A COMPARISON OF SIMULTANEOUS PROMPTING AND STRATEGIC INCREMENTAL REHEARSAL FLASHCARD METHODS WITH STUDENTS WITH INTELLECTUAL DISABILITIES

by

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(Under the Direction of Scott P. Ardoin)

ABSTRACT

Simultaneous prompting (SP) is a response prompting strategy that utilizes errorless learning to teach individuals a variety of skills. Strategic Incremental Rehearsal (SIR) is a flashcard intervention modified from an original procedure called Incremental Rehearsal (IR). SIR involves prompt fading and the addition of unknown items contingent on the learner's proficiency of the previous targets. The current study compared SP and SIR in teaching the receptive identification of household items to elementary school aged participants with intellectual disabilities. The percentage of correctly identified items during assessment was reported, as well as the cumulative number of targets mastered in the second phase. Results from the current study suggest that teaching methods for discrete skills may need to be evaluated on an individual basis.

INDEX WORDS: Simultaneous prompting, Strategic incremental rehearsal

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INTRODUCTION

Children with speech and language impairment may have delays in speech, receptive and expressive language, and cognitive abilities (Weitz, Dexter, & Moore, 1997). Many times, a child who displays delays in receptive language will also display delays in expressive language (Ganz, Hong, Goodwyn, Kite, & Gilliland, 2015). Students with autism and developmental disabilities that have not acquired a vocal imitation repertoire commonly use receptive identification of targets during instruction (Petursdottir & Carr, 2011). The identification of items from an array is referred to as receptive identification (Grow, Carr, Kodak, Jostad, & Kisamore, 2011). These identifications require the student to make conditional discriminations between stimuli, which are composed of a single stimulus, several comparison stimuli, a response, and a consequence. There is evidence to support that receptive identification from a field of three, or the conditional-only method, is a reliable and effective teaching method (Grow et al., 2011; Grow, Kodak, & Carr, 2014).

Flashcards are often the stimuli used to present the targets when utilizing receptive identification with students. The use of flashcards is common in both general and special education classrooms with extensive evidence demonstrating the effectiveness of multiple flashcard methods for teaching a variety of skills (Nist & Joseph, 2008; Browder & Xin, 1998; Tan & Nicholson, 1997). Skills commonly taught using the flashcard methods include sight word, letter sounds, vocabulary, and math facts recognition.

One teaching procedure that utilizes errorless learning to increase the skill acquisition of students is simultaneous prompting (SP). SP is a prompting procedure that involves consistently

delivering a controlling prompt during every teaching trial. A controlling prompt is a prompt that will result in a correct prompted response by the student (Morse & Schuster, 2004). It can be a gestural, model, or full-physical prompt. Teaching a skill using SP involves delivering a demand and immediately delivering the controlling prompt before the student responds. After the delivery of the controlling prompt, the student should respond correctly due to the model during teaching trials. Incorrect responses are minimal because the controlling prompt is always presented simultaneously with the instruction and before the student response (Morse & Schuster, 2004). SP does not include a prompt delay or fading procedure. Instead, probe sessions are conducted immediately prior to teaching trials to assess acquisition (Schuster, Griffen, & Wolery, 1992). A few of the reported advantages of SP include: (a) SP provides more opportunities for the student to come into contact with reinforcement, because the student does not make errors while learning (Cooper, 1987); (b) SP can decrease problem behavior associated with making errors and subsequently increase instructional time (Cooper, 1987); (c) SP involves simple and identical trials (Schuster et al., 1992); (d) the absence of differential reinforcement of correct responses (Morse & Schuster, 2004); and (e) a lack of required wait training (Schuster et al., 1992; Gibson & Schuster, 1992). Evidence exists supporting the use of SP in teaching skills across age groups, ranging from preschoolers to adults; both with individuals with and without disabilities; and across skills, including discrete and chained tasks (Morse & Schuster, 2004; Schuster et al., 1992; Parrot, Schuster, Collins, & Gassaway, 2000). In a review of the literature, it was reported that SP is most often used in a 1:1 instructional setting (Morse & Schuster, 2004). After analyzing the data from 18 published studies, including SP as a strategy used to teach skill acquisition, it was concluded that SP is an effective errorless learning procedure. High rates of

procedural fidelity signify the simplicity of the procedure, posing another potential advantage of SP (Morse & Schuster, 2004; Gibson & Schuster, 1992).

Despite the advantages of SP listed above, the literature notes some important challenges. The reported rate of error during the necessary daily probe sessions was high in several investigations, despite errorless learning during instruction (Gibson & Schuster, 1992; Schuster et al., 1992; Fickel, Schuster, & Collins, 1998). This challenge is consistent across many studies (Gibson & Schuster, 1992; Schuster et al., 1992; Fickel, Schuster, & Collins, 1998; Morse & Schuster, 2004) using SP and is arguably its largest limitation. Schuster et al. (1992) also identified time as a limitation, as the probe sessions must be accounted for when planning instructional time. The added time required for probe sessions can result in SP procedures lasting longer than other time delay procedures, such as constant time delay (Schuster et al., 1992). Gibson and Schuster (1992) also discusses the potential for the student to become prompt dependent when SP is implemented because a prompt delay is never incorporated in the teaching trials. These limitations provide a rationale for examining alternative procedures.

Strategic Incremental Rehearsal (SIR) is a relatively new flashcard method that is similar to SP. SIR is similar to SP in providing very few stimuli to the learner and incorporating only unknown stimuli during instructional sessions. However, SIR does not involve modeling the correct response during every instructional trial. Although there is currently limited research supporting SIR, it is derived from a heavily researched procedure known as Incremental Rehearsal (IR).

IR is a drill ratio technique that incorporates unknown items into a group of known items (Joseph, 2006). The technique uses a specific ratio of unknown to known items that is incorporated into teaching trials. Nine known and 10 unknown items are identified for an

individual through screening (Joseph, 2006). The first unknown word is presented to the individual with a model. The unknown word is presented again and then a known word is presented. Once the individual has responded to the unknown word and first known word, the unknown word is presented again followed by the first and second known words. The unknown word is presented again, followed by the first, second, and third known words. This sequence is repeated until the unknown word becomes known. When this happens, the ninth known word is removed from the group, and the previously unknown word replaces it. IR involves many opportunities to practice and high rates of correct responding due to the incorporation of many known items (MacQuarrie, Tucker, Burns, & Hartman, 2002). The use of known words has also been shown to increase motivation and preference for the task because the amount of response effort is less than a task that involves all unknown items (Skinner, 2002).

SIR is a technique that involves delivering a controlling prompt when a target is presented for the first time and then inserting a prompt delay in subsequent teaching trials. It involves only unknown targets during instruction. The targets are numbered U1, U2, U3, etc. This dictates the order that the targets will be presented in during instruction sessions. U1 is presented with a 0 s delay and a controlling prompt. For example, for a student learning the expressive identification of sight words, the researcher presents a sight word on a flashcard, says "What word?", and says the word aloud in order to deliver the controlling prompt. For a student receptively identifying sight words, the researcher presents an array of three sight words, says "Touch ___", and models touching the correct target. U2 is presented in the same fashion. U1 and U2 are presented again with the model. Then, a delay is inserted while presenting U1 and U2. For example, the researcher would present the word on a flashcard, say "What word?" and wait a predetermined number of seconds before repeating the discriminative stimulus. Before U3

is presented, the individual must correctly respond to U1 and U2 within the duration of the delay. Next, U3 is presented with a 0 s delay and a controlling prompt. When the individual correctly responds with the 0 s delay, the researcher represents U1 and U2 with a delay. When the individual correctly responds to both U1 and U2 with a delay, U1, U2, and U3 are represented with a delay. U4 would then be presented with a 0 s delay and the procedure would continue until all targets had been presented, practiced, and correctly identified with a delay.

Kupzyk et al. 2011 compared the effects of IR and SIR on sight word acquisition for four elementary aged students in general education. Both procedures resulted in the acquisition and maintenance of sight words, however SIR was slightly more effective. All four participants read more sight words correctly in SIR compared to IR in assessment sessions. The participants maintained the acquisition of sight words better in SIR compared to IR. With time held constant in this investigation, SIR allowed for more response opportunities and more presentations of items within instructional sessions. SIR improves upon the procedures of IR because SIR does not limit the number of unknown items that can be presented within an instructional session. The participant has the opportunity to learn more unknown items in SIR because only unknown items are included in instruction, as opposed to taking instructional time to review known items in the IR procedure. In comparison to IR, SIR simultaneously increases the probability of a correct response and the probability of accessing reinforcement by providing modeling and error correction. By combining an antecedent prompt when unknown words are first presented, along with a prompt delay as the instructional trial progresses, SIR helps reduce errors during instruction. Repeated practice and error correction within the procedure also help to reduce future errors as well (Kupzyk et al., 2011). There is evidence to suggest that, when compared to IR, SIR is a more efficient procedure (January, Lovelace, Foster, & Ardoin, 2016) and leads to

higher response rates in maintenance (Kupzyk et al., 2011). SIR allows for flexibility in student learning because the shift to the presentation of the next target stimuli is contingent on correct responding and not simply based on the order of the procedure (Kupzyk et al., 2011).

Purpose

The purpose of this study was to compare two flashcard methods, SP and SIR, with three students in a special education classroom. Researchers previously used SP to teach a broad range of skills, such as sight word identification (Schuster et al., 1992), identification of community signs (Singleton, Schuster, & Ault, 1995), animal identification (Tekin & Kircaali-Iftar, 2002), and learning a chained task (Schuster & Griffen, 1993). SP was chosen as the comparison procedure due to the fact that it was being used prior to the implementation of the intervention. The SIR literature has primarily focused on teaching students the acquisition of sight words (January et al., 2016; Kupzyk et al., 2011). There are very few investigations that teach the identification of functional objects using one of these two methods (MacFarland-Smith, Schuster, & Stevens, 1993; Tekin-Iftar, Acar, & Kurt, 2003). This study aims to add to the literature by teaching participants the receptive identification of household items. Researchers have failed to evaluate the effectiveness of SIR with students who have special education needs and developmental disabilities. This study aims to extend that literature as well.

METHODS

Participants and Setting

Participants were three students in a third through fifth-grade classroom for students with low-incidence disabilities at the same public elementary school. Alex was a fourth-grade student diagnosed with Autism and a Speech - Language Impairment and was 10 years old. Alex had a minimal vocal repertoire and used a combination of AAC, signs, and vocal approximations of words such as “help” and “hug” to communicate. Jordan was a fourth-grade student diagnosed with Moderate Intellectual Disability and a Speech - Language Impairment who was 10 years old. Jordan had a minimal vocal repertoire and used AAC and 1-2-word utterances to communicate. There was no differentiation between Jordan’s tacts and mands and he had difficulty using his vocal repertoire functionally. Freddie was a third-grade student with Autism and a Speech - Language Impairment who was 8 years old. Freddie had a minimally functional vocal repertoire. He engaged in repetitive utterances but was inconsistent in his use of functional language. Using receptive identification was consistent with each participants’ Individualized Education Program goals.

Sessions were conducted in the participants’ classroom at a table that was blocked off from classroom instruction using a divider. Jordan was referred to a clinic for severe behavior during the study. After session 6, Jordan’s assessment and instruction were conducted at the clinic. The researcher and procedure remained the same, however the sessions were conducted at a table in an empty classroom at the clinic. His change in setting is indicated with a dashed line on his graph.

Materials

Researchers chose household items based on item lists that were predicted to be in every participant's home and items that were thought to be functionally relevant to the participant. Researchers found pictures online and chose pictures where the household item was the only item in the image. Household item pictures used during sessions were printed in colored ink and cut out. Each item was pasted in the center of a white flashcard (7.62 cm X 12.7 cm), laminated, and cut out. The household item name that corresponded with what was taught in instruction was written on the back of the flashcard in blue ink and was numbered (1-75).

Dependent Variable

The dependent variable was the number of correctly receptively identified items from a field of three during a session. Answers were scored as correct if the participant correctly identified the item within 8 s of the flashcard being presented in a field of three, or if the participant corrected an initial incorrect response within 8 s of the flashcard presentation. Answers were scored as incorrect if the participant did not correctly identify the item within a field of three or did not respond within 8 s.

Interobserver Agreement and Treatment Integrity

All sessions were recorded with a laptop or cell phone. A second observer was given videos of each of the assessment sessions and a list of the correct items in order that the participant was asked to identify in the recording. The observer scored whether the participant's responses were correct (+) or incorrect (-). Interobserver agreement was assessed during 35% of sessions across both phases. It was calculated by dividing the total number of agreements by the total number of agreements plus disagreements, then multiplying by 100%. A response was

considered an agreement if both the researcher and the observer marked the item as correctly or incorrectly identified. The mean interobserver agreement was 100% across participants.

A checklist of separate and explicit protocols was made that the experimenter followed for both SP and SIR. A second observer watched the recordings and reported treatment integrity by scoring how many of the items on the checklist the experimenter followed (+/-). Each step had to be implemented correctly each time that step was performed during the session for it to be counted as correct. Treatment integrity was calculated by dividing the steps correctly implemented in a session by the total number of steps required in that condition. The mean treatment integrity for instructional sessions was 100%. The mean treatment integrity for assessment sessions was 96.33% (range, 93%-100%).

Design

An alternating treatments design (ATD) was used to compare the effectiveness of the two methods in teaching household items. The order of conditions was randomly assigned to each participant in order to counterbalance to control for sequence effects.

Procedures

Screening. Screening sessions were conducted to identify unknown household items for each participant to be included in the study. Screening was conducted individually with each participant to accurately determine which targets were known and unknown. A researcher presented 75 household items in arrays of three and instructed the participant to "Touch ___." First, all 75 items were presented to each participant twice in two separate sessions. Then, a third screening session was conducted for each participant to reduce chance responding. In the third screening session, items that the participant had incorrectly identified in one or both of the previous two screening sessions were represented. Items that the participant had correctly

identified in both of the previous two screening sessions were not represented and were not included in the study. Participants were required to identify an item correctly for at least two out of three presentations of that item for it to be considered known. If a participant correctly identified an item once, or did not correctly identify the item in any of the three screening sessions, the item was considered unknown and was included in the study. Reinforcement in the form of verbal praise was given for on-task behavior after every participant response. Participants also earned tokens on an FR 1 schedule for responding using the token boards from their classroom. No consequences were delivered based on correct or incorrect responding during screening. Once screening was concluded, targets for each participant were randomly assigned to a condition and then randomly arranged into groups of four within that condition.

Instruction. Unknown household items were identified in screening. A coin was flipped before intervention began to determine in which condition the participant would begin treatment. Instruction sessions were conducted daily, with the exception of when a participant was absent. Instruction sessions took place Monday-Thursday and assessment took place Tuesday-Friday. Instruction was conducted after the assessment session for that day was completed. All instruction sessions were stopped at 12 min. If the participant finished the procedure before 12 min elapsed, the session was concluded.

Simultaneous prompting (SP). SP was used by the classroom instructors prior to the onset of the study. Before conducting SP sessions, the researcher prepared a randomization of 20 arrays that the four flashcards of that session would be arranged in. Preparing this arrangement beforehand allowed the researcher to ensure that each target was presented at a maximum of five times and that no one flashcard appeared in the arrays more than another. Incidental learning may have occurred if the participant saw one card more than another in the arrays, so the number

of times an item appeared in the arrays was held constant. SP sessions began when the researcher started the participant's 12 min timer and stated the prompt, "We are going to do some work." The researcher presented an array of three flashcards using the predetermined placements. After securing the participant's attention, the researcher stated the discriminative stimulus (SD), "Touch ___" for the first target, and simultaneously modeled the correct response by touching the target flashcard. Modeling prompts were the controlling prompts for each participant in the study. The researcher waited 8 s for the participant to respond. If the participant responded correctly, the researcher reinforced on-task behavior ("Thanks for working!") and gave the participant a token. If the participant responded incorrectly, or did not respond within 8 s, the researcher repeated the SD ("Touch ___") and modeled the correct response every 8 s until the participant responded correctly within the 8 s. Once the participant responded correctly for the first target, the researcher repeated this procedure with the remaining three targets until the participant had completed five instructional trials for each of the four targets or the 12 min was complete. Responding was reinforced on an FR 1 schedule using the participants' token boards from their classroom. Alex and Jordan were given edible reinforcers on an FR 10 schedule during teaching trials and Freddie on an FR 5. These schedules of reinforcement were consistent with the token economy being used in the classroom by the participants' teachers.

Strategic incremental rehearsal (SIR). Daily targets in this condition were labeled as U1, U2, U3 and U4. The researcher prepared four random arrays in which the four targets could be arranged. These arrangements were used in the initial presentations of U1-U4. SIR sessions began when the researcher started the participant's 12 min timer and stated the prompt, "We are going to do some work." The researcher presented the predetermined array of three for teaching U1. After securing the participant's attention, the researcher stated the SD, "This is ___. Touch

___.” for the first target (U1). The researcher simultaneously modeled the correct response by pointing to the target while delivering the SD. If the participant responded correctly, the researcher reinforced on-task behavior (“Thanks for working!”) and gave the participant a token. If the participant responded incorrectly or did not respond within 8 s, the researcher repeated the SD (“No, this is ___. Touch ___.”) and modeled the correct response every 8 s until the participant responded correctly. Once the participant responded correctly for the first target, the researcher presented U2 in the predetermined array. The researcher repeated this procedure for U2, and once more for U1 and U2 once more. Once the participant responded correctly for both U1 and U2 with a model, the researcher inserted an 8 s delay between the SD and the prompt for U1. The researcher stated the SD (“Touch ___”) and waited 8 s for the participant to respond. If the participant responded correctly within 8 s, the researcher provided reinforcement by praising on-task behavior (“Thanks for working!”) and giving the participant a token. If the participant responded incorrectly, the researcher corrected the participant by saying, “No, this is ___. Touch ___.” and modeling the response. If the participant did not respond within the 8 s, the researcher repeated the SD (“Touch ___”) until the participant responded correctly or incorrectly, and followed the procedure mentioned above. Once the participant responded correctly within the delay for U1, the same procedure followed for U2. When the participant responded correctly within the delay for U1 and U2, the researcher presented U3 in the predetermined array and stated the SD, “This is ___. Touch ___.” for U3. The researcher simultaneously modeled the correct response by pointing to the target while delivering the SD. If the participant responded correctly, the researcher provided reinforcement by praising on-task behavior (“Thanks for working!”) and giving the participant a token. If the participant responded incorrectly or did not respond within 8 s, the researcher repeated the SD (“No, this is ___. Touch ___”) and modeled

the correct response every 8 s until the participant responded correctly. Once the participant responded correctly with the model, the researcher removed U3 and re-presented U1 and U2 with a delay in arrays of three. When the participant responded correctly with a delay for both U1 and U2, the researcher added in a delay with U3 and represented U1, U2, and U3 in arrays of three. Once the participant responded correctly before the prompt for U1, U2, and U3, U4 entered the array of three and the researcher modeled the correct response. When the participant responded correctly with a model for U4, the researcher returned to presenting U1, U2, and U3 with a delay. Finally, when the participant correctly responded to U1, U2, and U3 with a delay, the researcher added in a delay with U4 and represented U1, U2, U3, and U4 in arrays of three. The session concluded once the participant responded correctly before the prompt for all four targets, or 12 min had passed. Responding was reinforced on an FR 1 schedule using the participants' token boards from their classroom. Alex and Jordan received edible reinforcers on an FR 10 schedule during teaching trials and Freddie on an FR 5.

Assessment. Assessment sessions were conducted daily contingent on instruction occurring the day prior. The household items that were taught on the previous day were presented during the assessment session the following day. Each assessment session was conducted prior to the instructional session for that day. The researcher began the assessment session by saying, "We are going to do some work" and then allowing the participant to choose what edible they wanted to work for. The researcher presented each item in an array of three and instructed the participant to "Touch ___." The researcher presented each of the four items taught on the previous day twice to help reduce chance responding by the participant. After a participant response, the researcher recorded whether the response was correct (+) or incorrect (-). If the participant did not respond within 8 s of the instruction, the researcher counted it as incorrect (-).

The researcher verbally praised the participant for working after each response. Tokens were given on an FR 1 schedule for responding, and edibles were given when the participant's token board was complete.

Phase 2. Due to the population in this study, the researchers decided to alter the procedure in order to increase the percentage of known items during assessment across the three participants. After observing low percentages of correctly identified items in treatment, Alex and Freddie entered the second phase of treatment after session 8. Due to one absence and one severe bout of problem behavior, Jordan entered the second phase after session 5. The change in phase for all participants is indicated with a solid line on each of their graphs. The phase change consisted of teaching the participant the same set of items in each condition on subsequent days in order to increase the amount of teaching trials for those targets. The participant was taught the same items during the SIR condition until they correctly identified a target in two consecutive assessments. At this point, the item was considered mastered and a new item replaced the learned target in the group of four. If the participant did not correctly identify any of the items in consecutive assessments, the researchers continued to teach the same four targets in that condition. This procedure was the same for the SP condition.

RESULTS

For all three participants, the Phase 1 data resulted in minimal learning and no clear differentiation between SP and SIR procedures. Given student performance, the continuation of the alternating treatments design would likely not have resulted in sufficient learning and differentiation between conditions was not likely to occur. The top panels of Figures 1-3 represent the percentage of correctly identified items in assessment sessions for each participant. The bottom panels of Figures 1-3 represent the cumulative number of targets mastered in Phase 2 for each participant.

Figure 1 suggest that Alex learned few household items during Phase 2. Correctly identified items in assessment were variable and there was no clear level or trend (top Panel Figure 1). As indicated in the bottom panel of Figure 1, he mastered one target in SP and none in SIR during Phase 2.

Figure 2 suggest that Jordan learned few household items during Phase 2. Correctly identified items in assessment were variable and there was no clear level or trend (top Panel Figure 2). As indicated in the bottom panel of Figure 2, he mastered one target in SP and one target in SIR during Phase 2.

Figure 3 suggest that Freddie learned more household items in SP compared to SIR during Phase 2. Correctly identified items in assessment were variable in Phase 1, however there was clear differentiation in Phase 2 (top Panel Figure 3). Correctly identified items in assessment ranged from 50-100% in Phase 2 for SP (top Panel Figure 3). As indicated in the bottom panel of Figure 3, there was an increasing trend in the number of targets mastered in Phase 2 for SP. Freddie mastered six targets in SP and one target in SIR.

DISCUSSION

The current study compared the effects of SP and SIR on the acquisition of household item identification for three participants in special education. Unfortunately, differences were not observed during the first phase for any of the participants. Differences were observed for one of the three student participants during the second phase.

An alternating treatments design was used in this study to compare the effectiveness of the current classroom teaching procedure, SP, to SIR, a refinement of a heavily researched IR procedure. During the SP procedure, a controlling prompt was delivered during each teaching trial. Participants in this study always responded correctly during SP instructional trials because the researcher always delivered a controlling prompt for each target presentation. Several of the advantages detailed in prior investigations were observed during this study. SP allowed for high rates of reinforcement for on-task behavior and responding because the participants were learning errorlessly (Cooper, 1987) and the procedure was easy to implement because the trials were quick and identical (Schuster et al., 1992). However, the limitations were consistent as well. Error rates were very high during assessment sessions for SP despite the fact that the student was learning errorlessly (Gibson & Schuster, 1992; Schuster et al., 1992; Fickel, Schuster, & Collins, 1998; Morse & Schuster, 2004).

During the SIR procedure, researchers followed the procedure laid out by Kupzyk et al., 2011. Changes were made only to accommodate the receptive identification of items from a field of three. For example, instead of saying “Say ___” the researcher said “Touch ___.” A controlling prompt was delivered when the researcher presented the target to the student for the

first time. This allowed the student to learn errorlessly during the first presentation of the item. Then, a delay of 8 s was inserted in subsequent teaching trials. The researcher utilized error correction in the subsequent teaching trials to correct any mistakes that the participant made. The advantages and limitations of SIR in the literature are all in comparison to the IR procedure. In this study, the error rates during assessment sessions were approximately the same as SP. However, for one participant, Freddie, the percentage of correctly identified items was less in SIR than in SP. Freddie mastered more items in SP than he did in SIR.

Instructional length remained constant in order to directly evaluate the effectiveness of SP and SIR procedures on the acquisition of household item identification. Although this allowed for a direct comparison between the two procedures, sometimes participants were not exposed to the last target in the SIR procedure before 12 min elapsed. This is one possible explanation for the low levels of acquisition in the SIR procedure. If the participant did not receive exposure to the item during teaching trials, a correct response for that target would not be expected during assessment.

Another possible explanation for the low levels of acquisition during the SIR procedure includes prompt dependency and the familiarity of the SP procedure. Because SP was the prompting procedure used in the participants' classroom prior to the commencement of the study, the participants could have become dependent on an instructor's prompt during prior instruction. A prompt delay is inserted during SIR after a participant responds correctly with a prompt. If a participant is prompt dependent, there would frequently be non-responses when the prompt is faded during SIR. This is consistent with prior research that acknowledges prompt dependency as a limitation to the procedure (Gibson and Schuster, 1992). With an 8 s delay and the potential for several non-responses, the SIR procedure could have resulted in less

presentations than the SP procedure within the 12 min time limit. SIR could have resulted in more initial errors in instruction as well.

Limitations and Directions for Future Research

Not all instruction and assessment sessions occurred at the same time each day for each participant. The researcher conducted all sessions in the same classroom, however the exact location of the session was frequently changed due to individual and group instruction of other students and the occurrence of problem behavior. Jordan's location changed from the classroom setting to a clinic room, which could have had an effect on his responding and skill acquisition. The primary limitation of the study is the potential for prior knowledge of the targets. Although the researcher conducted three screening sessions, the researcher cannot be certain that the participant did not have any prior knowledge of the household items selected as unknowns with such a small item pool. Although this is a functional skill, there is a greater possibility of familiarity with household items compared to targets such as sight words or math facts.

Future studies could evaluate the effects of extending the instructional length to allow for a greater number of teaching trials in SIR to increase skill acquisition. Participants in this study commonly worked for 20 min in individual work sessions in their classroom prior to the commencement of the study. The length of instruction for future studies could benefit from extending the work time to the duration of work time that teachers expect students to complete in their classrooms. This would allow for more teaching trials in SIR for this population and potentially an increase in skill acquisition. For this population, it would also be worth evaluating the effects of IR on skill acquisition because of the inclusion of known items. The IR procedure includes already known targets along with the presentation of unknown targets. SP and SIR only present unknown items during instructional sessions. Considering known items are targets that

the participant has already mastered, there is evidence to support that individuals may prefer work that includes known items because it demands a lower level of response effort (Skinner, 2002). Motivation may play a role in effecting participant attention and responding. Attending was commonly a challenge during sessions with this population, so the inclusion of known items could potentially help increase attending and increase the acquisition of skills.

This study aimed to compare two flashcard methods with students in special education on the acquisition of household item identification. Despite the evidence to suggest that SP and SIR are effective prompting procedures, it is possible that neither are appropriate for the population included in this study. Considering these results, researchers should continue to evaluate the effectiveness of the SIR procedure within this population. This study added to the current literature as SIR has not been used with participants in this population and the procedure has not been used to present targets receptively. Future research could include finding a streamlined approach to using SIR receptively in order to assess its effectiveness and provide instructors a guide on how to use it with students similar to the ones in this study.

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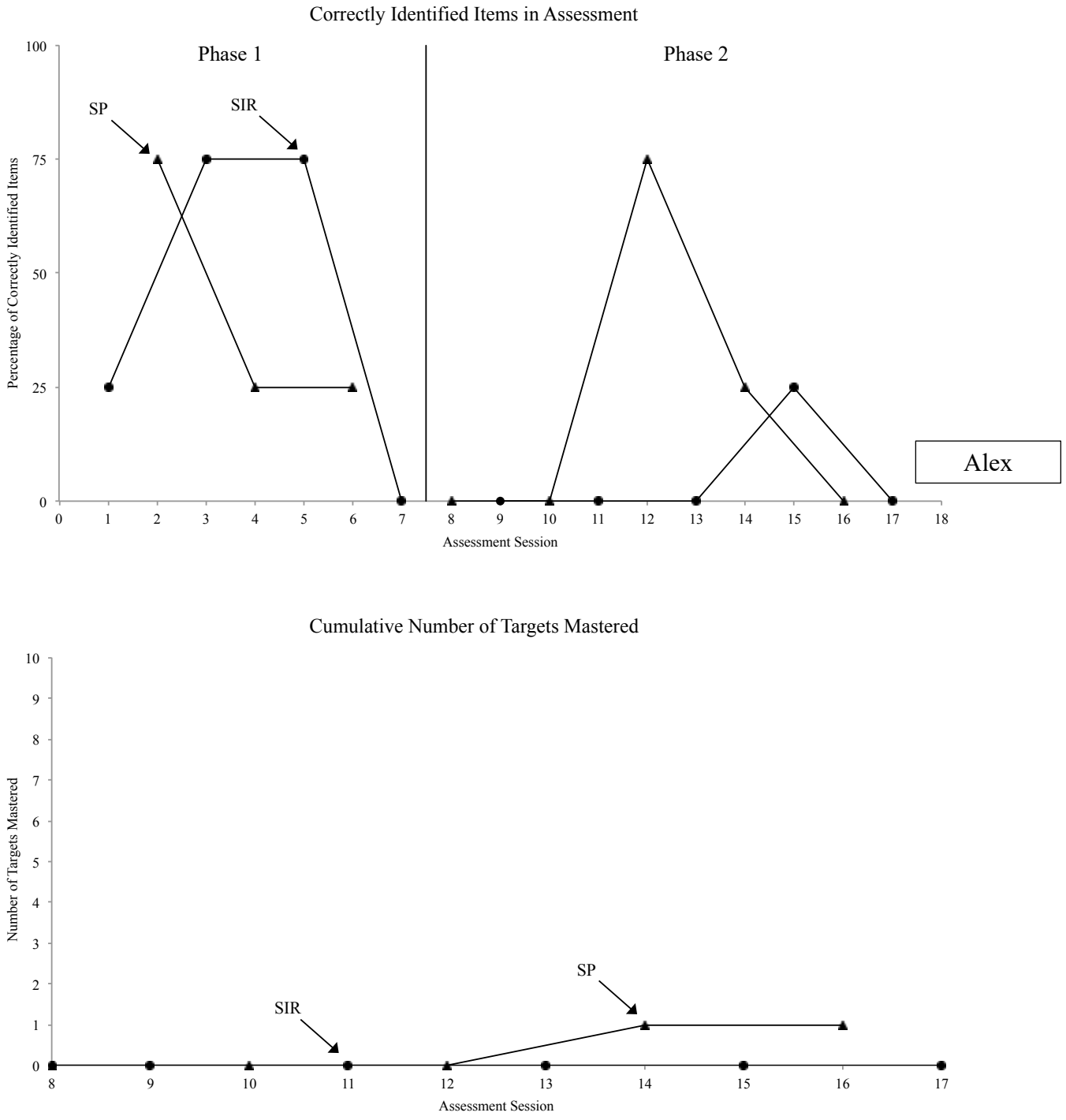

Figure 1. Percentage of correctly identified items in assessment sessions for Alex (top Panel). Number of targets mastered in Phase 2 (bottom Panel). SP = Simultaneous prompting; SIR = Strategic incremental rehearsal.

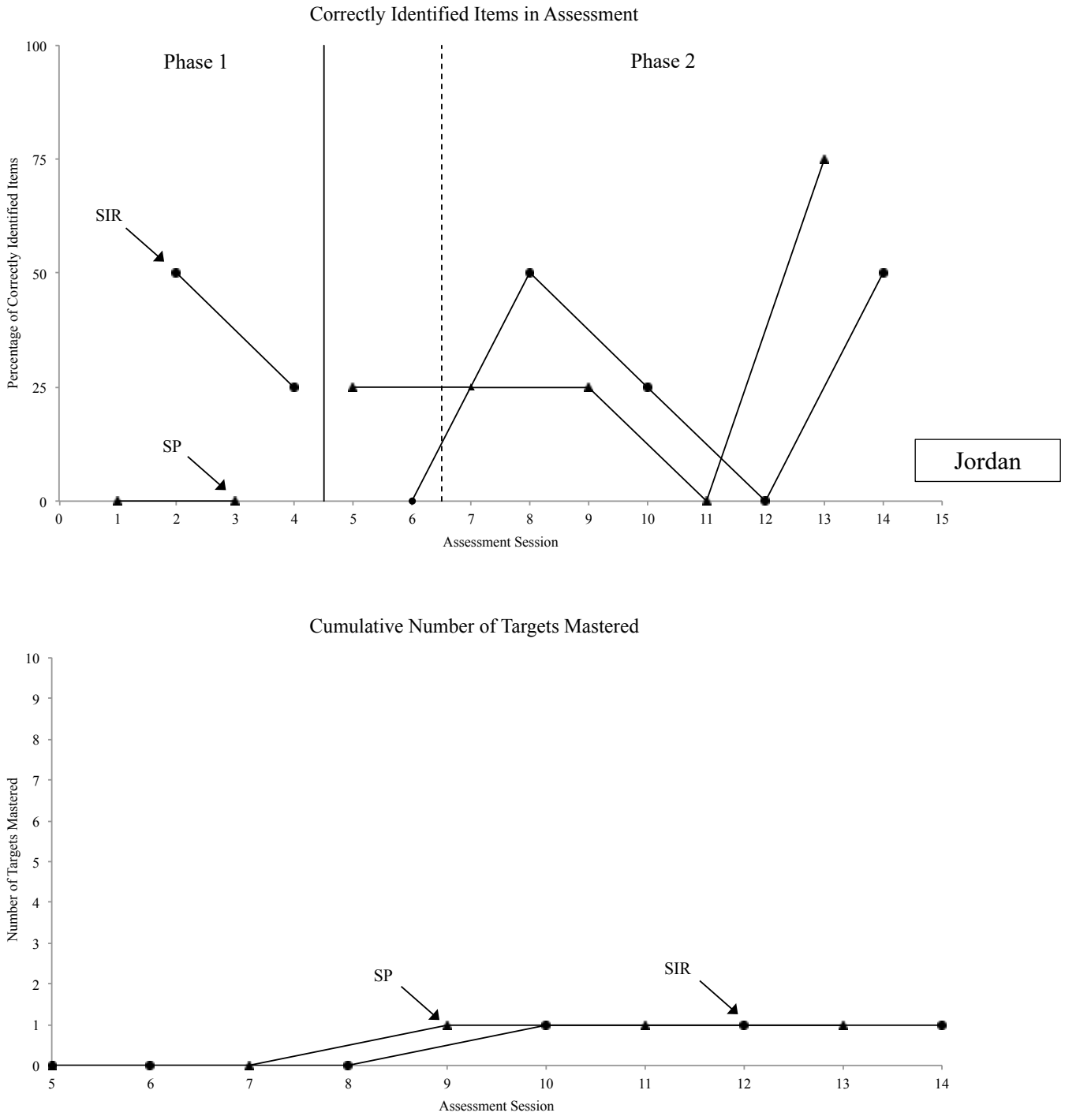

Figure 2. Percentage of correctly identified items in assessment sessions for Jordan (top Panel). Number of targets mastered in Phase 2 (bottom Panel). SP = Simultaneous prompting; SIR = Strategic incremental rehearsal.

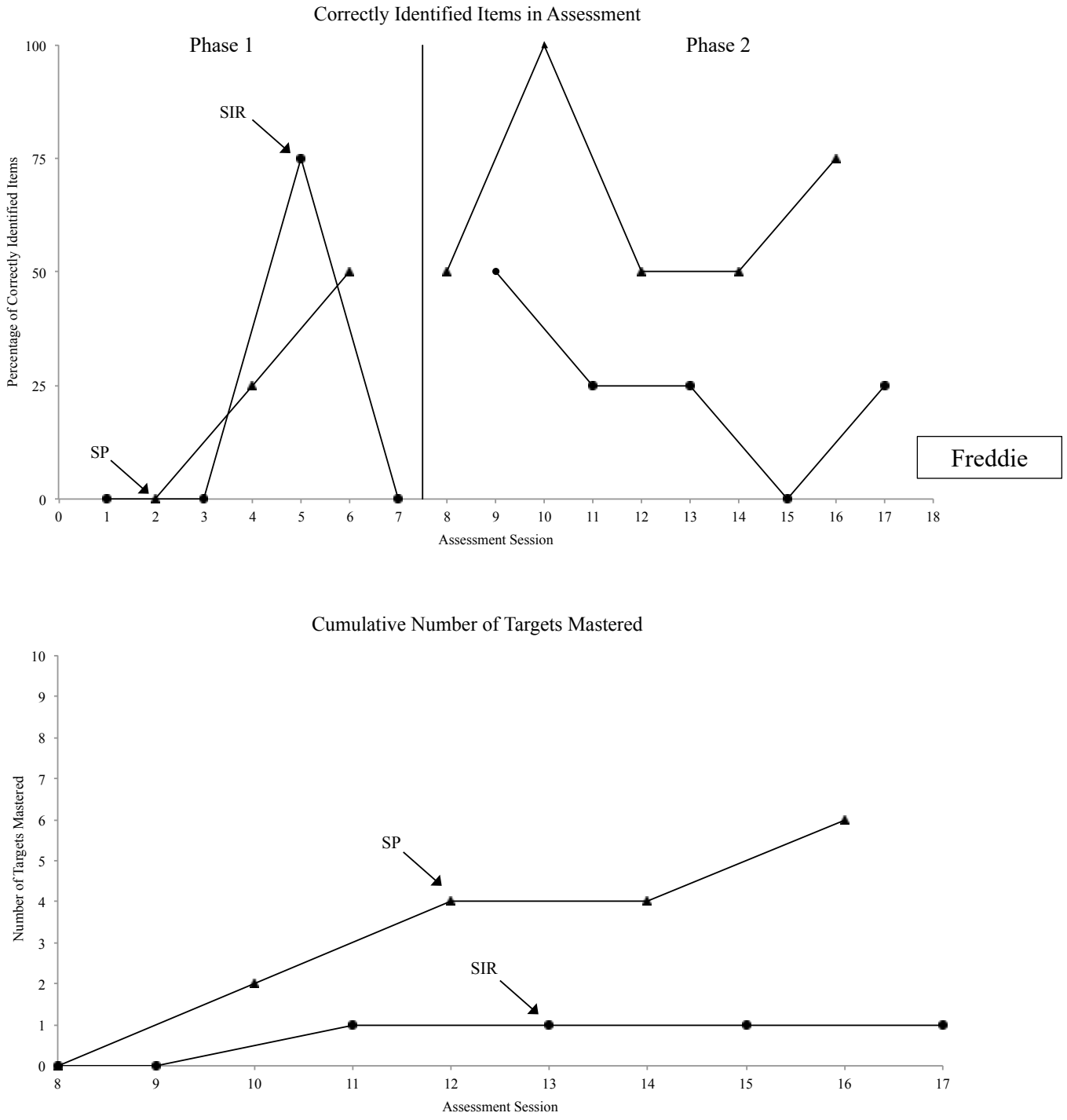

Figure 3. Percentage of correctly identified items in assessment sessions for Freddie (top Panel). Number of targets mastered in Phase 2 (bottom Panel). SP = Simultaneous prompting; SIR = Strategic incremental rehearsal.