michelle Lee. The effect of high-probability request sequences on latency to comply with instructions to transition in a child with severe mental retardation. Master of Science (Behavior Analysis), December 2010, 41 pp., 2 tables, 4 illustrations, references, 28 titles.

This study investigated the effect of implementing high-probability request sequences prior to the delivery of instructions to transition in a child with severe mental retardation. Data were collected on latency to comply with a low-probability request to transition and a modified version of the low-probability request. Implementation of high-probability request sequences resulted in shortened latencies to comply with the modified low-probability request instructing the child to engage in a preferred activity located at the endpoint of the transition.

ACKNOWLEDGEMENTS

I would like to thank Dr. Janet Ellis for her incredible patience, guidance, and support throughout my graduate career at the University of North Texas as well as her shaping of my behavior as a practitioner of applied behavior analysis. I would also like to express my gratitude to Dr. Einar Ingvarsson and Dr. Smita Mehta for their insightful and helpful feedback on my thesis. Finally, thanks to my family for their immeasurable support and encouragement as I pursue my dreams.

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CHAPTER I

INTRODUCTION

Excessive transition times between classroom activities is a common problem in schools, with students spending over 70 min a day engaged in preparation and clean-up activities in some classrooms (Fisher et al., 1980 as cited in Ardoin, Martens, & Wolfe, 1999). Efficiently transitioning from one instructional activity to another increases academic learning time. By dedicating more time to academic tasks, students are provided more opportunities to respond (Christenson & Ysseldyke, 1989; Wyne & Stuck, 1982).

Difficulty transitioning from one activity to another during the school day is a challenge for some students with developmental disabilities (Sainato, Strain, Lefebvre, & Rapp, 1987). Noncompliance with instructions to transition may be defined as ignoring teacher instructions or may involve aggression or self-injurious behavior. Difficulties encountered during transitions may also include avoiding the approaching activity or setting, escaping from the instruction associated with transition (regardless of task preference), and attempting to re-establish a terminated activity (Davis, Reichle, & Southard, 2001).

Several interventions have increased compliance and decreased transition times for children with developmental disabilities. Such interventions include teaching transition routines at the beginning of the school year (Gettinger, 1988), informing students of the upcoming transition (Cote, Thompson, & McKerchar, 2005; Tustin, 1995), assigning typically developing peers as “buddies” to assist children during transitions (Sainato et al., 1987), and providing visual schedules to students (Waters, Lerman, & Hovanetz, 2009). Delivering high-probability (high-*p*) requests has also proved successful for increasing transition behaviors for students with and without disabilities (Banda, Neisworth, & Lee, 2003).

High-*p* request sequences involve delivering several requests with which a participant is likely to comply prior to issuing an instruction with which the participant is usually noncompliant (Mace et al., 1988). These high-*p* sequences have been reported to be effective interventions for reducing noncompliance in children and adults diagnosed with developmental disabilities. High-*p* request sequences have been implemented successfully in a wide range of contexts including treatment of escape-motivated stereotypy (Mace & Belfiore, 1990); medication acceptance (Harchik & Putzier, 1990); social interactions (Davis, Brady, Hamilton, McEvoy, & Williams, 1994); attempts to complete difficult tasks (Horner, Day, Sprague, O’Brien, & Heathfield, 1991); compliance with instructions (Bullock & Normand, 2006; Davis, Brady, Williams, & Hamilton, 1992; Ducharme & Worling, 1994; Rortvedt & Miltenberger, 1994; Wilder, Zonneveld, Harris, Marcus, & Reagan, 2007).

In addition to the aforementioned contexts, researchers have demonstrated the efficacy of high-*p* request sequences to increase compliance during transitions in school settings. Singer, Singer, and Horner (1987) investigated the effects of delivering pre-task request sequences to increase compliance with an instruction to “return to work” from recess in elementary-aged students. They developed a procedure consisting of a rapid series of two- to three-word requests delivered immediately prior to the request, “Return to work.” The implementation of this request sequence yielded significant increases in compliance with the instruction, “Return to work,” in the participants.

Ardoin, Martens, and Wolfe (1999) conducted the first study investigating the effects of a group application of high-*p* sequences to increase compliance during transitions. The high-*p* sequence was delivered to the class as a group, while recording data on compliance of three target children. Ardoin et al. (1999) also incorporated a fading procedure designed to transfer stimulus control from the high-*p* sequences to the original instruction with which the participants were noncompliant. Results indicated that high-*p* requests increased compliance with instructions to transition for two of the three students, and the results were maintained at 2- and 3- week follow-up.

Davis, Reichle, and Southard (2001) compared the effects of high-*p* requests and using a preferred item as a distractor on increasing compliance and reducing inappropriate behavior (e.g., hitting staff, screaming, dropping to the floor) during transitions in two young students with developmental disabilities. During the preferred item as a distractor condition, the teachers handed each student a preferred item prior to delivering a request to transition. The student held onto that item during the transition period. Results indicated that both interventions were effective in increasing compliance and reducing inappropriate behavior in both students.

Banda and Kubina (2006) examined the effects of teacher-implemented high-*p* sequences on compliance with instructions to transition in a middle-school student with autism. Delivering high-*p* sequences reduced latency to complete transition activities. Banda and Kubina (2006) also reported a decrease in the number of prompts delivered to the student during transitions.

In addition to demonstrating the efficacy of high-*p* request sequences, most researchers have explained the procedure's effectiveness as a result of behavioral momentum. Mace et al. (1988) related the success of high-*p* request sequences to establishing behavioral momentum (a theory originating in basic operant research). Behavioral momentum refers to the tendency for a behavior to persist following a change in environmental conditions (Mace et al., 1988). Nevin, Mandell, and Atak (1983) proposed similarities between a behavior's resistance to change and the momentum of objects in motion as described by Newton's first law of motion. Nevin et al. (1983) suggested that a behavior's resistance to change (i.e., response strength) was analogous to behavioral mass, and response rate was analogous to behavioral velocity. Increasing response rate of a behavior and rate of reinforcement affects the behavior's resistance to change. A greater rate of reinforcement produces stronger behavioral momentum.

Mace et al. (1988) conducted a series of five experiments investigating the effect of high-*p* request sequences on noncompliance, excessive compliance latency, and task duration. All five studies were conducted in a group residential living facility for adults with moderate to severe mental retardation. A high-*p* request sequence was implemented to increase participants' response rate, thereby increasing the rate of reinforcement delivered for compliance with these requests. Results showed high-*p* request sequences increased compliance, reduced compliance latency, and reduced task duration for all participants.

Mace and his colleagues interpreted their results within a behavioral momentum framework. An increase in rate of compliant behavior and rate of reinforcement during the high-*p* sequence creates momentum persisting when the individual is presented with a low-probability request. A low-probability (low-*p*) request is defined as a request with which an individual is unlikely to comply. Implementing a high-*p* request sequence in each of the five experiments appeared to establish a series of responses with high behavioral mass. Increased compliance with low-*p* requests following the high-*p* sequence may be evidence of the behavior's resistance to change when presented with altered environmental conditions (Mace et al., 1988).

The present study was designed to replicate prior research investigating the effects of high-*p* request sequences on compliance with instructions to transition between classroom activities. This study also extended prior research involving high-*p* request sequences in two ways. First, it examined the effect of combining high-*p* sequences with an instruction that states engagement in a relatively higher preferred activity. This component of the current study incorporated a strategy implemented by Sainato et al. (1987) to facilitate transition times with handicapped preschool children. This strategy involved introducing an antecedent event that set the occasion for performance. Teachers presented a card with a large hotel-style bell drawn on the paper and instructed the target students to go to another area and ring the bell. Results showed presenting the antecedent prompt produced the most significant increases in compliance with teacher commands to move to a different area. Instead of placing an arbitrary object (i.e., the bell) at the endpoint of the transition, the present study investigated the effect of using a relatively higher preferred activity. The instruction to complete the undesired transition ("Go sit at your desk") was replaced with an instruction to engage in a relatively higher preferred activity placed at the endpoint of the transition. Thus, the student could complete the transition without hearing the instruction, "Go sit at your desk," which had a history of noncompliance.

The second extension of prior research involving high-*p* sequences was testing for generalization of treatment effects in the participant's primary classroom. Thus far, Davis et al. (1994) has conducted the only study examining generalization effects of high-*p* sequences across settings. Their study evaluated the effects of high-*p* request sequences on the social interactions of three young students with autism and other disabilities. The present study examined generalization effects of high-*p* sequences on reducing latencies to comply with instructions to transition across settings for a student with severe mental retardation.

The purpose of this study was to reduce latency to comply with instructions to transition for a student with severe mental retardation. Specifically, this study was designed to address the following research questions: (a) How will implementing high-*p* sequences affect latency to comply with an instruction to return to a desk? (b) How will implementing high-*p* sequences affect latency to comply with an instruction to transition to a relatively higher preferred terminal activity?

CHAPTER II

METHOD

Participant

Ava is an 11-year-old female with severe mental retardation. Standard testing instruments were not able to be used with Ava due to her disability. Observations, teacher and parent interviews, and an adaptive behavior scale were used to estimate Ava's cognitive development. The Vineland Adaptive Behavior Scale was used to determine Ava's level of functioning in the areas of communication, daily living skills, socialization skills, and motor skills. Results indicated Ava's adaptive level for each area was low.

During the course of this study Ava was enrolled in a fifth-grade life skills classroom with two students with mental retardation and behavior problems. As stated in written reports and corroborated by direct observations, Ava's repertoire differed greatly in academic and developmental levels compared to the students in her classroom. Ava's academic tasks consisted of matching numbers, letters, shapes, and colors, threading beads, sorting objects, and naming objects when prompted by staff. Her classmates could trace their names, type on computers, count to 20, name objects without prompting, and complete puzzles. While her classmates responded to any teacher instructions related to class work or transitions, Ava could respond appropriately to a very limited number of instructions delivered to her during work sessions and while transitioning. Her vocal repertoire consisted primarily of one-word requests (e.g., “potty,” “outside,” “cookie”) and imitations of the words and phrases (up to 4 words) spoken by classroom staff. At the conclusion of intensive behavioral rehearsals conducted prior to this study, she was able to respond appropriately to several one-step instructions [e.g., “sit down”; “line up”; “show ready”; “match (color, letter, shape, number)”; “say (color, shape, letter, number)”; “touch (color, shape, letter, number)”].

As observed by the experimenter, Ava engaged in noncompliant behavior when instructed to transition back to her classroom work area following periods of earned play/free time. Such behavior included remaining seated on the floor, mumbling to herself, touching objects in her vicinity, rolling on the floor, and/or running from classroom staff. She never engaged in aggressive and/or self-injurious behaviors during episodes of noncompliance. Ava always complied with instructions to transition, but the latencies to comply averaged 8 min. Prior to any intervention she was often physically prompted to initiate or complete the transition to her desk. Due to her size and school policy, physically prompting Ava was not a long-term practical option for managing her noncompliance during transitions.

Settings and Materials

Baseline phases, Conditions 1 and 2, and maintenance tests occurred in a separate room from Ava’s primary classroom. During the aforementioned phases of the study Ava and the experimenter were the only individuals in the room. This room was chosen because there were fewer distractions. In the primary classroom, the staff constantly delivered instructions to the other students. Ava’s attention was easily diverted away from tasks during work sessions, especially when her classmates were engaged in any activity other than academic work. Staff delivered numerous instructions when her classmates were not working. It was necessary for this study that the experimenter had Ava's undivided attention during sessions so that she heard the experimenter's requests. After testing each condition in the experimental room, the experimenter implemented the most effective condition with Ava in her primary classroom (i.e., the generalization tests).

Ava worked in the experimental room individually with her classroom aide and/or the experimenter during the fall of her fifth-grade school year. She spent 2 months working in her primary classroom before returning to the experimental room. The experimental room was equipped with 4 student desks, 5 chairs, and a teacher's desk. When sessions were conducted the experimenter brought play materials from the primary classroom to this room. Ava's play materials included a hula hoop, balls, and stuffed animals.

The preference assessment, high-probability (high-*p*) requests test, low-probability (low-*p*) and modified low-*p* requests tests, and generalization tests took place in the primary classroom. The classroom staff and other students in her classroom were present in the room during the preference assessment, high-*p* requests test, and low-*p* and modified low-*p* requests tests. The classroom staff and students were present during 6 of the 15 sessions of the generalization test. Ava and the experimenter were alone in the classroom during the remaining 9 sessions of the generalization test. The primary classroom contained 2 rectangular tables, 1 large circular table, 12 classroom chairs, a teacher's desk, 2 computers, a set of cubby holes in which the students' backpacks and jackets were stored, and an area of shelving on which classroom materials were stored. The classroom was divided into 7 areas: computer center, teacher's desk, group work table, calendar corner, reading/circle time, bell work table, and Ava's work area. Ava's work area was located in a corner of the room. It contained two 3-drawer containers which held her academic materials, 2 chairs, a rectangular table, and a large bin in which her play materials were stored.

All sessions in the study were video recorded using a hand-held digital video camera. The generalization tests conducted in Ava's primary classroom with her classmates present were not video recorded. The experimenter used these recordings to score sessions and conduct interobserver agreement observations.

Preliminary Interventions and Assessments

Preliminary interventions. Prior to this study multiple treatment options had been attempted to shorten the response latency for Ava to comply with instructions to transition. Such options were to warn Ava that termination of play time was approaching; to allow her to engage in a preferred activity when/if she sat down at her desk; to deliver edibles, she rarely received otherwise, as soon as she initiated and when she completed the transition to her desk; to tell Ava she could engage in a preferred activity once she returned to her desk; to deliver the instruction every 30 s and wait for her to initiate the transition independently. None of these options resulted in compliance with instructions to transition within 1 min of the delivery of the first instruction 80% of the times she was instructed to return to her desk.

It was important to identify an effective option for managing Ava's compliance with instructions to transition. Two classroom staff worked in Ava's primary classroom. During some instances when the staff delivered an instruction to transition every 30 s waiting for Ava to complete the request, she climbed on classroom furniture and ran from the staff member who attempted to get Ava to return to her desk. In these instances, both the teacher and aide intervened to block access to areas of the room and prompt Ava to her work area. This staff engagement left the other students unsupervised. Time and staff attention could not be spent waiting for Ava to return to her desk after she earned an opportunity to play. If the high-*p* request sequence intervention reduced the latency to comply with instructions to transition, Ava could participate in more activities with her classmates away from her work area without both staff members required to return her to the desk. Implementing a high-*p* request sequence would also involve little to no risk to the safety of Ava or staff compared to the challenges involved in physically prompting Ava to her desk (i.e., dropping to the floor and staff straining to lift her).

Low-probability request test. The low-*p* request was defined as an instruction to transition with which Ava had a history of noncompliance. The low-*p* request, "Go sit at your desk," was determined by observing Ava when instructed to transition from play activities to her desk in the classroom. Ten trials were conducted a week prior to the implementation of the first baseline phase. After 5 min of play, the experimenter delivered the request, "Go sit at your desk." The experimenter started the time on a stopwatch at the termination of the delivery of the request. The request was delivered every 30 s until Ava completed the request. Completion of the request was defined as Ava returning to her desk and sitting in her chair.

Modified low-probability request test. The original low-*p* request, "Go sit at your desk," was modified to an instruction that stated engagement in a relatively higher preferred activity located at the endpoint of the transition. This modified request, "Go play hot potato," was delivered during Condition 2, maintenance tests, and generalization tests of the present study. "Hot potato" was what Ava called putty. Due to Ava's limited language skills, high-*p* and low-*p* requests delivered during this study were direct one-step instructions that included words she had heard throughout the course of the school year. The experimenter modified the original low-*p* request to state, "Go play hot potato" instead of "Go play with putty" because Ava referred to putty as "hot potato."

The experimenter determined Ava's probability of compliance with the modified request by delivering the request over 10 trials and measuring the latency to comply. Ten trials were conducted during the week prior to the implementation of the first baseline phase. After 5 min of play in the classroom, the experimenter delivered the modified request, "Go play hot potato." The experimenter started the time on a stopwatch as soon as the request was delivered. The request was delivered every 30 s until Ava completed the request, which was defined as sitting at the chair behind her desk.

"Go sit at your desk" and "Go play hot potato" qualified as low-probability because Ava took longer than 30 s to complete the requested responses in more than five of the trials. These trials determined that nonperformance of the low-*p* request and modified low-*p* request was a result of noncompliance rather than lack of physical ability or comprehension of the instructions.

High-p requests test. High-*p* requests were defined as instructions Ava had a history of performing. A pool of eight requests was determined by observing Ava during play. Ten trials were conducted over the course of 3 days to determine the probability of compliance with each request. Within each trial all 8 requests were delivered in random order during a play break.

After 2 min of play, the experimenter removed the toy item from Ava. The experimenter began the trial once she had Ava's attention (i.e., eye contact). The first request was delivered and Ava was given 5 s to respond. If she complied, the experimenter delivered descriptive praise and delivered the next request within the set. If she did not comply within 5 s, the experimenter delivered the next request. The final pool of high-*p* requests included requests with which Ava had complied at least 80% of the time. Six high-*p* requests were used during this study: (a) "Clap hands," (b) "Hands up," (c) "Stomp feet," (d) "Say pink," (e) "Say purple," and (f) "High five." For each high-*p* request sequence delivered during the present study, three requests were randomly selected from the pool of 6.

The 3 requests delivered in each high-*p* request sequence were selected randomly based on the findings of previous research. Zarcone, Iwata, Mazaleski, and Smith (1994) examined the effects of a high-*p* sequence, when implemented alone and then with an extinction component, as a treatment for escape-maintained self-injurious behavior (SIB). When implemented alone, the high-*p* sequence had no effect on SIB or compliance with low-*p* requests. Zarcone et al. noted a decrease in compliance with high-*p* and low-*p* requests when a single set of three high-*p* requests were presented. They suggested two possible explanations for this result. First, high-*p* requests, when paired repeatedly with low-*p* requests, may acquire the aversive properties of the low-*p* request. Second, the high-*p* requests may become discriminative stimuli for reinforced escape behavior.

Based on the explanations suggested by Zarcone et al. (1994), Davis and Reichle (1996) examined the effects of variant versus invariant high-*p* request sequences on the efficacy of the high-*p* intervention to increase compliance. Their results demonstrated that high-*p* requests delivered in a variant sequence were more effective than high-*p* requests delivered in an invariant sequence. The decrease in compliance with invariant high-*p* requests and subsequent low-*p* requests supported what was initially suggested by Zarcone et al. In addition to Zarcone et al.'s explanation, Davis and Reichle suggested the repeated presentation of high-*p* requests may produce satiation to reinforcers delivered for compliance. If satiation occurs, the probability of compliance with those high-*p* requests diminishes. Diminished compliance would affect the attempt to create behavioral momentum, which relies on increased response and reinforcement rates. The experimenter of the current study delivered 3 high-*p* requests selected at random from a pool of six requests in an attempt to produce the greatest rate of responding prior to delivering the low-*p* request or modified low-*p* request.

Behavioral Measures and Interobserver Agreement (IOA)

The dependent variable was latency to comply with the low-*p* request and modified low-*p* request. Compliance latency was defined as the interval beginning with the completion of the experimenter's delivery of a low-*p* request and ending with Ava sitting in the chair located behind a student desk. Latency was measured in minutes to the nearest second by the experimenter using a stopwatch.

IOA. A trained observer independently scored latency to comply with the low-*p* request and the modified low-*p* request during 30% of the sessions across all phases. IOA was measured by comparing the observer's records with the experimenter's records on a trial-by-trial basis. For latency measures an agreement was defined as both observers recording the time of a transition within ± 2 s of each other. Mean agreement for latency was 98% across the experimental phases (range 85.7%-100%).

Procedures

Preference assessment. Prior to the implementation of the study the experimenter conducted a paired choice preference assessment (Fisher et al., 1992) to determine which play item Ava most preferred. This play item would be used in the modified low-*p* request delivered during Condition 2 of the study. Five items were selected for the preference assessment. The items were selected based on two criteria: (a) what object Ava had requested during previously observed play times when she was in her primary classroom and (b) whether she could interact with the item while seated at her desk. The items included putty ("hot potato"), clay, a water snake, a small ball, and crayons and coloring pages. Each item was paired once with every other item, in a randomized order, for a total of 10-pair presentations. The left and right positioning of each item when a pair was presented was also randomized.

With Ava seated at her desk, two items were simultaneously presented 0.30 m apart and approximately 0.25 m in front of the participant. She was instructed to pick one item and allowed 10 s to choose. When she chose an item, the remaining item was removed and she interacted with the chosen item for 10 s, then the next trial began. If no selection was made within 10 s of being instructed to select an item, the experimenter removed both items and advanced to the next pair presentation.

After the 10-pair presentations Ava had selected putty and water snake on three trials each, which resulted in a tie. Five additional pair presentations of putty and water snake were conducted to determine which item was the most preferred. Left and right positioning of the items on the desk were randomized. Presentations were conducted in the same manner as the initial 10-pair presentations. The results of the tie breaker trials indicated that the putty was the most preferred item.

Baseline. Each phase of the study, except the generalization tests, was implemented in the following manner: Sessions were conducted between 9:00 a.m. to 11:20 a.m. The experimenter conducted morning sessions to prevent exhausting Ava. Ava displayed longer periods of attention toward staff during morning hours. Conducting sessions in the morning hours enabled Ava to participate in special activities with her classmates (e.g., playing in the motor lab, music class, and gym). An average of 5 sessions was completed each day the study was conducted.

The experimenter brought Ava to the individual room and allowed her to play while she arranged the room for the experimental sessions. She also set up a work area for Ava. Once the room setup was completed, the experimenter instructed Ava to return to her desk and conducted a work session consisting of 2-3 tasks. Following a work session, Ava was given a 5 min break to interact with the experimenter and/or the play materials in the room. Approximately 45 s prior to the end of the 5 min, the experimenter turned on the video camera and began recording the session. The video camera was positioned on a student desk located near the door across the room from Ava's work area (about 6 m from the back wall of the room).

During baseline phases the experimenter delivered the low-*p* request, "Go sit at your desk," after end of the 5 min play period. This request was delivered during each baseline phase. The experimenter started time on a stopwatch as soon as the request was delivered. The low-*p* request was delivered every 30 s until Ava completed the request. No prompts, visual or physical, were provided during any phase of this study. The experimenter stood within 0.30-0.91 m of Ava while delivering the request and waiting for Ava to respond. When Ava complied with the request the experimenter delivered praise and a squirt of candy spray into her mouth. The experimenter then walked across the room to pause the recording on the video camera. There were 15 sessions conducted during the first baseline phase, 10 sessions during the second baseline phase, and 10 during the third baseline phase.

Condition 1. A high-*p* request sequence preceded the delivery of the low-*p* request. The high-*p* request sequence involved delivering 3 high-*p* requests, one every 5 s. The low-*p* request was delivered approximately 5 s after the last high-*p* request, or reinforcer delivered for compliance with the last high-*p* request of the sequence. The experimenter moved her lips to count the 5-s interprompt time (IPT) to herself (i.e., "One

Mississippi, two Mississippi," etc.). IPT was defined as the time interval beginning with the cessation of a high-*p* request and ending with the onset of the next high-*p* request or the low-*p* request.

To ensure the experimenter delivered precisely timed 30 s intervals two stopwatches were used: one to record latency to comply with the low-*p* request and another to record the 30 s interval between delivery of the low-*p* request and the next high-*p* request sequence in the event of noncompliance. Both stopwatches were started at the cessation of the first low-*p* request delivered in the session. The stopwatch recording the 30-s IPT was stopped and reset at the onset of the first high-*p* request in the next sequence and started as soon as the low-*p* request was delivered. Both stopwatches were stopped when Ava sat in her chair in the work area. Then latency to comply with the low-*p* request was recorded.

Compliance with each high-*p* request was immediately followed by praise and a squirt of candy spray into Ava's mouth. If Ava was noncompliant with a high-*p* request within 5 s of delivery, the experimenter presented the next high-*p* request in the sequence or the low-*p* request. Compliance with the low-*p* request resulted in another squirt of candy spray and praise. If she failed to complete the low-*p* request within 30 s of its delivery, the experimenter repeated the high-*p* request sequence prior to delivering the low-*p* request again. Twenty sessions were conducted in Condition 1.

Condition 2. High-*p* request sequences preceded delivery of the modified low-*p* request, "Go play hot potato." Ava's access to putty was restricted throughout the course of the study immediately following the preference assessment. She was provided 30 s of access to putty when she complied with the modified low-*p* request during Condition 2. The procedure remained consistent with that of Condition 1 regarding compliance and noncompliance with requests, delivery of high-*p* sequence, and the use of the stopwatches to record latency and the 30-s IPT. When Ava sat down in her chair at her desk, the experimenter immediately handed her the putty and delivered praise and a squirt of candy spray. Twenty sessions were conducted in Condition 2.

Maintenance tests. This phase was conducted following a 4-day break from school and the study. The experimenter reviewed the data to determine which condition produced the greatest effect (i.e., produced latencies to return to her desk in 1 min or less across 80% or more of the sessions). The data indicated that Condition 2 was the more effective intervention.

The maintenance tests were designed to determine whether implementing Condition 2 would show Ava continuing to return to her desk within 1 min following delivery of the modified low-*p* request. Sessions replicated the procedures of Condition 2. Ten sessions of maintenance tests were conducted.

Generalization tests. Once the data showed the effects of Condition 2 maintained latencies of less than 1 min to comply with the modified low-*p* request during the maintenance test, the experimenter conducted sessions of Condition 2 with Ava in her primary classroom. Two areas were used in the classroom during this phase. Area 1 was located near Ava's work area and extended out approximately 1.52 m from the edge of her work table to the end of a small bookcase. Area 2 was the reading/circle time area in the classroom. This area was located in the front of the classroom approximately 8 m from Ava's work area. Generalization tests were conducted in Areas 1 and 2 when Ava and the experimenter were alone and when the classroom staff and students were present.

The procedures in Condition 2 were replicated in the generalization tests. During the generalization tests the video camera was placed in a corner of the room located diagonally from Ava's work area to maximize the area recorded during the session. Fifteen sessions were conducted in the following order: 4 sessions in Area 1 alone, 5 sessions in Area 1 with the classroom staff and students present, 5 sessions in Area 2 alone, and 1 session in Area 2 with the classroom staff and students present.

Procedural Integrity

An independent observer scored the experimenter's administration of the treatment for 30% of randomly selected sessions in Condition 1, Condition 2, and maintenance and generalization tests. Correct performance of the high-*p* sequence required (a) the delivery 3 high-*p* requests in a sequence, (b) delivery of reinforcers following compliance with requests, (c) administration of high-*p* requests and the low-*p* request or modified low-*p* request within 5 s of the previous request, and (d) initiation of a sequence following 30 s of noncompliance with the previous low-*p* request or modified low-*p* request. Correct implementation of the treatment was recorded if the experimenter delivered three high-*p* requests per sequence and delivered reinforcers following compliance with requests. The 5-s and 30-s IPTs were measured using a stopwatch. IPT measurements within ± 2 s were considered to be correct implementation of the treatment.

Procedural integrity was calculated by dividing the number of correct implementations of the treatment by the total number of implementation opportunities and multiplying by 100. Correct implementation of delivery of three high-*p* requests and reinforcers was 100% across sessions of Condition 1, Condition 2, and maintenance and generalization tests. The 5-s IPT was implemented correctly 94.4% of opportunities during Condition 1, 96.9% of opportunities during Condition 2, 93.8% of opportunities during maintenance tests, and 95% of opportunities during generalization tests. Correct implementation of 30-s IPTs was 92.3% for Condition 1, and 100% for Condition 2 and maintenance tests.

Experimental Design

The experimental phases were presented in a reversal design, ABACACDE. The phases were as follows: (a) Baseline, (b) Condition 1, (c) Condition 2, (d) maintenance tests of the effects in Condition 2, and (e) generalization tests of the effects in Condition 2. Eight phase changes occurred: 3 baseline phases, 1 Condition 1 phase, 2 Condition 2 phases, 1 maintenance phase and 1 generalization phase.

CHAPTER III

RESULTS

Figure 1 displays Ava's latency to comply with "Go sit at your desk" during the low-probability (low-*p*) request test. The shortest latency was 1 min 8 s recorded during Session 1, and the longest latency was 17 min 41 s recorded during Session 10. The remaining latencies ranged between 4 min and 11 min. Figure 2 shows the Ava's latency to comply with "Go play hot potato" during the modified low-*p* request test conducted prior to implementing the experimental phases of the study. Latency to comply with this request ranged from 9 s to 8 min 26 s across 10 trials.

Figure 3 depicts Ava's latency to comply with low-*p* requests during baseline, Condition 1, Condition 2, and maintenance test phases. During the initial baseline phase latency to comply with the low-*p* request ranged from 16 s to 27 min 36 s. Ava's latency to comply with the low-*p* request during Condition 1 remained variable ranging from 5 s to 36 min 21 s. Compliance latency during the second baseline phase varied from 44 s to13 min 14 s. During Condition 2 Ava's latency to comply with the modified low-*p* request ranged from 9 s to 2 min 21 s. Compared to the latencies to comply with the low-*p* request during the first and second baseline phases and Condition 1, she consistently complied with the modified low-*p* request at a more rapid rate.

In the third baseline phase Ava's latency to comply immediately increased to 16 min 15 s. Throughout this phase her response latency averaged 6 min ranging between

38 s and 16 min 15 s. During the return to Condition 2 phase she complied with the modified low-*p* request in 12 s or less in 4 of the 5 sessions. The slowest latency was 2 min 23 s occurring during the third session. Ava's latency to comply with the modified low-*p* request ranged from 7 s to 3 min 55 s during the maintenance tests. Latency ranged from 5 s to 16 min 24 s during the generalization tests.

Figure 4 shows latency to comply with the modified low-*p* request during the generalization tests. When Ava was located in Area 1 of the room while alone with the experimenter her latency to comply with the modified low-*p* request were short ranging from 7 s to 1 min 3 s. During the second generalization test sessions conducted with Ava originating in Area 1 with distractions present, latency to comply was 5 s in the first session before increasing to 3 min 3 s in the second session. Ava's latency to comply with the modified low-*p* request returned to shorter latencies during the final three sessions. These latencies ranged from 5 s to 58 s. When Ava was located in Area 2 and alone with the experimenter latency to comply with the modified low-*p* request remained short ranging from 13 s to 1 min 36 s across 5 sessions. The longest latency was recorded during the fourth and final generalization test (i.e., Ava located in Area 2 of classroom with distractions present). Latency to comply with the modified low-*p* request was 16 min 24 s during this session.

CHAPTER IV

DISCUSSION

The results of this study indicate that implementing a high-probability (high-*p*) request sequence prior to the delivery of the modified low-probability (low-*p*) request was effective in reducing compliance latency. This effect maintained after a 4-day hiatus from the study. Most importantly, Ava continued to comply with the modified low-*p* request within 1 min of the delivery of the sequence during generalization tests conducted with and without distractions in Area 1 and in Area 2 while alone with the experimenter. The high-*p* request sequence had little effect on evoking consistent compliance with the low-*p* request within 1 min of the first delivery of the request.

After the first presentation of the high-*p* sequence Ava's percentage of compliance with high-*p* requests during Condition 1 dropped over 30% and remained lower than 70% in 19 of the 20 sessions. The longest latencies recorded accompanied the lowest percentages of compliance with high-*p* requests. It is not clear why this reduction and variability in compliance with high-*p* requests occurred. As suggested by Zarcone et al. (1994) and Davis and Reichle (1996), it is possible that the high-*p* sequence acquired the aversive properties of the low-*p* request, despite delivering a random sequence. The order of request delivery may not have been the reason for low compliance. Instead, low compliance could have been due to the implementation of a novel pattern of requests (i.e., the high-*p* sequence) preceding the delivery of the low-*p* request. Overall, the presentation of an instruction sequence may have functioned as an S-delta (S^{Δ}) for compliance with both low- and high-*p* requests.

As stated by Nevin et al. (1983) and Mace et al. (1988), the momentum of a specific behavior is a function of the response rate and rate of reinforcement. Increasing response rate and reinforcement rate results in greater behavioral persistence when an environmental change occurs (i.e., presentation of low-*p* request) (Mace et al., 1988). The low response rate and reinforcement rate accompanying the high-*p* requests could explain the inability of the high-*p* sequences to evoke consistent immediate compliance with the low-*p* request during Condition 1.

The most intriguing result of the current study was consistent compliance with the modified low-*p* request within 1 min of the delivery of the request despite compliance with high-*p* requests averaging between 56% and 67% across both phases of Condition 2 and maintenance and generalization tests. Three possibilities may explain these results. First, the implementation of the high-*p* sequence may have become a discriminative stimulus (S^{D}) for acquiring the preferred object, putty. Embedding engagement with a relatively higher preferred activity in an instruction to transition may explain how the high-*p* sequences could have functioned as S^{D}'s.

Sainato et al. (1987) offered three speculations as to why the “ring the bell” intervention implemented in their study produced the greatest compliance with transitions. First, the bell may have acted as a salient cue for the children to help them reach the endpoint of the transition successfully. Second, the bell may have acquired reinforcing properties. Third, the instruction, “Go to the table and ring the bell,” may have provided the children an alternative to perform a more desired behavior, thus removing the focus on a less desired behavior (i.e., walking quickly and quietly to the next activity).

The second speculation provided by Sainato et al. (1987), could account for the high-*p* sequence becoming an S^D. Prior to conducting this study, putty was requested most often by the participant during school days, and it had been demonstrated to be an effective reinforcer for engagement with academic tasks. The pre-existing reinforcing properties of putty were highly likely in effect during this study. Hence, it was possible the high-*p* sequences functioned as S^D's due to repeated pairings with the instruction, “Go play hot potato.”

Sainato et al. (1987) speculated the instruction, “Go to the table and ring the bell,” provided their participants an alternative to perform a more desired behavior. This speculation could explain the reduction in latency to comply with the modified low-*p* request. It is possible the instruction to play with putty (at the endpoint of the transition) provided Ava an alternative to perform a more desired behavior instead of focusing on the less desired behavior, returning to the desk.

Third, the possibility exists that the increased rate of compliance with high-*p* requests observed during Condition 2 was great enough to produce behavioral momentum. Compared to Condition 1, percentage of compliance with high-*p* requests was 67% or greater in more sessions of Condition 2 (approximately twice as many). By complying with more requests in Condition 2, Ava was able to earn more reinforcers, thus strengthening her behavioral resistance to change when presented with the modified low-*p* request.

Based on the results of this study and reported results in previous transition literature, it appears that a combination of the reinforcing properties of putty plus behavioral momentum attributed to the reduced latency in complying with the modified low-*p* request during Condition 2. As illustrated in Figure 2, Ava's latency to comply with the modified low-*p* request (not preceded by a high-*p* sequence) was inconsistent and excessive with latencies ranging from 9 s to 8 min. Delivering putty as a consequence for returning to her desk resulted in shorter latencies to comply with the modified low-*p* request compared to the low-*p* request, but access putty failed to evoke compliance with the modified request within 1 min of the first delivery of the request in more than 5 trials during the modified low-*p* request test. Therefore, it was doubtful access to putty was a reinforcer for Ava's compliance with the modified low-*p* request prior to implementing the high-*p* sequence.

In prior studies reporting the greatest increases in compliance (as a result of the high-*p* request sequence intervention), percentages of compliance with high-*p* requests ranged from 75% to 100% (Davis & Reichle, 1996; Ducharme & Worling, 1994; Mace et al., 1988). The percentage of compliance with high-*p* requests during Condition 2 averaged 61%. In 16 of the 20 sessions, percentage of compliance was 67% or less. Since Ava's percentage of compliance with high-*p* requests was low compared to prior research, it was unlikely that momentum alone accounted for the reduced latency to comply with the modified low-*p* request.

Low compliance with all of the high-*p* requests delivered was recorded during each experimental phase although Ava's percentage of compliance with each request was 80% to 100% during the initial high-*p* test. When high-*p* request sequences have successfully increased compliance with instructions to transitions in prior studies, researchers reported percentages of compliance with high-*p* requests ranging from 67% to 100% (Ardoin et al., 1999; Davis et al., 2001; Mace et al., 1988). One possibility for Ava's low compliance with high-*p* requests was how frequently each request was delivered since the pool was limited to 6 requests. Frequent use of the high-*p* requests may have caused Ava to lose interest in responding to them.

"Losing interest" in the requests could have been a result of satiation. Davis and Reichle (1996) suggested the possibility of satiation as a result of repeated presentation of reinforcers for compliance with high-*p* requests. In this study, Ava earned praise and one squirt of candy spray each time she complied with high-*p* requests. Candy spray was selected as an additional reinforcer based on observations conducted during work sessions prior to this study. High rates of compliance with instructions were recorded when candy spray was delivered for correct responses and appropriate behavior during work sessions. Since the same reinforcers were delivered contingent upon compliance with high-*p* requests during this study, Ava may have become satiated.

It is also possible the candy spray was no longer an effective consequence for performing the behaviors necessary to comply with each high-*p* request. Mace, Mauro, Boyajian, and Eckert (1997) conducted 3 studies to test their hypothesis that the efficacy of the high-*p* intervention may be improved by using higher quality reinforcers for compliance with high-*p* requests. The study most applicable to the current study compared the effects of delivering praise, food, or praise plus food for compliance with high-*p* requests in 2 adolescents with moderate mental retardation. Results demonstrated improved compliance with high-*p* requests when the participants earned food and/or praise plus food. Based on the results of Mace et al. (1997), it is possible Ava's compliance with high-*p* requests decreased due to the quality of the reinforcers delivered for compliance with high-*p* requests.

It is important to note the relationship between the modified low-*p* request delivered during this study and nondirective prompts. Piazza, Contrucci, Hanley, and Fisher (1997) developed a treatment package to decrease the aversiveness of hygiene tasks by presenting them in a nondirective manner to a child with mild mental retardation. Nondirective prompts were verbal suggestions, cues, or physical movements that introduced or provided information about the next step in the routine to be completed (Piazza et al., 1997). When steps in the hygiene routine were presented as nondirective prompts, the rate of the participant's destructive behavior was markedly lower, and task completion was more consistent.

Piazza et al. (1997) hypothesized one possibility for the effectiveness of their treatment package was the removal of the direct instructions. According to Piazza et al., a particular task may be more aversive when the individual is told to do it (i.e., directive prompt) compared to when the task in presented as a game or subtle suggestion (i.e., nondirective prompt). In the present study, the modified low-*p* request presented the instruction to transition as a game; therefore, shorter latencies were recorded when the modified low-*p* request was delivered in combination with the high-*p* request sequence. Despite modifying the low-*p* request to a request stating engagement in a relatively higher preferred activity, the topography of the modified low-*p* request was more comparable to a directive prompt. The modified low-*p* request directly instructed Ava to engage in a particular behavior, whereas the nondirective prompts delivered by Piazza et al. were presented as questions or statements that indirectly mentioned the behavior required by the participant in order to complete the task.

Although this study extended and added support to previous findings on the implementation of high-*p* sequences to reduce latencies to comply with instructions to transition, there are some limitations. First, IOA was not recorded for procedural integrity. Second, the pool of high-*p* requests used in this study was limited to 6 requests. Each time a sequence was delivered, the experimenter randomly selected 3 requests from that pool. A larger number of high-*p* requests would have increased the variability in the 3-request sequences possibly increasing the overall compliance with the high-*p* requests.

Another limitation of this study was the number of adults delivering the high-*p* interventions to Ava. The experimenter was the only individual who implemented the high-*p* sequence interventions with Ava. Generalization tests across classroom staff were not conducted during this study. Staff members were constantly moved to other classrooms and might or might not return to Ava's classroom, thus eliminating any consistency in staff-student interactions.

A fourth limitation was the number of generalization tests conducted in Area 2 of the classroom with staff and students present. This test resembled transitioning from circle/reading time to Ava's desk, the transition during which Ava spent the most time completing. Only one generalization test could be conducted in Area 2 with distractions present. Originally Ava was scheduled to withdraw from class 1 week prior to end of the school year. However, she returned to class the last day of that week she was scheduled to be out of school. Extenuating circumstances (i.e., the classroom had to be reorganized for summer school) prevented the experimenter from conducting further generalization tests in Area 2.

The longest latency when implementing high-*p* sequences prior to the modified low-*p* request was recorded during the generalization test conducted in Area 2 with distractions present. A fading procedure designed to transfer stimulus control to Area 2 with distractions present was planned. However, due to the aforementioned scheduling conflicts this procedure was not possible to implement.

This study raises questions for future research. First, more research is needed on the effect of delivering a variety of reinforcers for compliance with high-*p* requests. In order to deliver each high-*p* request in the sequence within 5 s apart, it is essential to deliver reinforcers that are quickly consumed and/or quickly distributed to the individual. Higher rates of compliance with high-*p* requests might be achieved if larger arrays of reinforcers are available contingent on compliance.

Second, further research is needed to investigate effects of implementing high-*p* sequences prior to instructions to transition with students diagnosed with severe mental retardation and who demonstrate low levels of adaptive behavior. Previous studies investigating the effect of high-*p* sequences on compliance with instructions to transition have involved typically developed children enrolled in general education classrooms (Ardoin et al., 1999) and students with mild to moderate disabilities (Banda & Kubina, 2006; Davis et al., 2001). Singer et al. (1987) conducted the only study investigating the effects of implementing a high-*p* sequence on compliance with an instruction to return to work after recess with students diagnosed with severe disabilities. A student's level of mental and/or behavioral functioning may influence the effectiveness of high-*p* intervention on compliance with instructions to transition.

Considering studies investigating the effect of high-*p* sequences on compliance with instructions to transition have been conducted in schools as noted in the thesis, it is necessary to collect follow-up data to assess the maintenance of treatment effects after an extended hiatus from the school setting (i.e., summer vacation). Two previous studies collected follow-up data at 6-months and reported the high-*p* intervention was still effective (Harchik & Putzier, 1990; Mace & Belfiore, 1990). Although Harchik and Putzier (1990) and Mace and Belfiore (1990) reported lasting effects of the high-*p* request sequence at 6 months, these studies were conducted with adult participants who resided in group living facilities. The interventions were implemented in the same environment in which the participants' lived.

Most students experience a 3-month break from school. During this break the students' environment typically differs compared to the school environment. For example, students encounter fewer instructions and the environments are less structured (i.e., following schedules). The adults who participated in the previously cited studies spent the 6-month period after the completion of the study in environments similar to environment used during the study. The longest duration before collecting follow-up data following the completion of a study investigating the effects of high-*p* request sequences on compliance with instructions to transition in students was 3-weeks (Ardoin et al., 1999).

This current study demonstrated the efficacy of implementing high-*p* request sequences to reduce the latency to comply with an instruction to transition from play to work. Compared to a high-*p* sequence preceding an instruction to return to her desk, Ava's latency to comply with an instruction to engage in a relatively higher preferred activity when preceded by a high-*p* sequence resulted in consistent compliance within 1 min of the delivery of this instruction. Reducing latency to comply with an instruction to transition increased the amount of time Ava spent working on academic activities. Considering time engaged in academic learning is the reason for attending school, it is important to continue to develop strategies that effectively reduce time wasted completing transitions. Once students have improved compliance with instructions to transitions, they are provided more opportunities to achieve academic goals.

Table 1

Interobserver Agreement Results during Baseline (BL) Phases, Condition 1 (C1), Condition 2 (C2), Maintenance Test (MT), and Generalization Tests (GT) Sessions

	BL 1	C 1	BL 2	C 2	BL 3	MT	GT
Latency to Complete Transition	100%	100%	100%	85.7% (0%-100%)	100%	100%	100%

Table 2

Procedural Integrity during Condition 1, Condition 2, Maintenance Tests, and Generalization Tests Sessions

	Condition 1	Condition 2	Maintenance Tests	Generalization Tests
Delivery of HPR[1]	100%	100%	100%	100%
Delivery of Reinforcers	100%	100%	100%	100%
Occurrence of 5-s IPT	94.4%	96.9%	93.8%	95%
Occurrence of 30-s IPT	92.3%	100%	100%	---

[1]High-Probability Requests

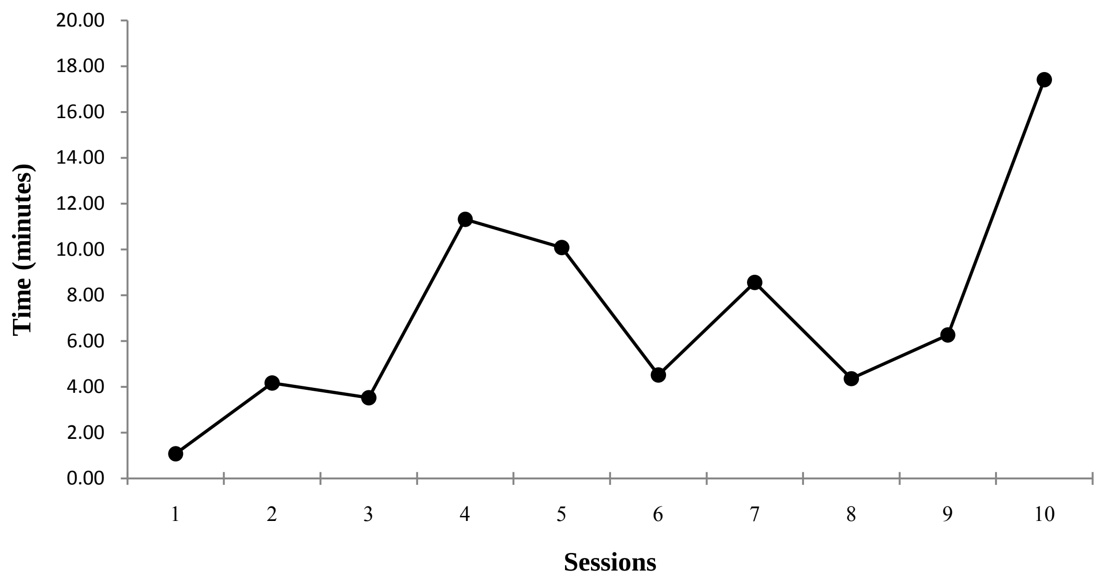

Figure 1. Latency to comply with the low-probability request during low-probability request test.

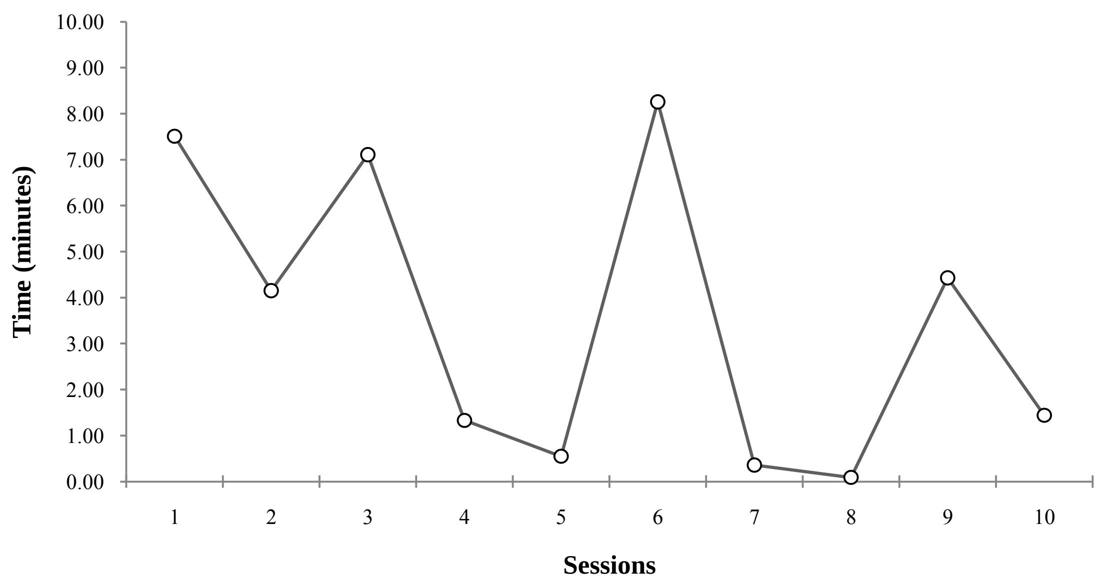

Figure 2. Latency to comply with the modified low-probability request during modified low-probability request test.

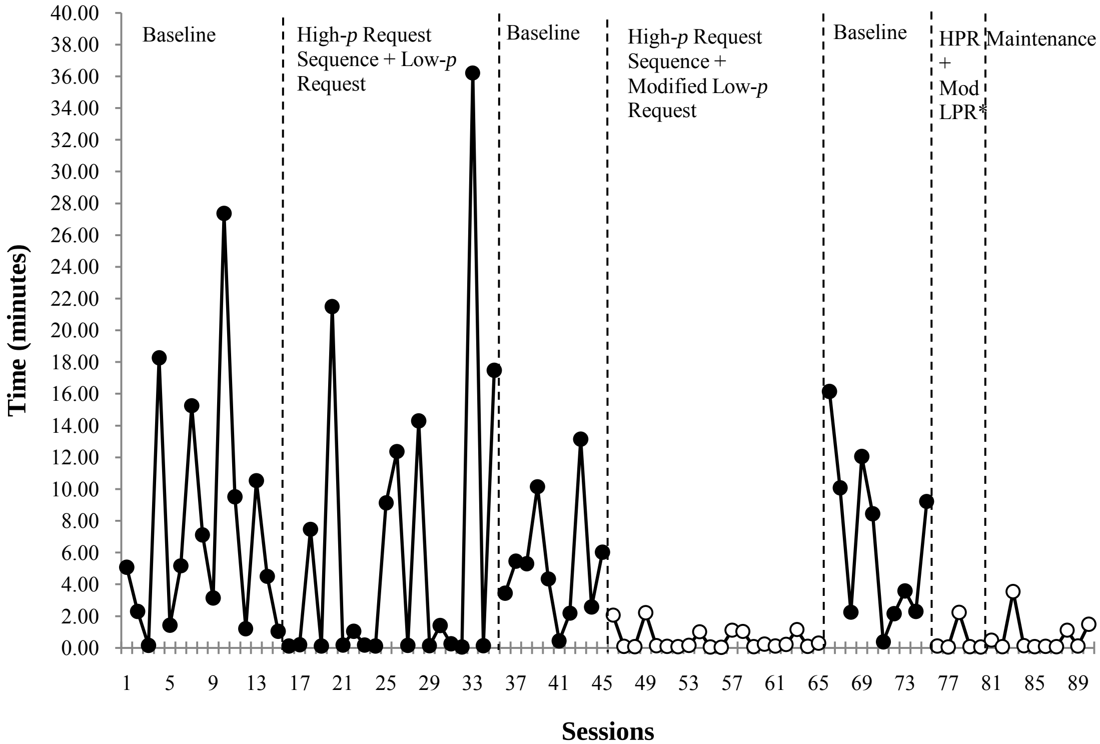

Figure 3. Latency to comply with low-probability request and modified low-probability request during baseline phases, Condition 1, Condition 2, and maintenance tests.

*High-Probability Request Sequence + Modified Low-Probability Request

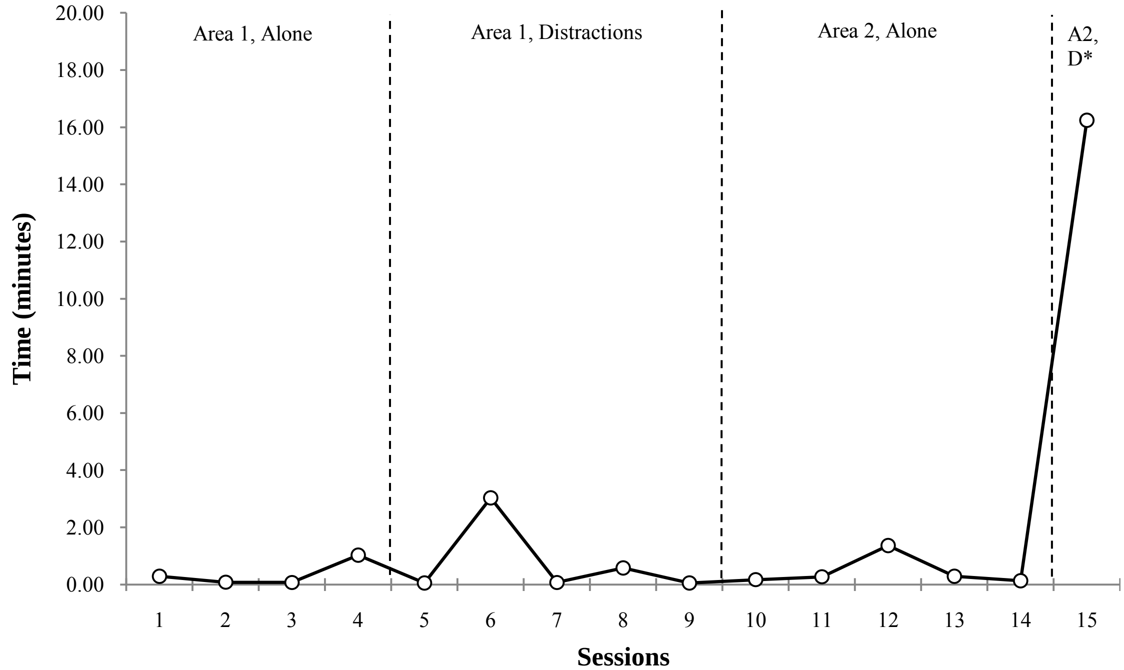

Figure 4. Latency to comply with modified low-probability request during generalization tests. Generalization tests were conducted in Area 1 of the classroom without distractions present (i.e., alone), Area 1 with distractions present, Area 2 without distractions present, and Area 2 with distractions present. The distractions included the classroom teacher, classroom staff, and two students.

*Area 2, Distractions

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