



University of Kentucky
UKnowledge

Theses and Dissertations--Early Childhood,
Special Education, and Counselor Education

Early Childhood, Special Education, and
Counselor Education

2014

The Effects of a Simultaneous Prompting Procedure to Teach Math Skills During Play Time to Young Children with Developmental Disabilities

Abby Evans McCormick
University of Kentucky, abby.mccormick@clark.kyschools.us

[Right click to open a feedback form in a new tab to let us know how this document benefits you.](#)

Recommended Citation

McCormick, Abby Evans, "The Effects of a Simultaneous Prompting Procedure to Teach Math Skills During Play Time to Young Children with Developmental Disabilities" (2014). *Theses and Dissertations--Early Childhood, Special Education, and Counselor Education*. 6.
https://uknowledge.uky.edu/edsrc_etds/6

This Master's Thesis is brought to you for free and open access by the Early Childhood, Special Education, and Counselor Education at UKnowledge. It has been accepted for inclusion in Theses and Dissertations--Early Childhood, Special Education, and Counselor Education by an authorized administrator of UKnowledge. For more information, please contact UKnowledge@lsv.uky.edu.

STUDENT AGREEMENT:

I represent that my thesis or dissertation and abstract are my original work. Proper attribution has been given to all outside sources. I understand that I am solely responsible for obtaining any needed copyright permissions. I have obtained needed written permission statement(s) from the owner(s) of each third-party copyrighted matter to be included in my work, allowing electronic distribution (if such use is not permitted by the fair use doctrine) which will be submitted to UKnowledge as Additional File.

I hereby grant to The University of Kentucky and its agents the irrevocable, non-exclusive, and royalty-free license to archive and make accessible my work in whole or in part in all forms of media, now or hereafter known. I agree that the document mentioned above may be made available immediately for worldwide access unless an embargo applies.

I retain all other ownership rights to the copyright of my work. I also retain the right to use in future works (such as articles or books) all or part of my work. I understand that I am free to register the copyright to my work.

REVIEW, APPROVAL AND ACCEPTANCE

The document mentioned above has been reviewed and accepted by the student's advisor, on behalf of the advisory committee, and by the Director of Graduate Studies (DGS), on behalf of the program; we verify that this is the final, approved version of the student's thesis including all changes required by the advisory committee. The undersigned agree to abide by the statements above.

Abby Evans McCormick, Student

Dr. Belva Collins, Major Professor

Dr. Ralph Crystal, Director of Graduate Studies

THE EFFECTS OF A SIMULTANEOUS PROMPTING PROCEDURE TO TEACH
MATH SKILLS DURING PLAY TIME TO YOUNG CHILDREN WITH
DEVELOPMENTAL DISABILITIES

THESIS

A thesis submitted in partial fulfillment of the
requirements for the degree of Master of Science in the
College of Education at the University of Kentucky

By

Abby Evans McCormick

Lexington, Kentucky

Co-Directors: Dr. Amy Spriggs, Professor of Special Education
and Dr. Melinda Ault, Professor of Special Education

Lexington, Kentucky

2013

Copyright© **Abby McCormick** 2013

Abstract of Thesis

THE EFFECTS OF A SIMULTANEOUS PROMPTING PROCEDURE TO TEACH
MATH SKILLS DURING PLAY TIME TO YOUNG CHILDREN WITH
DEVELOPMENTAL DISABILITIES

This study was done to evaluate the simultaneous prompting procedure when teaching math skills during play time to young children with disabilities. The research included 5 students who participated in a special education resource classroom and general education classroom. The researcher used a design similar to a multiple probe design. The study found all participants who began intervention met criterion. The research also found students who participated in maintenance and generalization met criterion during those stages.

KEYWORDS: Simultaneous Prompting, Play, Math Skill, Children with Disabilities,
Multiple Probe Design

Abby Evans McCormick

December 2, 2013

THE EFFECTS OF A SIMULTANEOUS PROMPTING PROCEDURE TO TEACH
MATH SKILLS DURING PLAY TIME TO YOUNG CHILDREN WITH
DEVELOPMENTAL DISABILITIES

by

Abby McCormick

Dr. Belva Collins
Co-Director of Thesis

Dr. Amy Spriggs
Co-Director of Thesis

Dr. Melinda Ault
Co-Director of Thesis

Dr. Ralph Crystal
Director of Graduate Studies

December 2, 2013

TABLE OF CONTENTS

| | |
|--|----|
| List of Tables | v |
| List of Figures | vi |
| Section 1: Introduction..... | 1 |
| Section 2: Method..... | 6 |
| Subjects and Participants | 6 |
| Students. | 6 |
| Other participants. | 12 |
| Setting | 12 |
| Materials/Equipment..... | 13 |
| Data Collection and Procedures..... | 14 |
| Screening. | 14 |
| General Procedures..... | 15 |
| Baseline | 16 |
| Simultaneous prompting instruction,..... | 20 |
| Daily probes..... | 21 |
| Training trials. | 23 |
| Maintenance procedures..... | 25 |
| Generalization procedures. | 25 |
| Reliability..... | 26 |
| Dependent variable reliability. | 26 |
| Independent variable reliability. | 27 |
| Experimental Design..... | 27 |
| Data Analysis..... | 28 |
| Section 3: Results..... | 28 |
| Rosie | 29 |
| Josh..... | 29 |
| Austin..... | 29 |
| Will | 30 |
| Jake | 30 |
| Figure 1 | 31 |

| | |
|-------------------------------------|----|
| Table 1: Intervention Sessions..... | 32 |
| Section 4: Discussion..... | 32 |
| Section 5: Future Research | 37 |
| Appendix A..... | 39 |
| References..... | 44 |
| Vita..... | 46 |

LIST OF TABLES

Table 1: Intervention Sessions..... 32

LIST OF FIGURES

Figure 1 31

SECTION 1: INTRODUCTION

Teaching and working with young students daily is a rigorous, eventful task for teachers to accomplish. Add a mix of students with cognitive delays and adaptive behavior deficits, common core standards, individualized goals, and you have a whole new set of daily dilemmas. While instructing students with moderate severe disabilities (MSD), educators tend to lean toward errorless learning procedures, such as constant time delay (CTD) and simultaneous prompting (SP). Next, teachers decide what is important to teach, basic reading, basic math and functional skills. Then there are play skills, dressing skills, feeding skills and daily living skills to be introduced and instructed to these students. So, how would one do all of these things together? By embedding, instruction and using multi research based approaches to getting the job done. This literature review will give a quick glimpse as to what has worked, what seems to be important, and how to implement all the things together according to the professional literature.

Young students with moderate severe disabilities (MSD) need to be taught academic skills. These academic skills include reading and math. Schuster, Griffen, and Wolery (1992) taught sight words to elementary students using CTD and SP. The researchers taught 4 students with moderate mental retardation to read sight words. In the results, both procedures were efficient in the instructional sessions. The generalization and maintenance sessions showed mixed results as to which procedure was most efficient in those stages of learning. However, the study found students with MSD learned an academic skill of reading sight words. Birkan (2005) used SP to teach three students with intellectual disabilities, ages, ranging from preschool to secondary how to perform a variety of discrete math skills. The tasks included identifying single digit numbers,

identifying 20 math words expressively, and telling time from a clock. Each student was taught three sets of stimuli to learn. Each set of stimuli had five stimuli per set. The author used SP and all students learned their target stimuli. The students then maintained the skills for up to 25 days after criterion was met. These are just two examples of how academic skills are important when teaching young students with disabilities, and, in both articles, the researchers used systematic instruction.

Systematic instruction is needed for efficient learning. Researcher has shown these instructional strategies have been effective in teaching students with MSD. Research has also shown that systematic teaching procedures as CTD and SP have been used to teach functional content including both discrete and chained tasks (Collins, 2007). In a comparison study, Riesen, McDonnell, Johnson, Polychronis, and James (2003) used 4 participants with MSD who attended a general education classroom to determine which procedure was more efficient: CTD or SP. The skills focused on academic skills and how the paraprofessionals participated along with the students while in the general education setting. The study showed the students were able to verbally express words through embedded instruction during their school day, both errorless procedures were effective, and students generalized the words to the general education setting while working with the paraprofessional. The study does not give a definite answer as to which errorless procedure was most efficient. SP was used in a study done by Schuster and Griffen (1993). The researchers taught 4 elementary aged students with moderate mental retardation to make juice from a frozen concentrate and included non target information of reading recipe words. The students with moderate disabilities were first trained on the chained task of making frozen juice from a can. Then, they were taught the discrete task

of reading recipe words. Direct systematic instruction was used to teach both skills. All students acquired and maintained the skill of making juice. Three of the 4 students learned the non target information, the recipe words. Schsuter and Griffent not only found it important to teach a functional chained task, but included an academic skill or reading words. In another study completed by Akmangolu and Bata (2004), the researchers taught 3 individuals with Autism to point to numerals using SP. The researcher used a multiple probe design, which was effective for all participants. The high school aged students pointed to numerals presented on index cards during instruction and met criterion. Then, during generalization, the students pointed to numerals on calendar sheets. The procedure was effective during all sessions. This research above shows the importance for systematic instruction to students of all ages and all skills.

We know young students need to be taught academic skills, and we see systematic instruction is efficient by reviewing the research. The research will now show us that best practice is for young children to learn during routines and activities during their day. Daugherty, Grisham-Brown, and Hemmeter (2001) researched the effects of embedded instruction on the acquisition of target and non target skills. Three preschool students with developmental delays participated in the study. The target skill, counting, was taught through daily activities and routines. The teacher embedded the non target information, the color of the objects that were counted. The CTD procedure was effective when teaching the skill of counting. All 3 students reached criterion. One of the 3 students acquired the non target information. The effects of embedding the targeted information in the daily routines were positive.

Sewell, Collins, Hemmeter, and Schuster (1998) used an activity based instruction (ABI) approach with simultaneous prompting to teach dressing skills to preschoolers with developmental delays. The research was over three skills per student. The students embedded the skills, such as putting on a jacket to go outside and taking a jacket off when returning from outside. All students met criterion for their specific target skill and maintained the skills. The researchers found the SP procedure and the embedding of the skills to be efficient. Kurt and Tekin-Ifar (2008) completed a comparison study of CTD and SP within embedded instruction to teach leisure skills. The research included 4 preschool students with Autism to take a picture using a digital camera and using a CD player to play music. The settings included the classroom cafeteria, hallway, and free play areas. The researcher used CTD to teach one set of students how to take a picture, then used the SP procedure with those same students to use the CD player. Then, the second set of students were taught how to take a picture with CTD and to use the CD player with SP. Across all students, the SP procedure was most efficient when teaching both skills. The embedding instruction model has proven the importance of routine based learning and activity based instruction.

One way is to embed instruction in routines includes play. According to Bredekamp and Copple (1997), play is the most developmentally appropriate way for students and children to learn. The play allows for problem solving and emotional and social skills to develop. Ashabir feels play is beneficial to children. Ashabir finds seven areas that are developed during play time: socioemotional, negotiation, problem solving, perceptive taking, role taking, cooperation, and social understanding and related skills. This gives insight and a solid argument for why having play time is important and how it

can be important to teach during play. In an article by Cooney (2004), the author examined the perceptions of learning through play in a kindergarten classroom in Guatemala City through a parent and teacher survey. The study included two different socioeconomic settings. The investigator surveyed teachers and parents from those settings on their perception of learning through play. The surveys included questions related to their personal work, personal education, opinions of a classroom, and their opinion of activities performed in a kindergarten classroom. The survey found all participants, teachers and parents, believed play may affect the curriculum outcomes of students. The teachers and parents believed the benefits of play include broadening vocabulary skills, conceptual thinking, imagination skills, gross and fine motor skill development, and direction following. Both sets of the teachers and parents felt learning through play is intriguing and a natural process. In the results of this article, play appears to be important to teachers and parents, but its role in learning academic skills is not apparent.

In a different article, related to how to teach students to play, the researchers found teaching play increased student success in daily routines. Francke and Geist (2003) conducted a case study on teaching play strategies to a child with autism. The instruction occurred in a preschool setting with students with a variety of disabilities. The teacher taught the play skills in a structural manner, modeled from the Treatment and Education of Autistic and Related Communication Handicapped Children (TEACCH). The author reported anecdotal records of observations and teaching strategies. The findings of the effects of teaching play included an increase in the complexity of play, opportunities to play, social interactions, and generalization of social skills. The findings showed a

positive effect on the student, his school environment, and his home environment. Play is important to teach, according to Cooney, and teaching play skills is effective in other areas in the classroom, according to Francke and Geist.

In the end of this, we know teaching academic skills to young students with disabilities is important. We found out using systematic instruction, such as SP, is most efficient when teaching skills to young children with disabilities. Next, we found support that teaching through routines and embedding skills is effective, including leisure skills and academics. Then, we determined through professional opinions, such as Bredekamp and parents from Guatemala City, that play is important. But, we have yet to determine, can we put it all together and still be effective? The purpose of this study was to evaluate the use of SP to teach young children with MSD math skills in the context of play.

SECTION 2: METHOD

SUBJECTS AND PARTICIPANTS

STUDENTS. The study included one girl and four boys who attended a rural public elementary school that housed three resource classrooms for students with MSD. Each participant participated in both the general education kindergarten classroom and the resource room for students with MSD. The students attended art, music, physical education, computer lab, lunch, recess, and centers with their same-aged peers without disabilities.

All students had history learning with the CTD and system of least prompts (SLP) procedures. The students had not been introduced to the simultaneous prompting procedure by the researcher, a special education teacher in the school.

The female student, Rosie, was a 6-year old kindergarten student with developmental disabilities. She attended the classroom for students with MSD for 180 min per day. Her current individual education program (IEP) listed objectives related to answering wh- questions (i.e., Who, What, When, Where, Why), identifying letters, reading sight words, identifying numbers and shapes, performing steps for one-digit addition problems, completing task-analyzed daily skills, and completing two to three step verbal directions. Rosie's recent evaluation listed her overall IQ as a 54 according to the *Wechsler Intelligence Test*. Rose was able to perform age-appropriate skills, such as toileting, washing her hands, getting dressed, and feeding herself. Rosie showed deficits in putting shoes on the correct feet, organizing materials at school, and completing multi-step verbal directions. She was able to take notes or items to familiar places in school and travelled independently to and from her general education classroom. She received speech therapy and occupational therapy per her IEP. Rosie was able to have a conversation with peers and adults. She was able to use complete sentences with at least five words per sentence. She had difficulty understanding fact and fiction. Rosie would sometimes tell stories or get confused when an instance occurred. For example, Rosie had difficulty with elapsed time, such as yesterday and next week. Rosie enjoyed talking about her dogs, Barbie dolls, and television shows. She appeared to be happy and wanted to please others.

Josh was a 6-year old boy with Down Syndrome who had a label of Functional Mental Disability (FMD, the Kentucky label for students with MSD). His IEP listed identifying letters, identifying numbers, performing handwriting tasks, and performing gross motor tasks as educational objectives. Josh was able to complete simple four to six

piece puzzles. He was able to complete matching and sorting tasks with colors, familiar pictures, and objects. He was able to name familiar adults and would attempt to verbalize their names. He was able to attend to a preferred task, but he was easily distracted. Josh liked to watch others and informed others when they were doing something incorrect by yelling “No,” pointing at them, or physically prompting them to complete the task. Josh had attended preschool for two years with peers with and without disabilities. He required someone to hold his hand when transitioning out of the classroom due to a history of running. Josh would run to others and give hugs, pull at items in the hallway, and run into other classrooms. Josh was social and seemed to enjoy having fun. He also appeared to enjoy dancing, singing and playing with friends. Josh displayed inappropriate behaviors, such as nose picking, spitting, and hitting. He needed instruction on how to play with others and how to share toys. Josh used manual signs, gestures, and one-word utterances to communicate with adults and peers at school. Josh was able to say “mom,” “dad,” his teacher’s name, “no,” “yes,” “please,” and a few students’ names. He also was able to sign “toilet,” “more,” “eat,” and “sorry.” He waved goodbye when he left the classroom and would sometimes say “hi” and “bye,” when appropriate. In order to get someone’s attention, he would tap on the person’s arm and say “hey.” Josh was able to find needed materials while at school and identify objects and pictures related to his school day. At this time, there were no intelligence scores or adaptative scores because he had not been tested. Josh was currently under a re-evaluation process to determine accurate scoring for both an IQ and adaptive behavior score. Josh received speech therapy, occupational therapy, and physical therapy according to his IEP. He was able to hold a crayon and scribble, but could not stay in the

lines. He was unable to write his full name, but was able to cut on a line. Josh was able to run, gallop, climb stairs and use playground equipment. He enjoyed playing basketball and tag. He had difficulty catching a ball, but would try. He liked to play with toys, swing, and play on the playground.

Austin was a 6-year old male with developmental delays who was in kindergarten. Austin began attending school in late fall. According to his attendance records, Austin had been in three different schools over a six month period. His prior attendance records for preschool showed that Austin attended school close to a quarter of the preschool calendar year. Austin wore glasses and was small in stature compared to other kindergarten students. For example, Austin's clothing while in kindergarten was a 3T and 4T. When Austin attended preschool, he attended in his home district. During his preschool year, a full evaluation was planned; then his family moved. When Austin returned, the evaluation process picked up and he was undergoing the different assessments at the time of this study. Austin's IEP included the skill of identifying letters, colors, numbers, and shapes. Austin was able to identify letters, match a picture to the letter the picture began with, and identify numbers, but he had difficulty with counting objects. Austin was able to hold a crayon and pencil and would attempt to write his name. He was able to answer simple questions about a text, such as "Chicka, Chicka, Boom, Boom," and, when asked, "Where are the letters?" he would say, "The tree, they all fall down." Austin liked to play with cars and trucks and would share toys, but would get upset and cry when another student took his toy. Austin was able to use two to four word utterances, but had difficulty answering yes and no questions. He would answer yes to most questions. He would identify teachers and friends by their names. Austin

had difficulty carrying his tray during the lunch line and reaching objects in the line. He also had difficulty with putting on his jacket and backpack. He received occupational, physical, and speech therapies per his IEP. Austin had difficulty tracking items and catching a ball. When he attempted to catch a ball and reach for something, he was off by about six inches. Austin liked to be carried and held, but would run and walk when others in the class were performing those skills. Austin would trip and fall at different times throughout the day. Austin liked to play outside, play with toys, and run.

Will was a 6-year old boy with a FMD. His recent evaluation listed 54 as an overall IQ score according to the *Wescheller Intelligence Test*. According to his IEP, Will was working with identifying letters and colors, sequencing cards, identifying numbers and shapes, counting rote to five, performing gross motor skills, completing task-analyzed skills and improving self help skills. Will attended a different elementary school for the first three months of his kindergarten school year. After the completion of his re-evaluation, Will's placement was changed and he was serviced in the FMD classroom. Will was able to differentiate numbers and letters, but was not able to identify all letters of the alphabet or numbers to 10. He was able to verbally spell his name and was able to write the letter "K." he was able to identify colors, match colors and sort colors, complete a four-piece puzzle and play simple games on the iPad. Will was able to color in the lines and cut on the lines. Will had difficulty climbing stairs, catching a ball, throwing a ball and bouncing a ball. Will received occupational and physical therapies per his IEP. Will was able to communicate through five to seven word sentences. However, Will referred to himself in first person. For example, he would say "Will gonna use the restroom" when he needed to use the restroom. Will's emotional and

social developments were severely delayed. At the age of 18 months, according to record reviews, Will was shaken and beaten by a family member in the head area. Since then, Will demonstrated a delay in his cognitive, social, and emotional skills. When Will did not get a desired item, he would cross his arms, stomp his feet, scream and cry until the item was given to him. He would cry and sob for up to 20 min. Will wore glasses and, when frustrated, would attempt to break the glasses. Will required intense instruction on appropriate social and behavioral skills, as well as how to play with others and share items. Will enjoyed movies and was able to name the characters, settings, sequence and the main idea. Will's face lit up when Monsters Inc. was mentioned and would work hard to watch movie trailers on the computer.

Jake was a 6-year old male in kindergarten with FMD. Jake began attending his first school setting during his kindergarten year. He previously stayed at home with father and his three younger sisters. When Jake was approximately 2 years old, he fell and hit his head on concrete flooring. According to his parents, they began to see a delay in his progress; however, there was never paperwork or documentation completed regarding a traumatic brain injury. Jake was able to communicate through manual signs, gestures, and pictures. He was able to sign "more," "eat," "toilet," "all done," and "play." He was able to use pictures to identify desired objects, such as food and activities. He would use gestures, such as pointing; would jump to show excitement; and would cross his arms and rub them to show he was cold. His IEP listed identifying sight words, identifying pictures, identifying letters, identifying shapes, identifying numbers, completing task-analyzed skills, and using the Picture Exchange Communication System, as objectives. Jake was able to complete eight piece puzzles, look through a book and

turn pages, complete three-step work systems, and complete matching activities. Jake was able to match and sort colors, shapes, and different sized objects. He was able to navigate the computer to find a desired website and would sign “more” to an adult to get the person to sign in using passwords. When Jake was told to leave a desired activity or area of the classroom, he would stomp his feet, kick, and cry. When he cried, there were no tears but more of a whining sound. Jake was able to use the restroom and complete the steps of hand washing. He was able to walk into the classroom, put up his things, and get a morning activity box. Jake was successful with routine-based activities and schedules. When routine changed, Jake would cry and stomp his feet. Jake was able to hold a crayon and a pencil, however, he would refuse at times to complete handwriting and coloring activities. Jake fell at times and had difficulty ascending and descending stairs. He liked to play ball but had difficulty catching and throwing the ball.

OTHER PARTICIPANTS. The researcher was the teacher for the FMD classroom. She was in her 8th year of teaching and was in her 5th year at the school where the study took place. The researcher attended the University of Kentucky where she obtained a Bachelor’s Degree in Moderate/Severe Disabilities for Students K-12. She had completed over 40 hours of graduate work at the University of Kentucky. The reliability data collector was a graduate of the University of Kentucky where she too received her Bachelor’s Degree in Moderate/Severe Disabilities for Students K-12. She was completing her 2nd year of teaching.

SETTING

The setting was a resource classroom for students with MSD (i.e., FMD) in kindergarten through second grade. Students served in the classroom met eligibility per Kentucky law under FMD. This made students eligible for services in a classroom for

MSD. There was one teacher, one instructional assistant who stayed in the classroom, and one instructional assistant who performed environmental support in the general education setting. The speech pathologist, occupational therapist, physical therapist, and teacher for students with visual impairments were in the classroom throughout the day. The students were in the general education setting 40-80% of the day. While in the resource classroom, students received instruction on IEP goals and objectives. The students also participated in modified and adapted grade level work that was tied to alternate assessment standards. The resource classroom offered small group instruction and 1:1 instruction for the students. While students attended the general education classroom they participated in small group instruction during centers. They also participated in recess, lunch, read aloud and morning arrival routines. Students attended music, art, computer lab, physical education and library classes with the general education class. They attended field trips and special programs with the general education class. Students completed modified and adapted work. For example, when general education students were completing a spelling sheet, the participants may find a specified letter. Other participants may have a shortened spelling sheet with fewer words.

MATERIALS/EQUIPMENT

The researcher used the following materials during the study: (a) index cards with numbers one to ten, (b) data sheets, (c) reliability sheets (d) graphs, (e) play items (e.g., cars, play food, figurines), (f) pencils, (g) edible reinforcers deemed appropriate per student preference tests, (h) highlighters, (i) clipboard, (k) table, (j) kitchen play table, (k) post it notes, (l) building blocks, (m) Lego's, (n) Lincoln Logs, (o) pictures of the play items, (p) gymnastics equipment (e.g., balance beams, foam pieces, trophies), (q) bowling balls, (r) bowling pins, and (s) children museum items.

DATA COLLECTION AND PROCEDURES

SCREENING. Screening occurred in the resource classroom. The researcher observed students during math instruction and playtime. The researcher reviewed data sheets and work samples. The researcher did not have specific screening sessions, the researcher observed during different times of the school day and made anecdotal notes. During the screening, Rosie rote-counted to 100 with visual prompts, performed 1:1 correspondence with items up to 20, verbally expressed written number words to ten, and verbally identified rectangle, square, triangle, and circle. Rosie inconsistently demonstrated knowledge of simple addition. For example, in one observation, Rosie was asked, “What is $4+6$?” Rosie responded “10.” In a different observation, she was asked, “What is $1+4$?” Rosie responded with, “What are you talking about plus?”

During Will’s screening, he did not recognize numbers one to five, he rote counted to two, he recognized a circle, and he counted two objects with 1:1 correspondence. Austin verbally identified numbers one to five, he counted to five, he verbally identified square and circle, and he counted objects to two. Jake touched numbers one to five when asked, “Where is the number 2?” He put numbers in sequence into a puzzle. He counted objects up to three. He did not recognize number words. Josh did not identify numbers. He did not count objects. Josh rote counted to three. Based on the researcher’s observations, the researcher determined the target stimuli to instruct with each student. The researcher selected the following target stimuli for each student: (a) Rosie will perform single digit addition problems, including $3+2$ and $4+4$, (b) Will will verbally identify numbers 3 and 4, (c) Jake will point to numbers 6 and 7, (d) Josh will point to numbers 4 and 5, and (e) Austin will count 3 and 4 objects. Please see the attached table in Appendix A.

GENERAL PROCEDURES. The researcher used the errorless learning procedure SP. During SP students participate in both prompt and probe trials in each session. The researcher completed screening during classroom observations. The researcher reviewed student work samples and data sheets. Then, the researcher identified two math skills per student to be taught. The researcher completed a full baseline condition on each student's target stimuli. All students completed three baseline sessions. An example of the data sheet is located in Appendix A. After the initial baseline session, the researcher began instruction with the first student. Once a student met criterion, the researcher began instruction with the next student. This pattern continued until all students met criterion. Criterion was three sessions at 100% independent responding.

The researcher at times conducted two sessions a day, the first session occurring at approximately 10:00 a.m. and the second session at approximately 2:00 p.m. In each session, the researcher completed probe and prompt trials, as required in the SP procedure. The researcher first completed probe trials. Then, after six probe trials were complete, the researcher completed six prompting trials. Sessions occurred each day during the school week. The researcher used the same behavior management system during the study as in the daily classroom setting. The researcher used both edible reinforcement and verbal descriptive praise. All students in the study followed the same procedures and received the same consequences, the only difference being that each student had different target stimuli and a different edible reinforcement. Rosie's skill was to verbally express the answer to the addition problems $3+2$ and $4+4$. Josh identified numbers 4 and 5. Austin was to count objects to the amounts of 3 and 4. Will identified the numbers 3 and 4, and Jake identified the numbers 6 and 7. The researcher completed

all steps of the data sheet in the same manner for each student and completed the same task direction, attentional cue, and basic procedures for the study, with the exception of individualizing the target stimuli for each specific student.

BASELINE. The researcher collected baseline data on the target stimuli selected for each student. The baseline session occurred at the kidney shaped table in a 1:1 format. The researcher showed each student his or her predetermined stimuli. She gave each student an attentional cue “Are you ready to work?” and waited for their attention. If the student did not attend to the cue, the researcher provided an additional cue and, then, a specified task direction, which was different for each participant and was related to each of their target stimuli. Each student was given a 5 s-response time. If the student answered correctly per each student’s correct response definition, the researcher recorded a plus (+) sign in the response column. If the student responded incorrectly, he or she received a minus (-) in the response column. If the student did not respond to the task direction within the given time, the researcher recorded a 0 for no response. The researcher provided verbal descriptive, such as “Good job working,” praise for attending to the task every two trials for a total of five verbal praise statements during each baseline session. She only conducted three sessions of baseline with each student due to time constraints.

The researcher collected baseline data on single digit addition with Rosie. She presented a $3\frac{1}{2}$ by 5 in index card with the problem written horizontally in black marker on the card to Rosie along with unifex cubes. She gave the attentional cue, “Are you ready to work?” The researcher waited to ensure Rosie was ready to begin the task. If Rosie was not attending to the researcher, then the researcher provided the attentional cue

again. Next, she gave the task direction, “Solve the problem: $3 + 2 = ?$ ” On the next trial, she provided the same task direction, replacing $3 + 2$ with $4 + 4$. She waited 5 s for Rosie to respond. Rosie was to respond verbally by stating the answer. The researcher then recorded a plus for a correct response of verbally stating the sum of the problem within 5 s of the presented stimulus, a minus for an incorrect response of stating an incorrect sum of the problem within five s of the presented stimulus, and a 0 for no response. The researcher presented each stimulus five times each for a total of 10 baseline trials. She gave verbal praise every two trials for a total of five praise statements during each baseline session. At the end of the baseline session, Rosie chose a small edible treat from the treat box.

The researcher collected baseline data on number identification with Will. She collected baseline data in a 1:1 format at the kidney shaped table. She gave the attentional cue, “Are you ready to work?” The researcher waited to ensure the student was attending to the researcher. If the student did not attend, then the researcher provided the attentional cue again. Then, she gave the task direction, “What number?” paired with a $\frac{1}{2}$ by 5 in index card and the written number in black marker. She used the task direction for numbers 3 and 4. She waited 5 s for Will to respond. Then, she would record a plus for a correct response if he verbally stated the correct number within the 5-s interval, a minus for an incorrect response when he did not state the correct number within 5-s, and a 0 for no response when he did not verbally state a response. The researcher presented each stimulus five times for a total of 10 trials during baseline sessions. She provided verbal descriptive praise every two trials for a total of five statements (e.g. “Good job

working”) during the session. At the end of the session, Will could choose an edible reinforcer from the choice box.

The researcher collected baseline data on number identification with Jake. She collected baseline data in a 1:1 format at the kidney shaped table. She gave the attentional cue, “Are you ready to work?” The researcher waited to ensure she had the student’s attention. If the student did not attend to the researcher, she provided the attentional cue again. Then, she placed three index cards, one card with the correct response, then two cards with incorrect responses. The incorrect responses did not include the other target stimuli, but included numbers one to ten. She delivered the task direction, “Find the number 6,” for numbers 6 and replaced the number 7. She provided three choices each time. She operationally defined “find” as touch, pick up, hand to teacher, move, or push to teacher. She waited 5 s for Jake to respond. Then, she recorded a plus for a correct response when he found the requested number within 5 s, a minus for an incorrect response when he did not find the requested number within 5 s, and a 0 for no response when he did not choose, point, pick up, or find any number within 5 s. The researcher presented each stimuli five times for a total of 10 trials during baseline.. The researcher provided descriptive verbal praise, similar to other students, for attention and working hard after every two trials. She provided Jake with the choice box at the end of baseline session so he could choose an edible reinforcer.

The researcher collected baseline data on number identification with Josh. She collected baseline data in a 1:1 format at the kidney shaped table. She gave the attentional cue, “Are you ready to work?” The researcher waited to ensure she had the student’s attention. If the student did not attend to the researcher, she provided the

attentional cue again. Then, she placed three index cards, one card with the correct response, then two cards with incorrect responses. The incorrect responses did not include the other target stimuli, but included numbers one to ten. Then, the researcher gave the task direction, “Find the number 4.” She delivered the task direction for numbers 4 and 5. She provided three choices each time. She operationally defined “find” as touch, pick up, hand to teacher, move, or push to teacher. She waited 5 s for Josh to respond. Then, she would record a plus for a correct response of finding the correct requested number within 5 s, a minus for an incorrect response of finding the incorrect number within 5 s, and a 0 for no response of not finding any number within 5 s. The researcher presented each stimulus five times for a total of 10 trials during baseline sessions. The researcher provided descriptive verbal praise every two trials for a total of five verbal praise statements during each baseline session for attention to task and working hard. She then allowed Josh to make a choice from the edible choice box at the end of the baseline session.

The researcher collected baseline data on counting objects to 3 and counting objects to 4 with Austin. She collected baseline data in a 1:1 format at the kidney shaped table. She gave the attentional cue, “Are you ready to work?” The researcher ensured the student was attending to the researcher. If the student was not attending, the researcher provided the attentional cue. Next, she placed either three or four blocks on the table. Then, she gave the task direction, “Count the blocks.” She delivered the task direction in the same format, rotating numbers of blocks for 3 and 4. This allowed for five trials per number, for a total of 10 baseline trials per session. She waited 5 s for Austin to respond. Then, she would record a plus for a correct response when Austin counted the blocks to

the correct amount within 5 s, a minus for an incorrect response when he did not count any blocks to the correct amount, and a 0 for no response when he did not touch the blocks or count the blocks. The researcher presented each stimuli five times during each baseline session for a total of 10 trials. The researcher provided verbal descriptive praise for attention and working hard after every two trials. She then allowed Austin to choose from the edible choice box at the end of the baseline session.

After all baseline sessions were completed, the students chose an edible reinforce from the choice box. Within the classroom behavior plan, students made choices throughout the day. At the beginning of the school year or when a student arrived in the classroom for the first visit, the researcher performed preference tests. Each student had his or her end of the day choice, such as the iPad, puzzles, computer, games, or toys. They also had an end of session reward. Typically, a session was 30 to 45 min long and occurred in a small group setting. The students chose from the edible choice box which included Skittles, M & M's, Goldfish, Hot Tamales, and other items the students had preselected. The researcher chose to use this system throughout the study. An example of the baseline data sheet is located in Appendix A.

SIMULTANEOUS PROMPTING INSTRUCTION, The SP procedure is a response prompting procedure where probe sessions and prompt sessions occur sequentially. The researcher first completed the six probe trials, then completed the six prompt trials each session. The researcher conducted instruction and collected data three to five times per week during playtime in the resource room. During playtime the students chose which play areas they preferred. The play areas included the kitchen, rug with beanbags, rectangle table area, free floor space, and the kidney table. Sessions took place at

approximately 10:00 a.m. and 2:00 p.m. each day. Playtime typically lasted 15 to 20 min. The researcher collected data on one student while other students played with the target student and the researcher. She collected daily probe data and daily training data as part of the SP procedure. She allowed a five-s response time in each trial. She collected daily probe data for three trials per target stimuli. She then trained each target stimuli for three trials. The example of the data sheet is located in Appendix A.

DAILY PROBES. At approximately 10:00 a.m., the 5 students and the researcher made their way to the kidney shaped table in the classroom. The researcher began with the first student, Rosie. She provided Rosie with pictures of the various play items and areas in the room. She then asked Rosie, “Where do you want to play today?” She allowed 10 s for the student to make a decision. If the student had not decided within 10 s, she verbally described each of the pictures. Once the student decided, the other students and the researcher went to that area and began playing. If the student chose the kitchen area, they sat down at the table, stood by the stove, or took a similar position in the area. They then played with food, utensils, stove, or other kitchen materials. The researcher asked the students questions related to the items they were playing with in the kitchen area. She then began the daily probe session with the target student. The first student in the study, Rosie, began her daily probe typically in the kitchen. She allowed the student to choose what she was playing with in the kitchen area. She then provided the task direction. For example, the researcher said, “Rosie, I have two blue plates and three red plates. How many plates do I have?” She allowed for a 5-s response interval to initiate and 10 s to complete the task, If the student initiated and completed the task correctly and verbally stated the correct answer, the researcher circled “Probe” and

marked a “+.” If the student did not verbally state the correct answer, she circled “Probe” and marked a “-.” If the student did not initiate and did not complete the task, she circled “Probe” and marked “NR.” The researcher probed each target stimuli three times per session. This allowed for six trials per daily probe session. She completed the appropriate sections of the data sheet. Then, she provided verbal descriptive praise for attention to the task and appropriate behavior after every two trials. The same procedures occurred at the 2:00 p.m. session.

When Josh began instruction, the researcher allowed Josh to choose the desired play area for his instruction. The researcher and the other students went with Josh to the play area. If Josh chose the blocks on the rug area, the researcher and the students got on the rug and began to play. The blocks had number stickers with numbers one to ten on each block. The researcher would find three blocks, one the stimuli and two distracters. The researcher provided the same attentional cue, task direction, and completed the data sheet as explained in the baseline section.

During daily probes for Austin, the instructor allowed Austin to choose the desired play area. If Austin chose the cars, the researcher and the other students made their way to the cars. The researcher found three to four cars. The researcher would present three cars and ask “Austin, how many cars do I have?” The researcher provided the same attentional cue, task direction, and completed the data sheet as explained in the baseline section.

Will’s daily probes began with his choice of the play areas. If Will chose the kitchen, then the researcher and other students went to the kitchen play area. The researcher played with the students and found plates, cups, bowls, and other items with

number stickers on them. The researcher would provide an attentional cue, such as “Look at this plate,” then wait for Will to look at the plate and provide the task direction, “What number?” The researcher then followed the same procedures for responses and verbal descriptive praise as stated in the baseline section.

When Jake began daily probe sessions, the researcher mirrored the procedures as used with Josh, replacing the numbers 4 and 5 with the numbers 6 and 7.

TRAINING TRIALS. The researcher conducted daily training trials immediately following daily probe trials in the same area that the daily probe session occurred. The researcher used similar task directions and similar materials. The researcher completed three training trials per target stimuli. She allowed for a 0-s response time during training. For example, the researcher said “Rosie, I have two blue plates and three red plates. How many plates do I have?” Then, immediately, the researcher said, “I have 5 plates. $2+3=5$. Now you say it.” The researcher allowed for a 5-s response time. She allowed 10 s to complete the task if the task was initiated within the first 5 s. If the student initiated and completed the problem correctly, the researcher circled “Prompt” and marked with a “+.” If the student did not complete the task correctly, she circled “Prompt” and marked a “-.” If the student did not initiate and did not complete the task, she circled “Prompt” and marked “NR.” If the student received a “-” or a “NR” during the training session, the researcher repeated the task direction, modeled the correct response, and moved onto the next problem. The researcher did not request for the student to respond, but, if the student did respond, the researcher praised the correct response.

When Josh began training trials, the training took place in the same area as to where his probes occurred. The researcher would say, “I have a block, this block has the

number 5. Josh, what number? 5.” The researcher would wait for Josh to immediately say, “5.” If Josh verbally expressed five or touched five, the researcher circled prompt and wrote down a plus sign. If Josh did not touch the number five or said an incorrect number, the researcher circled prompt and recorded a minus sign. Then if Josh did not respond, she recorded a NR. The researcher repeated this dialogue and replaced the numbers. The researcher prompted each stimulus three times for a total of six prompt trials per session. The researcher provided verbal praise for each correct response and praise for attending to the task and working hard.

During Will’s training trials, the training took place in the same area as to where his probes occurred. The researcher would say, “I have a block, this block has the number 4. Will, what number? 4.” The researcher would wait for Will to immediately say, “4.” If Will verbally expressed five, the researcher circled prompt and wrote down a plus sign. If Will did not touch the number four or said an incorrect number, the researcher circled prompt and recorded a minus sign. Then, if Josh did not respond, she recorded a NR. The researcher repeated this dialogue and replaced the numbers. The researcher prompted each stimulus three times for a total of six prompt trials per session. The researcher provided verbal praise for each correct response and praise for attending to the task and working hard.

When Austin began training trials, the training took place in the same area as to where his probes occurred. The researcher would say, “I have a car; this car has four wheels. Austin, how many wheels? 1, 2, 3, 4. Now you count.” The researcher would wait for Austin to immediately count to four. If Austin verbally counted to four, the researcher circled prompt and wrote down a plus sign. If Austin did not count to four or

counted incorrectly, the researcher circled prompt and recorded a minus sign. The researcher also stopped Austin if he was counting incorrectly and provided the model again. If Josh did not respond, she recorded a NR. The researcher repeated this dialogue and replaced the numbers and objects with three and four items to count. The researcher prompted each stimulus three times for a total of six prompt trials per session. The researcher provided verbal praise for each correct response and praise for attending to the task and working hard.

Due to time constraints, Jake did not make it to daily training or daily probe trails to due to time constraints and the end of school.

MAINTENANCE PROCEDURES. Criterion for each student was 100% independent responses during the daily probe trials for three consecutive sessions. Once a student met criterion, the researcher collected maintenance data after 3, 6, and 9 days in a play area. The researcher used the maintenance data sheet in Appendix A to collect student response. If the student did not maintain the behaviors, the researcher conducted a full baseline session on the 10th day. Then, if the student did not reach criterion during the baseline session, the researcher stopped intervention with the other student and went back to reteach to the student who did not maintain the target skill. Maintenance was defined as performing the desired tasks at criterion after 3, 6, and 9 days after criterion was met. The researcher reviewed data daily to determine if the students maintained the desired behaviors at the criterion set by the researcher.

GENERALIZATION PROCEDURES. The researcher conducted generalization sessions 5 and 10 days after the student met criterion. The researcher provided the student with a

teacher made worksheet. The worksheet presented the stimuli in a different manner than the playtime.

RELIABILITY

The researcher collected reliability data during baseline, instruction, and maintenance sessions for interobserver and procedural reliability. The researcher predated the data sheets and set up data collection for every Monday during the session at approximately 9:45-10:00 a.m. The researcher did not schedule times during generalization sessions due to the unavailability of the observer. She collected reliability data 7% of baseline sessions and 16% of instructional sessions. The researcher did not collect reliability data during generalization. A teacher of students with MSD collected reliability data. The researcher required agreement of 90% or higher as acceptable. The observer and the researcher had 100% agreement on all areas during each session. Rosie participated in reliability data collection one of 12 sessions, for 7% of her participation in the study. Josh participated in three reliability sessions out of his 16 sessions. The observer collected reliability 19% of Josh's time in the study. The observer conducted reliability data during three of Austin's 13 sessions, which was 23%. The researcher conducted reliability on all skills across students. The reliability data sheet is located in Appendix A.

DEPENDENT VARIABLE RELIABILITY. The researcher used the point-by-point method when calculating reliability on the dependent variable. She calculated the number of agreements divided by the number of agreements and disagreements and multiplied by 100. The researcher collected data on dependent variable reliability a total of seven sessions. During baseline, the observer collected data one of 15 sessions for 7% of baseline sessions. The observer collected data during instruction six of 36 sessions, for

17% of instructional and maintenance sessions. The observer did not collect reliability during generalization. The observer agreed with the researcher 100% of the sessions observed.

INDEPENDENT VARIABLE RELIABILITY. The researcher used the following formula for calculating independent variable reliability: the number of instructor behaviors observed divided by the number of behaviors planned multiplied by 100 (Billingsley, White, & Munson, 1980). The researcher assessed the following teacher behaviors: (a) providing the attentional cue, (b) providing the task direction, (c) waiting for student response, (d) providing verbal descriptive praise, and (e) providing edible reinforcement. The researcher collected data on independent variable reliability a total of seven sessions. The observer collected data one of 15 sessions for 7% of baseline sessions. The observer collected data during instruction six of 36 sessions, for 17% of instructional and maintenance sessions. The observer did not collect reliability during generalization. The observer agreed with the researcher 100% of the sessions observed.

EXPERIMENTAL DESIGN

The researcher planned to use a multiple probe design (Gast, D.L., & Ledford, J., 2010)) across 5 students. She collected full baseline probe data on all target skills across all 5 students. The researcher then began instruction with the target set of skills with the first student. However, the researcher did not complete a full probe session after the first student met criterion. The researcher began instruction with the second student once the first student met criterion. The researcher continued this process through all students. The researcher did not conduct multiple probes during the study. Experimental control is demonstrated in a multiple probe design when the dependent variable changes when and only when the independent variable is applied. Therefore, although all students made

progress in this study, there were insufficient baseline sessions conducted to ensure that the intervention was completely responsible for the increase in data.

DATA ANALYSIS

The researcher collected data every school day during a school week at least once daily. She reviewed data sheets and graphs daily. She analyzed data by reviewing student data sheets and reliability data sheets. Then, she determined if proper procedures were being followed. She reviewed student progress according to the data sheets and graphs. The researcher reviewed the preference test for students who were taking longer to reach criterion. She reviewed attendance data and took notes on student behaviors while not involved in the study. For example, the researcher reviewed other work samples and data to see if the acquisition of other skills was similar in the study.

SECTION 3: RESULTS

The researcher's question when this study began was: Is simultaneous prompting effective when teaching math skills during play to young students with developmental disabilities? As shown in Figure 1, the data indicate that the answer is yes. The data show two of the students maintained and generalized the skills when given opportunities. Four of the five students who participated in the study met criterion. The fifth student did not meet criterion due to the end of the school year and time constraints. Maintenance and generalization sessions occurred for Rosie and Josh, who both maintained and generalized their skills at 100%. The three other students did not participate in maintenance and generalization due to the end of the school year. Further instructional data are shown in Table 1.

ROSIE, the first student to begin instruction in the research study, met criterion in four instructional sessions. During her three baseline probes, Rosie answered 1 problem out of 30 attempts correct. The three sessions of baseline took 56 min. When instruction began, Rosie answered 18 out of 24 addition problems correctly over a total time of 37 min. On her first instructional session, she answered 0 out of 6 addition problems correctly. After criterion of 3 sessions at 100% was met, Rosie participated in three maintenance sessions. During each of these sessions, Rosie maintained at 100% accuracy for answering addition problems. Her maintenance time over the three sessions was 35 min. For generalization (a total of 46 min over three sessions), she generalized the skill at 100% while completing addition problems. Rosie completed addition problems on teacher made worksheets. She used manipulatives and her fingers to complete the addition problems.

JOSH. The second student to reach criterion was Josh. During baseline sessions, Josh answered 6 of 30 attempts correctly on number identification. Over the three sessions, Josh spent 32 min in baseline. When instruction began, Josh met criterion within 11 sessions. He answered 50 of 66 attempts correctly during probe sessions. The total time for the instructional sessions was 85 min. After instruction, Josh completed two sessions of maintenance, both at 100% criterion. The total time for maintenance was 18 min. Josh generalized the skill of number identification with 100% accuracy over two sessions in a total time of 19 min. Josh completed teacher made worksheets to generalize number identification.

AUSTIN was the third student to begin instruction. He completed three baseline sessions in 42 min. Austin did not answer any baseline probes correctly. When

instruction began, Austin met criterion in 10 sessions. During the 10 sessions, Austin counted objects correctly on 47 of the 60 attempts. His total instructional time was 135 min. Due to time constraints and the end of the school year, Austin did not participate in generalization and maintenance sessions.

WILL completed three session of baseline over a total time of 29 min. During baseline, Will did not respond on 18 of the 30 attempts. He answered incorrectly on 12 of the 30 attempts. Will begin instruction and met criterion within eight instructional sessions. He answered 38 of the 48 attempts over a total time of 63 min. Will did not participate in maintenance and generalization sessions due to time constraints and the end of the school year.

JAKE only participated in three baseline sessions due to time constraints and the end of the school year. Jake answered 8 of 30 attempts correctly during baseline and the total time for baseline was 39 min.

Please see the graph located in Figure 1.

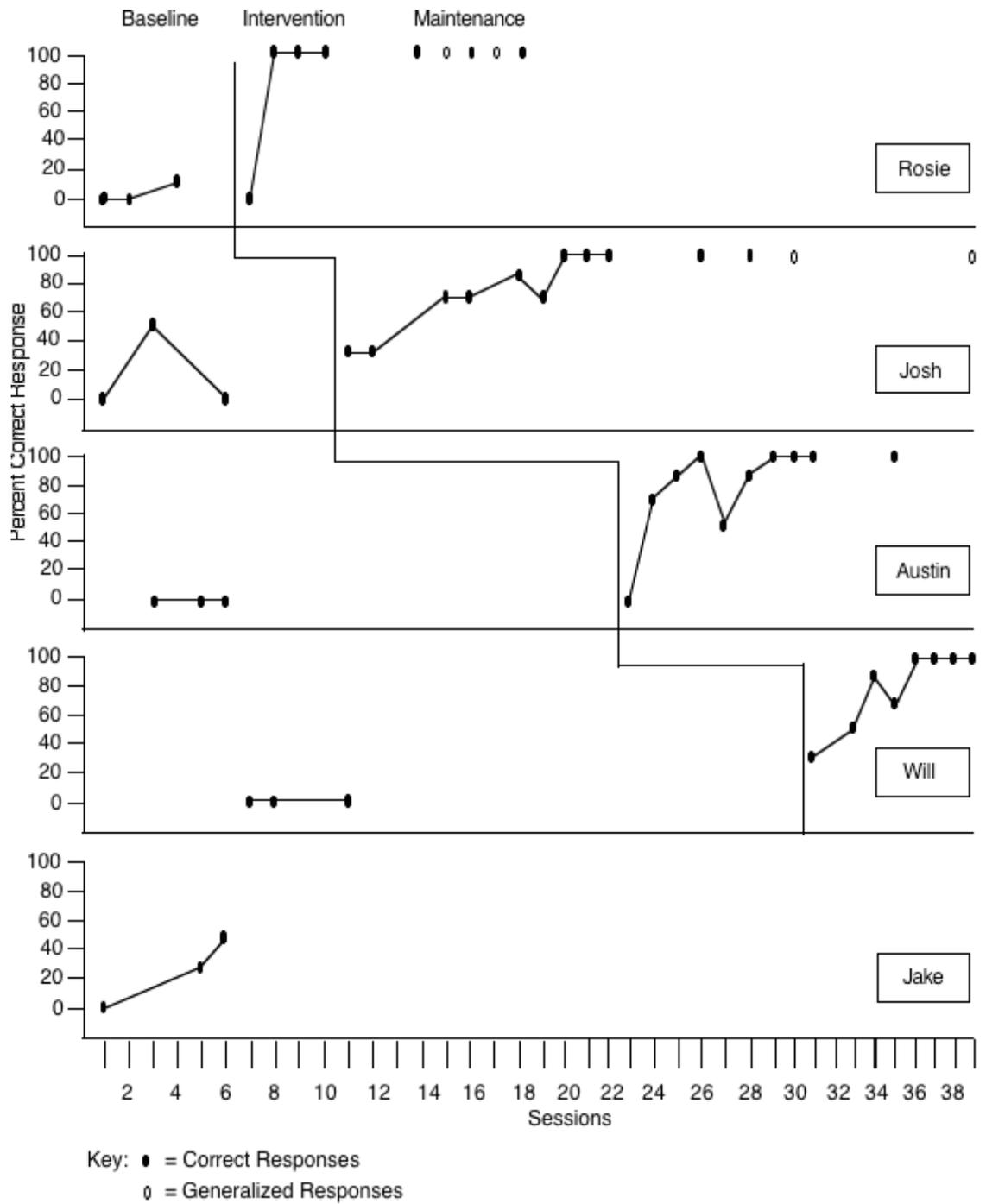


FIGURE 1: Student Success: This is a graph to show the effects of simultaneous prompting, the intervention and student success.

*TABLE 1: INTERVENTION SESSIONS.
Sessions and minutes during each intervention*

| Name | Sessions to Criterion | Min to Criterion | Session of Maintenance | Min of Maintenance | Sessions of Generalization | Min of Generalization |
|--------|-----------------------|------------------|------------------------|--------------------|----------------------------|-----------------------|
| Rosie | 4 | 37 | 3 | 35 | 2 | 46 |
| Josh | 11 | 85 | 2 | 18 | 2 | 19 |
| Austin | 10 | 135 | -- | -- | -- | -- |
| Will | 8 | 63 | -- | -- | -- | -- |
| Jake | -- | -- | -- | -- | -- | -- |

SECTION 4: DISCUSSION

The researcher's overall question is SP effective when teaching math skills during play to young children, was answered. The researcher found SP was effective, students did meet criterion. Two students maintained and generalized their target skills. Rosie, the first student in the study met criterion in four sessions, then maintained and generalized her target skills. Throughout the school year, Rosie made progress in all academic areas when systematic instruction such as CTD, SP and SLP were used. Josh, the second student in the study, met criterion in 11 sessions. Josh maintained and generalized the target skills. Austin, the third student, met criterion in 10 sessions. Due to the end of the school year, he was unable to participate in maintenance and

generalization sessions. Will met criterion in eight sessions. He did not participate in maintenance and generalization due to the end of the school year. The progress the students made proves the effectiveness of SP, the importance of play, and the acquisition of math skills.

Rosie, who attended half of her school day in a general education classroom, made progress throughout the school year in other academic, social, and behavior areas. She learned well from systematic routine based instruction, as evidenced by the data on her graph. Her success appears to be due to the intervention in this study, but it also could be due to the fact she attended math centers in her kindergarten classroom. Although the researcher asked the instructional assistant to not provide instruction on addition problems, it is possible that the kindergarten teacher may have taught addition while Rosie attended her class. During generalization, Rosie completed worksheets. She looked puzzled and confused the first time the worksheet was presented, but, after a model of the how to complete the problem with use of unifix cubes, Rosie completed the remaining generalization paper with 100% independence and accuracy. Rosie also was familiar with the researcher and the classroom routines. She understood the expectations and behavior programs. She attended to task and was eager to complete her work. Rose was a joy to work with on a daily basis, and it is hoped that she is continuing to make progress.

Josh was by the far the most difficult to instruct during play time or any time during the day. According to the data, there were numerous occasions where Josh would pick the first play area but would change his mind while in the middle of play. He had no experience with systematic instruction and was getting used to the researcher's classroom

expectations and behavior programs. During instruction, the researcher spoke to Josh's mother regarding his progress in the classroom. The mother informed the researcher that Josh was identifying numbers and counting objects to 10 while in preschool. After more investigation, Josh had identified and counted objects in a 1:1 format within a distraction free area. This may explain how he went from 6 of 30 correct responses in baseline to reaching criterion in 11 sessions.

Austin's instructional experience with counting objects was different than the other participants. In two of Austin's sessions, data were collected and instruction occurred during community-based instruction (CBI). The class attended CBI 5 days during the testing window for general education students. The researcher and the students left each morning at approximately 8:00 a.m. and returned around 2:00 p.m. Due to little time in the classroom within the play areas, the researcher collected data at two CBI sites instead. The first site was a gymnastics facility. There were trampolines, balance beams, foam pits, balls, swings, and other gymnastic equipment. The researcher collected data on counting foam blocks, jumping on the trampoline, rolling a ball, counting the number of balance beams, and counting how many trophies were in the trophy case. Austin scored 50% correct responses while at the gym. The next CBI occurred at the Lexington Children's Museum. The researcher collected data on the number of bubble machines, mirrors, toys, blocks, horses, and other objects. The student and the researcher walked around the museum, with the researcher occasionally saying, "Look, there are so many mirrors in this room. How many are there?" The student would then walk around and count the mirrors. The student counted objects with 87% accuracy while at the Children's Museum. On the third day, the researcher and the

students visited the bowling alley. The student counted the bowling balls, the number of holes in the ball, the number of pins, the students playing or bowling at the same time, and the video games. Austin reached 100% while at the bowling alley. If the researcher were to repeat this study, all the students who participated would have performed their math skills while on the CBI trips. The data would have been a way to facilitate generalization skills for all of the students.

The fourth student to participate in the study, Will, missed a total of 16 days during the study. However, due to illnesses, Will was the fourth student. Will came to the FMD classroom late November. He had been exposed to general education content and participated in a preschool environment for 2 years. It is possible that Will would have maintained and generalized his math skills if time had allowed. The same is true for Jake. Jake made progress during the school year with academics and communication. If time allowed, Jake may have met criterion and continued through maintenance and generalization.

There are a number of things in the study that could have been done differently. To start with, the researcher could have only included the students who attended her classroom full time. This would have allowed better understanding of behavioral expectations and systematic instruction. It also is possible that the study itself was not taken seriously by other staff working with the researcher and the students. The researcher sent a schedule of times she would be conducting her research and asked for the other teachers and assistants try to limit distractions. However, that did not work. Adults and staff would come in and out of the room, interrupt instruction, give a prompt to the student, and influence student performance at times. The researcher could have

been more direct with the adults and taken more control of her research and classroom. The researcher also notes that she did not inform all school staff (e.g. general education teachers) that worked with her students of the ongoing research. She did, however, inform the parents and special education teachers and assistants. Thus, it is possible that uninformed staff may have been teaching the same skills as the researcher. Also, the researcher should have been better organized with the toys and the play areas. The researcher should have explained and provided better examples of how students play with one another and share. There were times during instruction when toys were taken away and students would cry, causing an interruption to instruction. The researcher suggests that others teach during play skills but in a 1:1 setting. All in all, the researcher acknowledges that, although the results are promising, improvements could be made in a replication of this study.

The researcher acknowledged that there are several limitations to the study. The researcher divided the limitations in two categories. The first category is the limitations in the research. The researcher did not collect baseline multiple times during the study. The researcher collected baseline on all students three sessions before instruction. However, she did not collect baseline when each student met criterion. The researcher only collected baseline during the first three sessions and did not collect additional baseline as students met criterion. The researcher notes the remaining limitations are due to practical limitations. The researcher did not collect data twice daily as planned. The researcher encountered schedule complications, which permitted her from consistently collecting data twice. The researcher did not get to collect data on the playground or in the general education setting as planned, although instruction occurred on CBI. The

researcher sees the jump in Rosie's zero percent independent correct responses in baseline and her first instructional session, then jumping to 100% on the second instructional session. The researcher sees these limitations as problematic that could affect the validity of the research.

SECTION 5: FUTURE RESEARCH

The researcher would recommend future research be conducted during play. Students love to play and love the opportunity to play with their teacher. The students in this study were excited and giggled while their teacher played with them. The researcher, however, recommends the instruction occur with only one or two students in the play area. The researcher recommends play area rules and routines be instructed and maintained prior to instruction beginning. The researcher also recommends research be conducted with play with older children, such as when playing board games, outdoor activities, and sports. The researcher would recommend conducting research in teaching basic play skills, then embedding math or reading skills. A comparison should be conducted of teaching skills through play and teaching skills in a small group at a table. The researcher recommends reviewing schedules during the study, then determining if instructional times are working. The researcher selected 2:00 p.m. for the second instructional time; however, 2:00 was a hectic time in the classroom. Students were using the restroom and notes and backpacks were getting ready to be sent home. The researcher recommends using participants familiar with the classroom routines and structures. The researcher also recommends observing general education students during their play time. This data would provide social validity and provide examples of age appropriate play skills and manners. Also, research should validate the need for more

play time at school. As a society, we are focusing on academics at such an early age and are assessing and pushing to get to the top that we forget how to play. Yet, teaching and learning could be combined with play and fun.

APPENDIX A

Baseline Data Sheets

Simultaneous Prompting Data Sheet

Maintenance Sheet

Simultaneous Prompting Generalization Data Sheet

Simultaneous Prompting Data Sheet

Student: _____ Trainer: _____

Start time: _____ End time: _____

Location: _____ Date: _____

Targeted Skill: _____

KEY: + correct response, - incorrect response, NR no response

| Stimulus | Trial Type | Response |
|--------------------|--------------|----------|
| | Prompt/Probe | |
| # of Probe Correct | | |
| % of Probe Correct | | |

Simultaneous Prompting Maintenance Data Sheet

Student: _____ Trainer: _____

Start time: _____ End time: _____

Location: _____ Date: _____

Targeted Skill: _____

KEY: + correct response, - incorrect response, NR no response

| Stimulus | Trial Type | Response |
|--------------------|--------------|----------|
| | Prompt/Probe | |
| # of Probe Correct | | |
| % of Probe Correct | | |

Simultaneous Prompting Generalization Data Sheet

Student: _____ Trainer: _____

Start time: _____ End time: _____

Location: _____ Date: _____

Targeted Skill: _____

KEY: + correct response, - incorrect response, NR no response

| Stimulus | Trial Type | Response |
|--------------------|--------------|----------|
| | Prompt/Probe | |
| # of Probe Correct | | |
| % of Probe Correct | | |

REFERENCES

- Akmanolu, N. & Batu, S.(2004). Teaching pointing to numerals to individuals with Autism using simultaneous prompting. *Education and Training in Developmental Disabilities*, 39, 326-336.
- Ashiabi, G.S.. (2007). Play in the Preschool Classroom. *Early Childhood Education Journal*, 35, 199-207.
- Billingsley, F.F., White, O. R., & Munson, R. (1980). Procedural reliability: Rationale and an example. *Behavioral Assessment*, 2, 229-241.
- Birkan, B. (2005). Using simultaneous prompting for teaching various discrete tasks to students with mental retardation. *Education and Training in Developmental Disabilities*. 40, 68-79.
- Bredenkamp, S. & Copple, C. (1997). *Developmentally appropriate practice in early childhood programs*. Washington D.C: National Association for the Education of Young Children.
- Collins, B.C. (2007) *Moderate to severe disabilities: A foundational approach*. Upper Saddle River, NJ: Merrill/Prentice Hall.
- Cooney, M. H. (2004). Is play important? Guatemalan kindergartners' classroom experiences and their parents' and teachers' perceptions of learning through play. *Journal for Research in Childhood Education*, 18(4).
- Daugherty, S., Grisham-Brown, J., & Hemmeter, M. (2001). The effects of embedded skill instruction on the acquisition of target and nontarget skills in preschoolers with developmental delays. *Topics in Early Childhood Special Education*, 21(40), 213-221.
- Francke, J., & Geist, E. (2003). The effects of teaching play strategies on social interaction for a child with autism: A case study. *Journal of Research in Childhood Education*, 18(2).
- Gast, D.L., & Ledford, J. (2010). Multiple baseline and multiple probe design (pp. 276-328). In D.L. Gast *Single Subject Research Methodology in Behavioral Sciences*. Columbus, OH: Merrill.
- Kurt, O & Tekin-Ifar, E. (2008). A comparison of constant time delay and simultaneous prompting within embedded instruction on teaching leisure skills to children with Autism. *Topics in Early Childhood Special Education*, 28, 53-64.
- Riesenn, T., McDonnell, J., Johnson, J., Polychronis, S., & Jameson, M. (2003). A comparison of constant time delay and simultaneous prompting within embedded instruction in general education classes with students with moderate to severe disabilities. *Journal of Behavioral Education*, 12 (4) 241-259.
- Schuster, J., & Griffen, A. (1993). Teaching a chained task with a simultaneous prompting procedure. *Journal of Behavioral Education*, 3(3), 299-315.
- Schuster, J., Griffen, A., & Wolery, M. (1992). Comparison of simultaneous prompting and constant time delay procedures in teaching sight words to elementary students with moderate mental retardation. *Journal of Behavioral Education*, 2(3), 305-325.

Sewell, T.A., Collins, B.C., Hemmeter, M. L. & Schuster, J.W. (1998). Using simultaneous prompting within an activity based format to teach dressing skills to preschoolers with developmental delays. *Journal of Early Intervention, 21*, 132-145.

Wechsler Intelligence Scale for Children-Revised (Wechsler, 1981). Saddlebrook, NJ: Pearson.

VITA

University of Kentucky

Bachelor of Arts-Special Education, Moderate and Severe Disabilities

Teacher of Functional Mental Disabilities

Abby Evans McCormick