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The Use of Video Modeling to Improve Transitions Within a Preschool Classroom

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THE USE OF VIDEO MODELING TO IMPROVE TRANSITIONS WITHIN A PRESCHOOL CLASSROOM

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

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ABSTRACT OF THESIS

THE USE OF VIDEO MODELING TO IMPROVE TRANSITIONS WITHIN A PRESCHOOL CLASSROOM

Video modeling is a widely accepted and utilized intervention for students with autism spectrum disorder (ASD). A multiple probe design across participants was utilized to evaluate the effectiveness of using video modeling to decrease transition duration within a preschool classroom. Participants were between the ages of 3-5 and students within an interdisciplinary public preschool classroom in a rural county. All sessions were conducted in the student's classroom during their typical routine and the intervention was implemented by their classroom teacher. Preliminary results indicate that video modeling is an effective intervention for reducing the duration of transitioning.

KEYWORDS: video modeling, transitions, preschool, classroom, transitioning behavior

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03/24/22
Date

THE USE OF VIDEO MODELING TO IMPROVE TRANSITIONS WITHIN A PRESCHOOL CLASSROOM

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DEDICATION

To my children, Cora, and Hudson may you always follow your dreams.

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The time and dedication of the classroom teacher and staff was incredible. I cannot thank them enough for welcoming me into their classroom and allowing me to work with their students. To the participants, I am truly honored to get to know you and watch you grow. Thank you to my committee chair, you have been an incredible resource and your guidance has been invaluable. To my husband, your unconditional love and support means the world to me.

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Section 1: Introduction

In many cases, a child's first exposure to classroom transitions occurs when they attend preschool. Banerjee and Horn (2013) defined a classroom transition as "a teacher initiated movement from one ongoing classroom activity to another resulting in a change in the activity during a daily routine" (p. 3). Within a typical school day, children transition 15-20 times (e.g., from center to center, whole group to small group, bus to the classroom, classroom to recess, etc.) which collectively consumes 70 min of instructional time per day (Banerjee & Horn, 2013; Fisher et al., 1980). Prior to preschool, many children lack experience transitioning between activities quickly and efficiently as they are typically in a home setting where transitions do not necessarily need to be done in a timely fashion. Most children learn to adapt to daily classroom transitions with time and exposure, while some may need additional supports. In some cases, behavioral issues such as refusal, and aggressiveness (e.g., slapping, punching, kicking), increased anxiety, and distress (e.g., crying, screaming), may result from the onset of a transition (Banerjee & Horn 2013; Cihak et al., 2010). These behaviors cause a ripple effect in the classroom, causing distress from peers, increase stress of teachers, and the duration of the transitions to be extended for the entire class. Given that more instructional time is linked to higher levels of achievement (Fisher et al., 1980), it is essential that the duration of these transitions remains minimal so that children have more opportunities to access quality instruction.

In an inclusive preschool classroom, it is customary for 30% of the daily activities to include free-choice center activities (e.g., dramatic play center, science center, art

center Whorrall & Cabell 2015). These centers serve an important purpose in early childhood, as free play is a vital component of language development, cognitive development, social development (Weisman 2013), development of mathematical skills (Karaman & Ivrendi 2015), and abstract thought (Bodrova & Leong 2005). Since the onset of COVID-19 pandemic, many districts have adapted free-choice centers to allow for materials to be cleaned between use to limit children's exposure to other individuals. Given these new considerations, center time is more structured for many classrooms. This may look like a predetermined group of children rotating together to each center and engaging in the materials at that station freely for a set duration. When the allotted time has elapsed, the materials they were playing with get removed or sanitized, they rotate to the next center, and new clean materials are provided for each group. Given this adaptation, teachers are adding four to six structured transitions a day which take the place of free-choice centers.

Given the additional transitions in preschool classrooms as a result of COVID-19 mitigation measures, and the negative ripple effects that transitions bring about in the classroom, teachers may need to put in place additional supports to facilitate these additional transitions. One support that may be effective and feasible, is video modeling. Video modeling is a widely researched intervention for preschool students with disabilities to complete chained tasks (Shrestha et al., 2013), increase social communication (Cardon et al., 2019), and learn complex play behaviors (Cardon et al., 2019; D'Ateno et al., 2003; Shrestha et al., 2013). Specifically for children with autism spectrum disorder (ASD) video modeling has been identified as an evidence-based practice (Hall et. al,.2013 pp. 239). Video modeling involves a target individual watching

a video of a behavior and then having the opportunity to perform the behavior depicted in the video (Cihak et al., 2010). In today's world with the accessibility and abundance of technology, video models can be made and viewed on the same device (e.g., smart phone, tablet). As such, video supports are a mobile option that can travel wherever needed (Carnahan et al., 2012; Cihak et el., 2010; Hall et al., 2018).

Video modeling has also been used to aide in transitions for students with disabilities. Schreibman (2000) used video priming (e.g., previewing a future event so the event becomes more predictable) to aide in reducing disruptive behavior with preschool-aged children with ASD when transitioning to stores in the community. In this study, the participant's parents implemented the intervention (video modeling) right before they began their transition into the community. This study was effective in reducing problem behaviors during transitions for all participants and reductions maintained after the intervention was removed. Cihak and colleagues (2010) conducted a study in which video modeling was used in a package intervention with a system of least prompts (SLP) to determine if elementary students could transition with more independence within a school setting. The results of their study indicated that the intervention package was successful and resulted in more independent transitions among all four participants than when the system of least prompts was provided without a video support. Despite the successes in the previously mentioned studies, there has been limited research in this area with preschool population, in particular for preschool populations who do not have ASD. Given that (a) transitions were already a major part of preschool classrooms prior to COVID-19, (b) difficulties in teachers' facilitating transitions can cause a negative ripple effect throughout a classroom, (c) the increase in transitions as part of classroom routines

due to COVID-19, (d) the feasibility and accessibility of video modeling to potentially serve as a support for teachers to facilitate these additional transitions, and (e) the limited research done in this area with preschool populations, I perceive that research examining video supports for preschool aged-populations to facilitate efficient transition behaviors is warranted.

The purpose of the present study was to assess whether video modeling can reduce the duration of children's transitions within an inclusive preschool classroom. To my knowledge, there has been no published study to address these specific variables with this population. Given that video modeling is already an evidence-based practice for children with ASD (Hall et al., 2013), this study will extend the current literature to include preschool aged neurotypical children and children with diagnoses other than ASD. As previously discussed, many preschool children struggle with transitions, not just those with ASD, and it is essential to assess whether this intervention is effective for children from other populations. In addition, by targeting free choice centers, this study could be replicated in a variety of different preschool settings as centers are a component of nearly every publicly funded preschool program. The primary research question guiding this study was: Does video modeling reduce the duration of preschooler's transition time during structured center rotations? The secondary research question was: What are the collateral effects of video modeling to promote transitions on related teacher and child behaviors?

Section 2: Method

Participants

Students. Four pre-school age participants were selected based on teacher rankings of students that had the most intensive needs surrounding transitions during center rotations. The teacher ranked students from those needing the least assistance in transitioning during center rotations to those needing the most assistance. From that list, the top four students who needed the most assistance and who met the following inclusion criteria were selected: (a) followed one step directions, (b) imitated a discrete behavior presented via a video model, (c) independently walked or moved throughout the classroom without physical assistance from adults, (d) transition duration was at least 10% above a model student's transition duration, (e) researchers obtained informed consent from parents/guardians for student to participate in the study, (f) student was present for 90% of school days for the current academic year (not including days missed due to required quarantine), and (g) between the ages of 3-6 years. To screen for a participant's ability to imitate a video model, the PI showed five video models of durations less than 10 s depicting a child performing a simple motor movement (e.g., raising hands above head, touching toes, jumping). The principal investigator (PI) then told the child, told "your turn." This allowed the researcher to assess a child's ability to follow one step directions and imitate a video model. Participants were screened with five video models one time by the primary investigator. Finally, the PI observed children's ability to physically move from center to center without requiring physical assistance for mobility needs. If the participant met all other inclusion criteria and was able to imitate

four out of five video models and independently move between centers for three out of three transitions, they were included in the list of possible participants. A fifth student was recruited from the teacher ranking was in the middle of the rankings (i.e., not a student who needed the least assistance nor a person needing the most). This student was categorized as a "model" student and was utilized to indicate the average duration of transition for the class, as this was used as a reference point for the mastery criterion (discussed further in the Experimental Design section).

The first participant was a 5-year-old Kachin female named Sara. Sara immigrated to the United States from Myanmar six months prior to the start of the study. The primary language spoken at home was Jingpho qualifying Sara as an English language learner. This was Sara's first year in preschool. She qualified to attend public preschool with an income qualification and received no other therapies. Sara displayed age-appropriate social-emotional skills. Sara typically didn't initiate vocal speech with peers or adults but did play with peers without prompting.

The second participant was a 4-year-old White, Non-Hispanic English speaking, female named Adel. Adel was attending preschool for the first time under the classification of developmental delay. She received occupational therapy, speech therapy and special education services inside her interdisciplinary classroom. Adel was an extremely friendly child who greeted every adult who entered the classroom. However, Adel typically did not engage with peers in play or conversation without prompting.

The third participant was a 4-year-old Hispanic male named Joe. This was Joe's second year in public preschool. He was also an English language learner with the primary language spoken at home being Spanish. Joe qualified for public preschool under

the classification of a speech and language delay. He received speech and language therapy inside his interdisciplinary classroom. Joe often mimicked his peers and engaged in play with them on a regular basis without prompting. Joe often did not initiate conversations using vocal speech but instead used gestures to communicate his wants and needs.

The fourth participant's name was Jerry. Jerry was a three-year-old, English speaking, White, Non-Hispanic male. This was Jerry's first year in preschool. He qualified for preschool under the classification of a developmental delay. He received occupational therapy, speech therapy and special education services in his interdisciplinary classroom. Jerry typically played alone and did not initiate conversations using vocal speech but would play with peers if prompted. Jerry enjoyed showing adults items or art that he had created.

Investigators. The principal investigator (PI) was a White, female student pursuing her master's degree in Applied Behavior Analysis. She had a bachelor's degree in Elementary Education and Multiple and Severe Disabilities, and a teaching certification in Elementary Education (K-8), Special Education: Learning and Behavioral Disabilities (K-12) and Special Education: Moderate to Severe Disabilities (K-12). In addition, she had a state-level endorsement to teach English Language Learners. The PI had 9 years of classroom teaching experience in a variety of settings with children of all ability levels. She had experience with video modeling to teach chained tasks to learners, but not to aide in transitions. The PI served as the primary data collector throughout the study.

The classroom teacher was a White, female and served as the implementor of the intervention and a secondary data collector throughout this study. She had a bachelor's degree in Interdisciplinary Early Childhood Education and held a teaching certificate to serve children birth to kindergarten and was pursuing her master's degree in Interdisciplinary Early Childhood Education while the study was being conducted. She was in her third year of teaching interdisciplinary preschool (i.e., children with and without disabilities) when this study was conducted. She had not used video modeling in practice but was familiar with the intervention from coursework completed in her graduate training.

Instructional Setting and Arrangement

All study sessions were conducted in the children's classroom located in a rural public interdisciplinary preschool in central Kentucky. The teacher to student ratio in the morning class was 3:18 and in the afternoon 3:15. This ratio was sometimes lower when a special education teacher or speech and language pathologist joined the classroom to deliver services to select children. The ratio of children with disabilities and without disabilities in the morning class was 6:12 and the afternoon class 7:7. All conditions of the study were conducted during center rotations inside the participants' classroom. The morning preschool class conducted their center rotations from 8:15 a.m. to 9:15 a.m. and the afternoon class from 12:00 p.m. to 1:00 p.m. The classroom was approximately 7 m by 10 m. Each participant was grouped with two to four peers in each center and cleaned-up their materials and rotated to the next center following the sound of a doorbell and a verbal task direction presented by the classroom teacher to transition. In the morning

class, there were approximately 15 other peers in the room who did not participate in the study while the afternoon class had about 11 non-participants present.

Materials and Equipment

Each center contained at least five different sets of materials that corresponded to that center's focus (e.g., art, math, and literacy). These sets of materials were rotated biweekly, chosen by the classroom teacher, and related to the monthly theme (e.g., oceans, spring, space). The materials ranged from activities that created a final product, such as a puzzle, to more exploratory materials, like Magna Tiles. All sets of materials in each center were available to any child at that center and children could share their materials with peers. The math and literacy centers typically contained self-directed free play materials (e.g., matching letter manipulatives to letters on a board, tracing, matching colors file folders). Occasionally, the art center had a teacher-directed art activity where a specific final product was expected to be produced by the children; however, much of the time the children were given the opportunity to explore with any of the available materials using whatever method the child preferred for creating artwork. Students sat in chairs at tables measuring 1 m by 1.5 m in all three centers (i.e., math, literacy, and art). A wireless doorbell (made by SadoTech) was used to signal an approaching transition between centers.

The following datasheets were used: screening, PI datasheet (used for probe, intervention, procedural fidelity, maintenance, and generalization) and the teacher datasheet. All datasheets were made by the PI on Microsoft Word. In addition, a pencil and stopwatch were utilized by data collectors. Screening video models were made using

an iPad. The video model of a peer transitioning was made using video editing software (iMovie, free version) and displayed on a tablet (iPad). Video models were made prior to the intervention condition during typical center rotations in the same setting that the study was conducted. The video models were filmed in 3rd person to include a known peer of similar age performing the transition and environment surrounding the students. Each model was less than 45 s long and did not have audio. Audio was not included due to the level of noise in the classroom that may have prevented a child from hearing audio played on the iPad speakers, and therefore the teacher narrated each video while presenting a video to the participant (described further in the Dependent Variables section). The PI edited the video on the same device that the video model was recorded on. The PI had never edited a video on this application prior. After watching a short tutorial, all edits were able to be made in under 15 min.

Dependent Variables

Duration of Transitions. Due to the onset of the COVID-19 pandemic and guidelines specifying that classroom materials be cleaned between uses, center transitions were separated into two parts within the classroom. First, students were given a task direction to clean-up, during which they would put away their materials and sit down to indicate their table was ready to be sanitized. Second, after the center had been sanitized by a classroom teacher or paraprofessional, the teacher would give another task direction for the children to transition to their next center. The second part of the transition, moving from one center to the next, was not reported as an area of concern by the classroom teacher nor was this observed by the PI to be an area of need. Thus, for the purposes of this study and given the needs of the children in the classroom, the primary

dependent variable was the duration of the transition in seconds for only the first part of the transition—the cleaning-up of materials and then sitting to indicate completion. Data were collected by the PI and classroom teacher throughout all session conditions.

The duration started upon the delivery of the teacher-delivered task direction to begin cleaning (e.g., teacher rings the doorbell and says, "It's time to clean up!"), and the duration ended once all materials were cleaned in a center and the child was seated at their center with their bottom in the chair. This distinction, bottom in chair, was the teacher's expectation for her students. Duration per occurrence was recorded during each center transition using a stopwatch, rounded to the nearest second. Data were collected during center rotations that were randomly determined prior to the start of the study (literacy, math, and art) from 8:15 a.m. to 9:15 a.m. (participants enrolled in the morning class) and 12:00 p.m. to 1:00 p.m. (children enrolled in the afternoon class).

Secondary. Only the PI collected data on the secondary research question throughout all study conditions; that is, the secondary data collector never collected data on the secondary dependent variables. Data were collected on the duration of the teacher's implementation of the intervention. The timer began at the onset of the teacher talking to a student in preparation to present the video (e.g., "Hey Sara, I need you to watch something really quick."), continued through the presentation of the video, and ended following the end of the video and the teacher switching to another topic of conversation with the student or leaving the student's area. The PI also collected data on prompting provided by the classroom teacher or paraprofessional during each transition. Data were collected on (a) the number of verbal prompts provided to a participating child (frequency count), (b) whether a physical prompt was used at any point during the

transition (dichotomous code of *yes* or *no*), and (c) whether an adult assisted in cleaning up the materials (dichotomous code of *yes* or *no*). Data were also collected on whether the participant (a) cleaned up at least one item without prompting, (b) cleaned up at least one item after prompting occurred, or (c) did not clean-up any items. Teacher presented verbal prompts were defined as any vocalization containing intelligible speech which directed a participant or the participant's group to clean up. An example of this would be an adult telling Sara to "get the block under the table," or telling Sara's group "put the balls in the bin." A non-example of this would be a teacher telling a student they liked their shirt or asking them what they did last night. A teacher-delivered physical prompt was defined as any instance an adult touched the participant to assist them in cleaning up the materials. An example of this would be using hand over hand to pick up blocks or turning a child towards materials. A nonexample would be giving a child a hug or high five as a form of praise for a child's cleaning up. Adult assistance in cleaning materials was scored whenever an adult picked up a material from a participant's center and put it away during the designated cleaning time. An example of this may be an adult modeling putting pencils away with a child. A nonexample would be an adult putting away materials while centers are still occurring (i.e., it is not time to clean up) or an adult putting away personal materials that they added to the center (e.g., assessment documents). A child cleaning up unprompted was defined as the child cleaning up at least one item after the task direction was given but before an additional prompt to clean was given. An example of this would be a child putting a block in a bin immediately after the teacher gave the initial task direction to clean up. An example of a prompted clean up would be a child continuing play after the teacher gave the initial task direction to clean

up, the teacher interrupts the child's play and reminds them it is time to clean up, and then the child begins putting blocks in a bin. A child receiving a score of no response for cleaning up indicated that after receiving the initial task direction, regardless of whether additional prompting was provided, the child did not clean up a single center item, and classroom peers and adults cleaned up all materials in a center.

Transitions. Data were collected on three transitions for each child. The transitions were assigned as *acquisition* and *generalization* transitions, and randomly determined using a random number generator in Microsoft excel. Two transitions were assigned as *acquisition* transitions (art and math), and one was assigned as a *generalization* transition (literacy). Students rotated through each center in the same sequence each day, first literacy, then art and finally math. Duration data for each acquisition transition and generalization transition was plotted on a separate graph to allow for visual analysis. Data from acquisition transitions were used to guide experimental decisions for when to introduce the intervention and when to terminate an intervention condition for a child. The primary difference between the acquisition and generalization center is that intervention was never provided for the generalization center.

Experimental Design

The study employed a single-case multiple probe design across participants and replicated across centers (Ledford & Gast 2018). This design was used to examine the effects of video modeling on the duration of transitions in a preschool classroom. This design is ideal for educational research when multiple participants are exhibiting a similar behavior that requires intervention as the intervention does not need to be removed to evaluate a functional relation (Ledford et al., 2018). Within this study, data were

collected on all participants concurrently in the probe conditions and the design utilized a time-lagged procedure that allowed for the intervention to be introduced to participants at different points in time. Given that this study was conducted during participants' typical classroom routine, introducing multiple data collectors into the classroom to collect data on all participants simultaneously would not have been feasible and could have produced an adaptation effect on the participants' behavior.

Three of the four participants participated in three different types of sessions: probe, intervention, and maintenance. Sara participated only in probe sessions. Probe sessions were conducted first, followed by intervention, and then maintenance sessions. The order in which participants received intervention sessions was determined using conditioned randomized assignment to account for the resources available to the research team, such that participants in the AM class were randomly assigned to either the first or third tier of the design, and participants in the PM class were randomly assigned to either the second or fourth tier of the design. First, probe sessions were conducted to determine the duration of transitions during a child's targeted center rotations. Once all children exhibited a stable pattern of responding for their acquisition centers, the intervention was implemented with the first participant while probe sessions continued to be conducted with the other participants. When the first participant met the mastery criterion, that participant began maintenance sessions. The mastery criterion could be met by one of two conditions being achieved. The first condition was that a participant's transition duration was within 10% of or surpassed the 'average' peer's transition time for three consecutive sessions. If the first criterion was not met, then data collection would continue until five data points had been collected, at which point the PI would use the

split middle method to determine when the data indicated a therapeutic trend. The split middle line was calculated as described in Ledford et al. (2018). If neither criterion were met, the intervention would continue until either criterion was achieved. To conform with single-case designs standards, at least five data points were collected in the intervention tier for each participant. A probe session was conducted in the subsequent tiers upon each introduction of the intervention in each tier. This pattern continued with each participant.

Experimental control is demonstrated within a multiple probe design when all threats to internal validity are controlled for and data in each tier remain stable and improve when and only when the intervention was applied. Attempts to prevent and control for threats to interval validity were made in the development of and throughout the study. To help control for attrition, only participants that had an attendance record of 90% or greater were included. In addition, four participants were recruited in the event one dropped out. To prevent a sequencing effect, participants were randomly assigned to tiers. Maturation and history are a concern with this design, which is why two different objective mastery criteria were determined prior to the study beginning. Having two sets of mastery criteria, allowed for the participants in later tiers to reach their intervention condition in a timely manner, as clear decision guidelines per the mastery criteria could be followed to support changes in conditions in a timely and resource sensitive manner. In addition, there were open lines of communication between the researcher and teacher to ensure no other targeted interventions were being used to reduce the duration of transitioning. To help control for instrumentation and procedural infidelity, interobserver agreement (IOA) and procedural fidelity data were collected a minimum of 30% of sessions in all conditions. In addition, the PI trained the data collector to fidelity before

data collection began and planned to retrain if the IOA or procedural fidelity data fell below an 80% in more than two instances. The PI utilized Behavior Skills Training (BST) to train the data collector. BST is a method for teaching individuals new skills including the implementation of evidence-based practices (Sawyer et al., 2017). The initial training consisted of a didactic discussion, the PI modeling the procedures, practicing collecting data on a non-participant in the teacher's classroom, and feedback. The training continued until the PI and teacher had at least 80% IOA for three consecutive sessions with a non-participant.

Procedures

Probe Procedures

During each probe session, the data collectors started their respective timers after the doorbell rang and the task direction (e.g., "time to clean up") was given by the classroom teacher. The timer ended when the target student had all materials cleaned up in the center and was seated at their center. For the purposes of data collection during the probe condition, we asked that the typical classroom routine remain consistent and unchanged (i.e., teachers and adults support students in transitions as they typically would). At the end of the day, the durations from each center were graphed and visually analyzed. Data on the model child's transition duration was collected once during the probe condition (within the first five data collection days of the study) to support the development of the mastery criterion.

Intervention Procedures

During intervention sessions in the acquisition centers (art and math), the teacher showed a video model of the upcoming transition to a child while providing a verbal

description of what to do during the transition. This description included (a) a mention of the doorbell ringing soon, (b) the teacher saying, “it’s time to clean up,” (c) explanation of how to clean up the items, and (d) that the child needed to sit down at the table when all items at their center were put away. While the description of the video had to include all previously mentioned components, the teacher was free to add details about the specific materials being used that day. This may look like the teacher mentioning the materials that were on the table and indicating where they would go in reference to the video. The video model and verbal description were presented immediately prior to the teacher ringing the doorbell and providing the task direction to clean-up. The duration in seconds of the time it took for the target student to clean up their materials and sit in their center was recorded. This process was repeated for each transition, for a total of three transitions during center time. At the end of the day, the durations of center rotations were graphed and analyzed. When one student was receiving the intervention, probe data continued to be collected at least every six sessions in all subsequent tiers. The video model was never shown to a child for a generalization transition.

Maintenance Procedures

The maintenance condition began for a student after either mastery criterion was met in the intervention condition. Maintenance procedures were identical to probe procedures. Maintenance data were collected a minimum of once every six sessions.

Inter-observer agreement

The classroom teacher collected IOA data a minimum of 30% of sessions during all conditions. The classroom teacher was trained to collect IOA to fidelity by the PI who utilized BST (see Experimental Design section for more information). Total duration IOA

data were calculated by dividing the shorter transition duration by the longer duration and multiplying it by 100 to get the percentage (Cooper et al., 2020). This was done for each trial in the session. Acceptable percentages of accuracy were defined as any percentage greater than 80%.

Procedural Fidelity

The PI collected data on the occurrence and nonoccurrence of the classroom teacher's planned behaviors. The formula used for calculating procedural fidelity was the number of observed correct behaviors divided by the total number of planned behaviors, multiplied by 100 (Ledford et al., 2018). A percentage of 80% or higher was used as an acceptable level of fidelity. In the event the procedural fidelity dropped below 80% in two instances, the teacher was retrained on the procedures of the study using BST. The target behaviors for the probe, maintenance and generalization sessions were for the teacher to ring the doorbell, provide the task direction, and to not show a video model. In the intervention condition all the above behaviors were included with the addition of the video model of the correct transition being shown before providing the task direction and the teacher narrating the video as described in the intervention section. Procedural fidelity was collected for at least 30% of all sessions in all conditions.

Section 3: Results

The following results depict the data collected from an in-progress study. The PI anticipates the study to be fully completed by mid-May 2022. Three of the four participants were able to meet the requirements for the independent variable to be systematically applied. Given the multiple centers being measured there were six opportunities to demonstrate the effect of the intervention across the multiple probe designs. For the first participant, she met the mastery criteria in the probe condition and therefore didn't require intervention. Presently, the PI intends for all other participants to receive probe, intervention, maintenance, and generalization sessions.

IOA was collected on the duration of transitions in at least 30% of all conditions for each child in each center. Mean IOA was at least 95% in all centers in all conditions for each child in each center. The range of IOA was between 85-100% in all conditions. There was never a session in which IOA data were collected and IOA was below 85% meeting common design standards. Refer to Table 1 for more detailed information on IOA data collected. Procedural fidelity (PF) was collected a minimum of 30% of all sessions in all conditions for each child in each center. The mean PF did not fall below 95% in any center in any condition. PF ranged from 85.7-100%. Refer to table 2 for more information on PF data.

Table 1 *Interobserver Agreement Information for Duration of Transitions*

	Conditions		
Participants & Centers	Probe	Intervention	Maintenance
Sara			
Art	99.7, 99.4-100, 40	n/a	n/a
Math	97.5, 97.2-97.7, 40	n/a	n/a
Literacy	96.6, 93.3-100, 40	n/a	n/a
Adel			
Art	99.7, 99.4-100, 40	99.7, 99.2-100, 60	-
Math	96.3, 94-98.6, 40	98.6, 98.4-100, 60	-
Literacy	99.8, 99.6-100, 40	95, 85-100, 60	-
Joe			
Art	100, 100-100, 71.4	-	-
Math	99.8, 99.4-100, 71.4	-	-
Literacy	99.6, 99.4-100, 71.4	-	-
Jerry			
Art	99.2, 98.8-99.6, 66.6	-	-
Math	97.7, 93.4-99.4, 66.6	-	-
Literacy	99.3, 99-100, 66.6	-	-

Note. The first number is the mean percentage IOA for the duration of the transition, second number is the IOA percentage range in the condition throughout the center transition, the third number is the percentage of sessions for which IOA was collected for the duration of transitions; n/a= not applicable due to that participant not participating in sessions for that condition; -=denotes conditions that have not yet been conducted

Table 2 Procedural Fidelity

Participants & Centers	Conditions		
	Probe	Intervention	Maintenance
Sara			
Art	100, 100-100, 40	n/a	n/a
Math	100, 100-100, 40	n/a	n/a
Literacy	100, 100-100, 40	n/a	n/a
Adel			
Art	100, 100-100, 60	100, 100-100 60	-
Math	100, 100-100, 60	97.6, 85.7-100, 60	-
Literacy	100, 100-100, 60	100, 100-100, 60	-
Joe			
Art	100, 100-100, 71.4	-	-
Math	100, 100-100, 71.4	-	-
Literacy	100, 100-100, 71.4	-	-
Jerry			
Art	100, 100-100, 66.6	-	-
Math	100, 100-100, 66.6	-	-
Literacy	100, 100-100, 66.6	-	-

Note. The first number is the mean percentage of PF for the duration of the transition, second number is the PF percentage range in the condition throughout the center transition, the third number is the percentage of sessions for which PF was collected for the duration of transitions; n/a= not applicable due to that participant not participating in sessions for that condition; -=denotes conditions that have not yet been conducted

Model

The model child's transition duration data ranged from 101 s in the math center to 124 s in the literacy center and 144 s in the art center. The secondary data collected indicated they required a low level of assistance in transitioning. The amount of verbal prompting during the transitions ranged from 0-1. In addition, physical prompts were not needed for any transition or when cleaning at centers. Finally, adult assistance was only utilized in the literacy center.

Sara

Sara was initially included in the study but given that Sara met the mastery criterion during the probe condition, intervention was not introduced. During the probe condition, Sara's data began at a level similar to that of the model child in the art and literacy center, and the data displayed a visible therapeutic trend before reaching the mastery criterion. Her data remained at a low stable level for the reminder of the condition. In the art center, the transition duration ranged from 101 to 235 s (see Figure 1) and in the literacy center 60 to 196 s (see Figure 2). In the math center, all of Sara's sessions were at a low stable level, ranging from 43 to 82 s meeting mastery criteria (see Figure 3).

The secondary measures collected were comparable with the model child's data. The number of verbal prompts used during the transition ranged between 0-3 (see Figures 6, 7, & 8), and no physical prompts were required in any center (see Table 3). Sara cleaned unprompted in 100% of sessions in the art and math centers, and 66.6% of sessions in the literacy center (see Table 4). Adult assistance in cleaning was not utilized

in the literacy center and in only 33.3% of the sessions in the art and math centers (see Table 5).

Duration of Transitions

Center 1. During the probe condition, Adel's data began at a stable level and accelerated to a high-level relative to the model child's data, with moderate instability ranging from 167 to 327 s and a contratherapeutic trend. Once intervention was introduced there was an immediate change in level in the desired direction, followed by a therapeutic trend with modest stability relative to her data in the probe condition. After the second data point, Adel's data was meeting mastery criterion and continued to do so for the remainder of the condition through five data points. Joe's probe data was at a moderate to high level with a high level of instability ranging from 188 to 349 s and a slight therapeutic trend. Jerry's probe data was at a moderate level with some instability ranging from 153 to 279 s and a slight contratherapeutic trend. Both Joe and Jerry displayed similar patterns of responding prior to and during Adel receiving intervention (See Figure 1).

Center 2. Adel's probe data indicated a moderate, stable level with a range of 148 to 216 s. When the intervention was introduced, there was an immediate change in level into mastery criterion range, followed by a low, stable trend. Again, it was determined that Adel met mastery criterion within five sessions. Joe's probe data was at a relatively stable level ranging from 129 to 201 s, with a slight contratherapeutic trend. Jerry's probe data was at a moderately stable level ranging from 119 to 184 s. Again, both Joe and Jerry displayed similar patterns of responding prior to and during Adel receiving intervention (See figure 3).

Center 3. This center served as the generalization center. Adel's probe data were highly variable, ranging from 42 to 260 s. Once intervention was introduced, her data suggested greater stability (range 54-112s), and the level remained low with a slightly therapeutic trend throughout the condition. She met mastery criterion within five sessions of intervention. Joe's probe data began at a moderate level and then became highly instable ranging from 150 to 353 s. Jerry's probe data began at a low level and then rose to a moderate level before coming back down below mastery criterion (See figure 2).

Secondary

Verbal Prompting. Verbal prompting in the art center during Adel's probe condition began at a high level relative to the model child and displayed a therapeutic trend ranging from 6-11 verbal prompts per session. Once intervention was introduced the therapeutic trend continued to a low level of prompting ranging from 2-6 verbal prompts per session. Joe's level of verbal prompting in the probe condition began at a high level and displayed a therapeutic trend ranging from 3-12 verbal prompts per session. Jerry's probe condition began at a low level and had a contratherapeutic trend ranging from 2-6 prompts per session (See figure 6).

In the math center, during the probe condition, Adel's data began at a moderate level and continued a therapeutic trend ranging from 4-8 verbal prompts per session. Once intervention was introduced, a zero celerating trend emerged at a low-level ranging from 1-4 verbal prompts per session. During Joe's probe condition, the number of verbal prompts remained at a low-level ranging from 1-3 verbal prompts per session. Finally, Jerry's data indicated a contratherapeutic trend, ranging from 1-5 verbal prompts per session (See figure 7).

In the literacy center, during the probe condition, Adel's data displays highly variable data ranging from 1-7 verbal prompts per session. After intervention was introduced, the data had a therapeutic trend ranging from 1-5 verbal prompts per session. Joe's probe condition displayed a contra therapeutic trend beginning at a low level and steadily rising to a moderate level before intervention was introduced, ranging from 1-6 verbal prompts per session. Jerry's probe condition displayed a low level, ranging from 1-5 verbal prompts per session (See figure 8).

Physical Prompting. Physical prompting in Adel's probe sessions occurred in two centers, math in 25% of sessions and in the art center in 50% of sessions. In the intervention condition no physical prompting wasn't required in any session in any center. The percentage of physical prompting in Joe's sessions were 20% in the math and literacy centers and 40% in the art center during the probe condition. The percent of sessions in which physical prompts were used in Jerry's probe condition was 25% in art, 75% in math and 0% in literacy (See Table 3).

Child Cleaning. Adel participated in unprompted cleaning in 50% of sessions in the math and literacy center sessions and 0% of the art center sessions during the probe condition. In the intervention conditions, Adel participated in unprompted cleaning in 66.6% of sessions in the art and literacy center and 100% of sessions in the math center. Joe participated in unprompted cleaning in 20% of the art center sessions, 40% of the math center sessions, and 80% of the literacy center sessions during the probe condition. Unprompted cleaning by Jerry occurred in 50% of art sessions, 0% of math sessions and 100% of literacy sessions during the probe condition (See table 4).

Adult Cleaning. The percentage of adult cleaning one or more materials in Adel's probe condition was 75% in the art and math center sessions and 25% in the literacy center sessions. In the intervention condition that number dropped to 0% in the math and literacy center sessions and 33.3% in the art center sessions. In Joe's probe condition an adult cleaned in 40% of the art and literacy center sessions and 0% of the math sessions. In Jerry's probe condition, the adult cleaned in 33.3% of the art sessions, 66.6% of the math sessions and 0% of the literacy sessions (See table 5).

Duration of Intervention. The duration it took for the intervention to be implemented was added to the duration of the transition and displayed in figures 4 and 5. Thus far, Adel is the only participant to have data in this category as she is the only participant to receive intervention. In the probe condition, Adel's average transition in the art center was 216.6 s with a range of 167-327 s. Once intervention began, her transition average duration became 98 s with a range of 51-173 s. When you add the amount of time it took the teacher to implement the intervention with the new transition duration time the average became 164 s with a range of 95-217 s. This is a decrease of 52.6 s from the average time in the probe condition.

In the math center, Adel's average transition was 177.6 s and she had a range of 148-216 s during the probe condition. Once intervention was implemented the average transition duration became 60.4 s and the range, 43-87 s. When you add the amount of time it took to implement the intervention with the duration of the transition the average time became 128.6 s with a range of 119 to 124 s, this is an average decrease of 49 s per transition.

Table 3 Percentage of Sessions Physical Prompting Occurred

	Conditions		
Participants & Centers	Probe	Intervention	Maintenance
Sara			
Art	0	n/a	n/a
Math	0	n/a	n/a
Literacy	0	n/a	n/a
Adel			
Art	50	0	-
Math	25	0	-
Literacy	0	0	-
Joe			
Art	40	-	-
Math	20	-	-
Literacy	20	-	-
Jerry			
Art	25	-	-
Math	75	-	-
Literacy	0	-	-

Note. n/a= not applicable due to that participant not participating in sessions for that condition; -=denotes conditions that have not yet been conducted

Table 4 Percentage of Sessions Unprompted Cleaning Occurred

	Conditions		
Participants & Centers	Probe	Intervention	Maintenance
Sara			
Art	100	n/a	n/a
Math	100	n/a	n/a
Literacy	66.6	n/a	n/a
Adel			
Art	0	66.6	-
Math	50	100	-
Literacy	50	66.6	-
Joe			
Art	20	-	-
Math	40	-	-
Literacy	80	-	-
Jerry			
Art	50	-	-
Math	0	-	-
Literacy	100	-	-

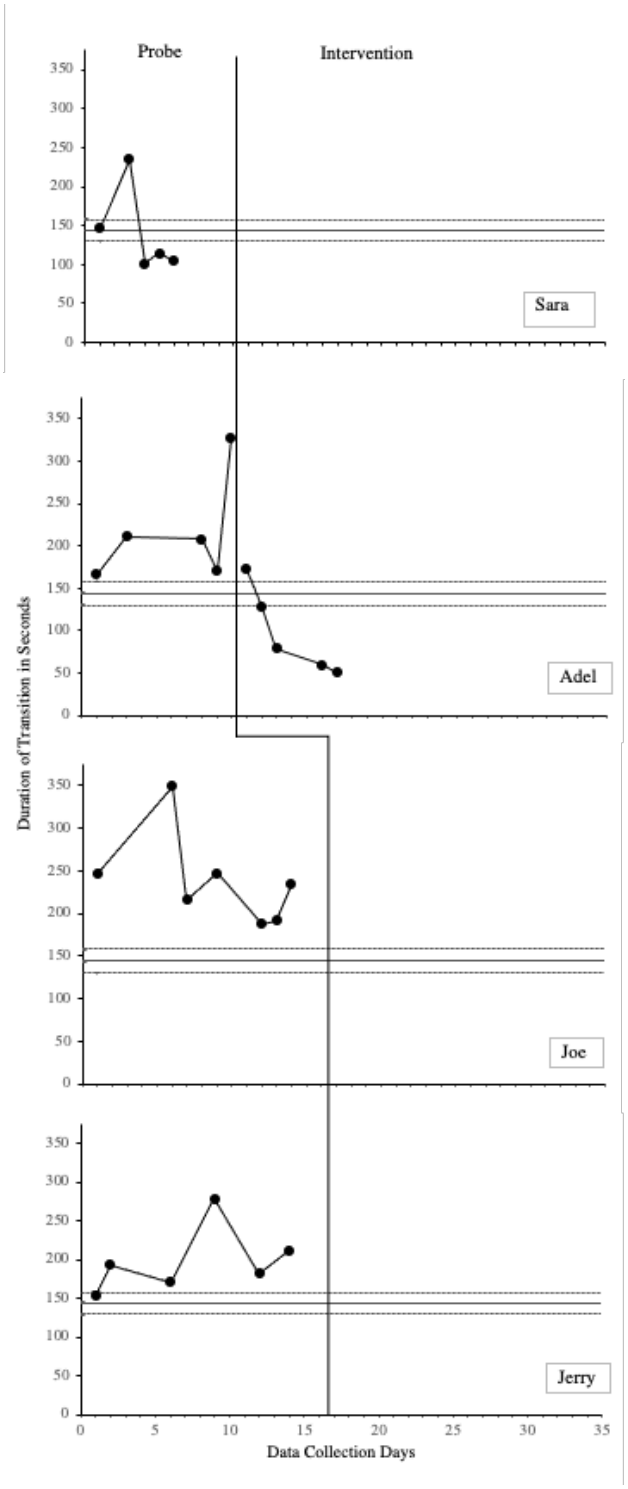
Note. n/a= not applicable due to that participant not participating in sessions for that condition; -=denotes conditions that have not yet been conducted

Table 5 Percentage of sessions where an adult cleaned

Participants & Centers	Conditions		
	Probe	Intervention	Maintenance
Sara			
Art	33.3	n/a	n/a
Math	33.3	n/a	n/a
Literacy	0	n/a	n/a
Adel			
Art	75	33.3	-
Math	75	0	-
Literacy	25	0	-
Joe			
Art	40	-	-
Math	0	-	-
Literacy	40	-	-
Jerry			
Art	33.3	-	-
Math	66.6	-	-
Literacy	0	-	-

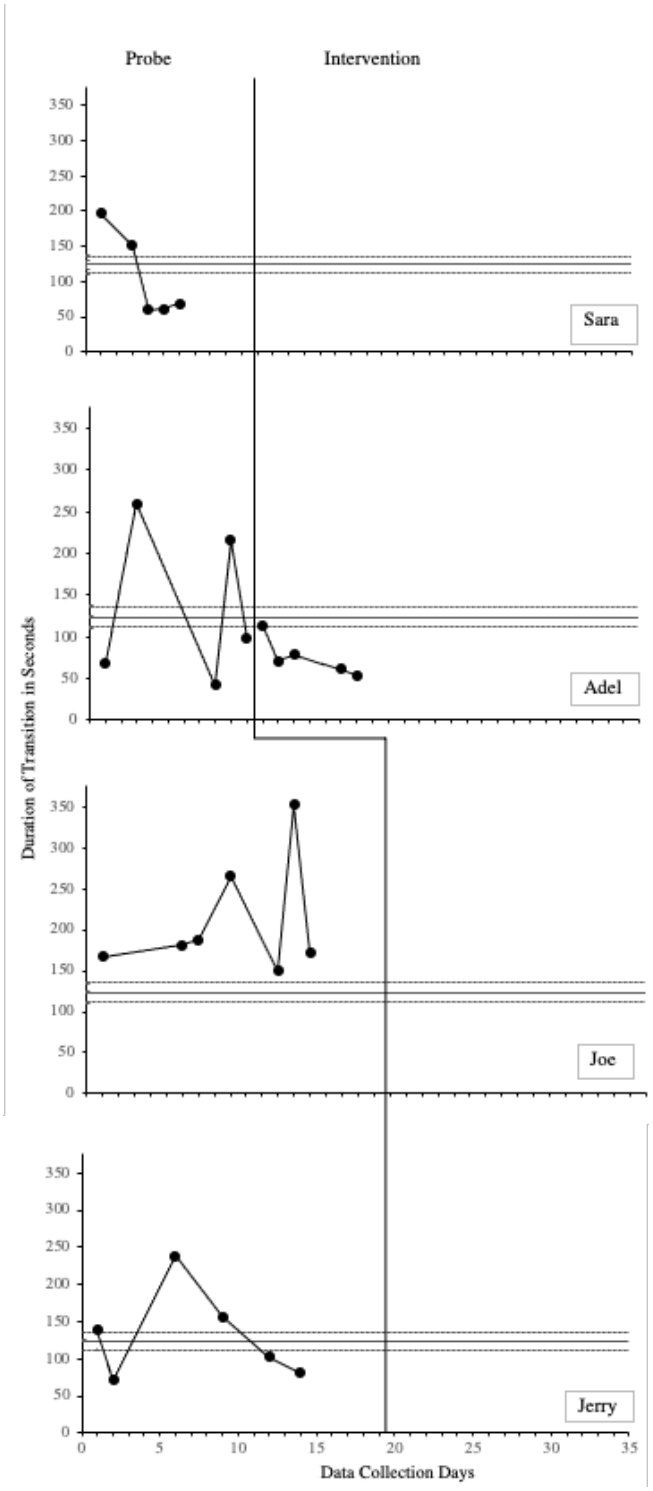
Note. n/a= not applicable due to that participant not participating in sessions for that condition; -=denotes conditions that have not yet been conducted

Figure 1 Duration of transition in the art center.



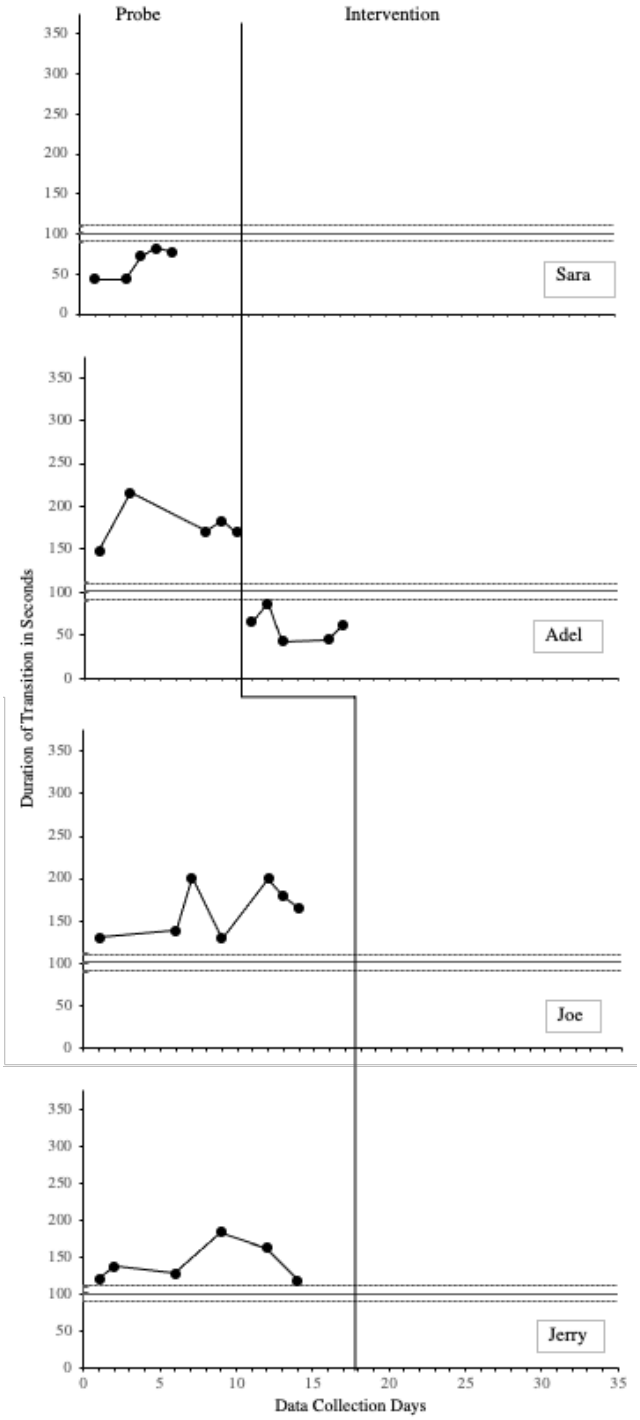
Note. Solid line indicates the mastery criterion. Dashed lines indicate 10% above and below mastery criterion.

Figure 2 Duration of transition in the literacy center.



Note. Solid line indicates the mastery criterion. Dashed lines indicate 10% above and below mastery criterion.

Figure 3 Duration of transition in the math center.



Note. Solid line indicates the mastery criterion. Dashed lines indicate 10% above and below mastery criterion.

Figure 4 Duration of intervention plus duration of transition in the art center.

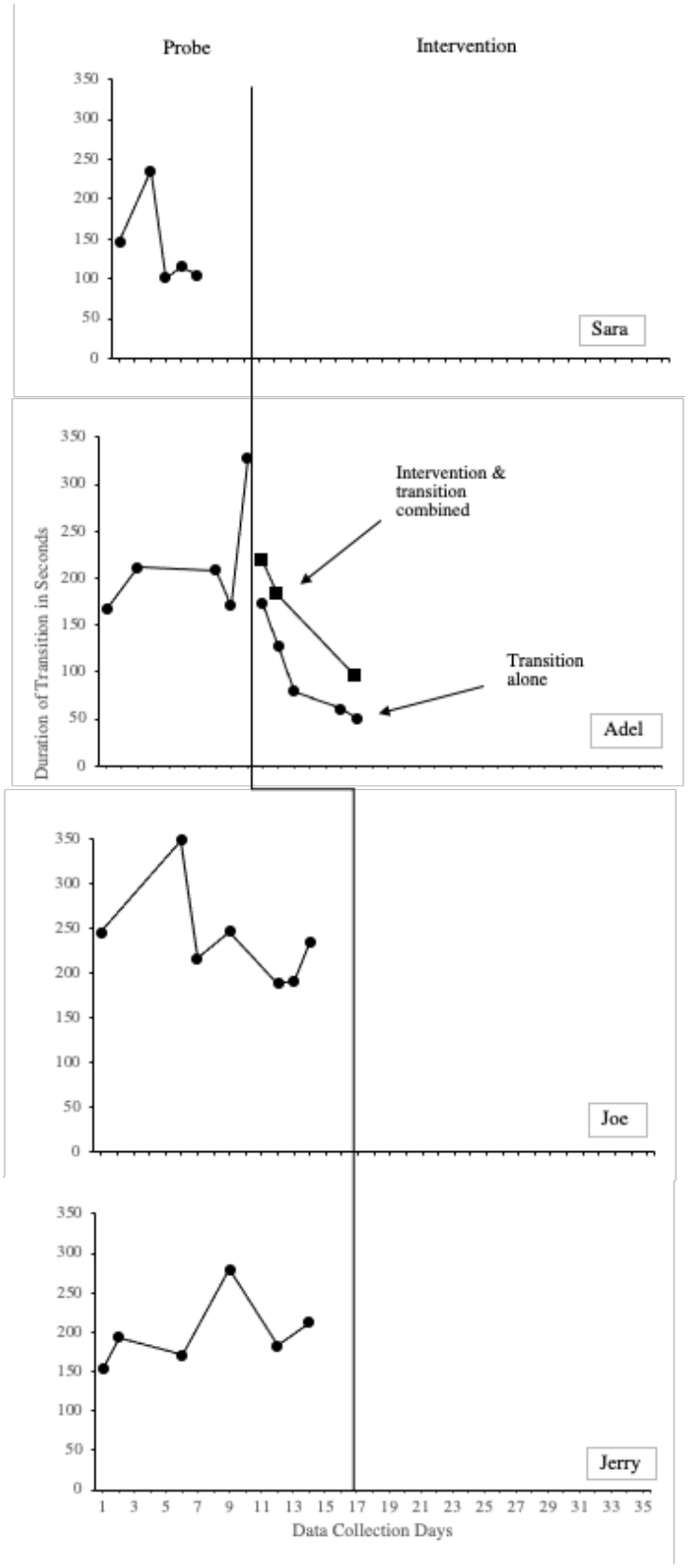


Figure 5 Duration of intervention plus duration of transition in the math center

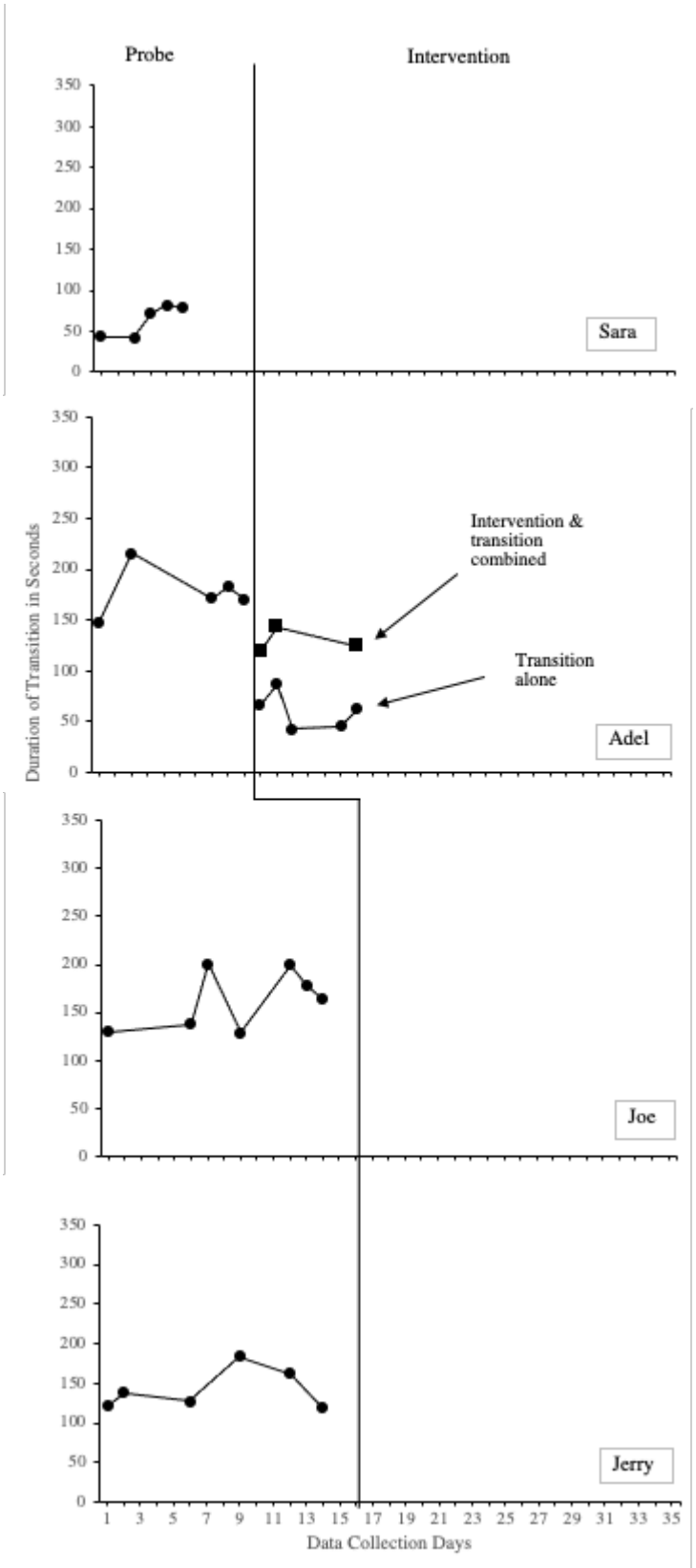


Figure 6 Frequency of verbal prompting in the art center

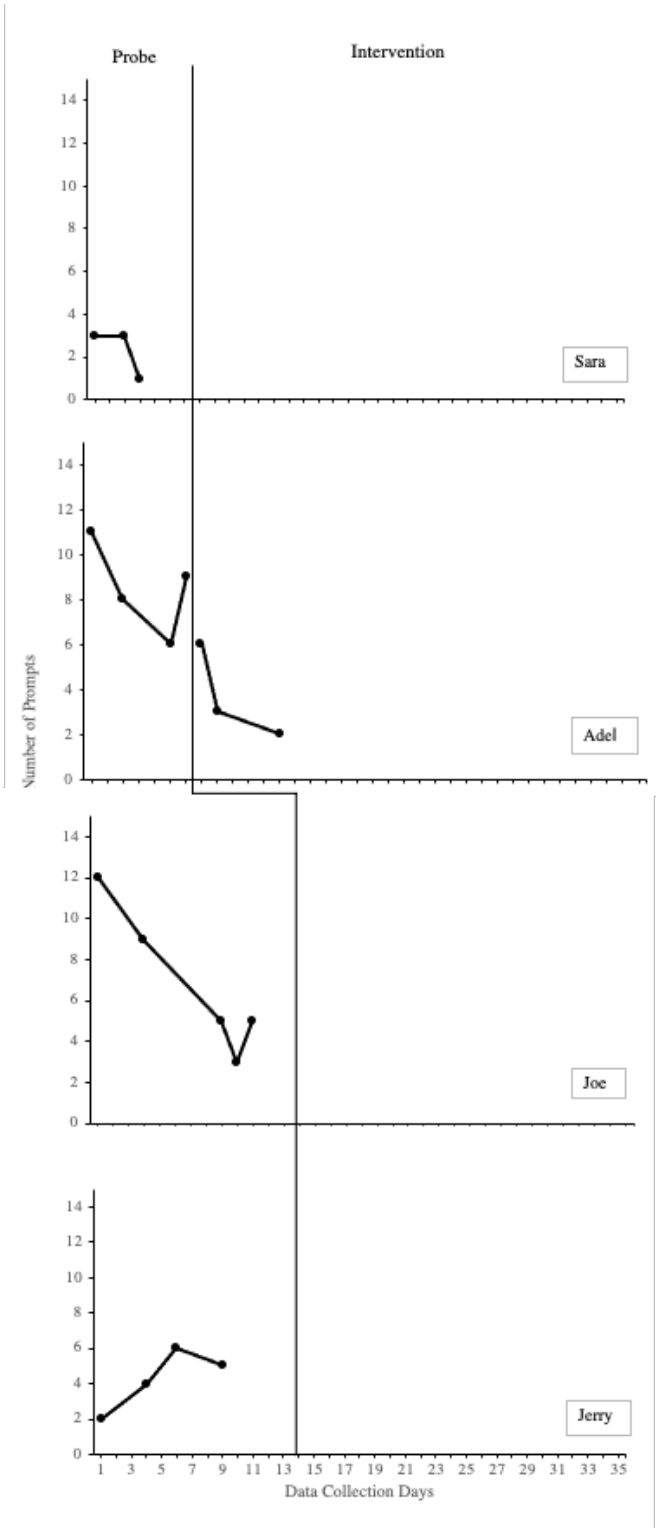


Figure 7 Frequency of verbal Prompting in the Math Center

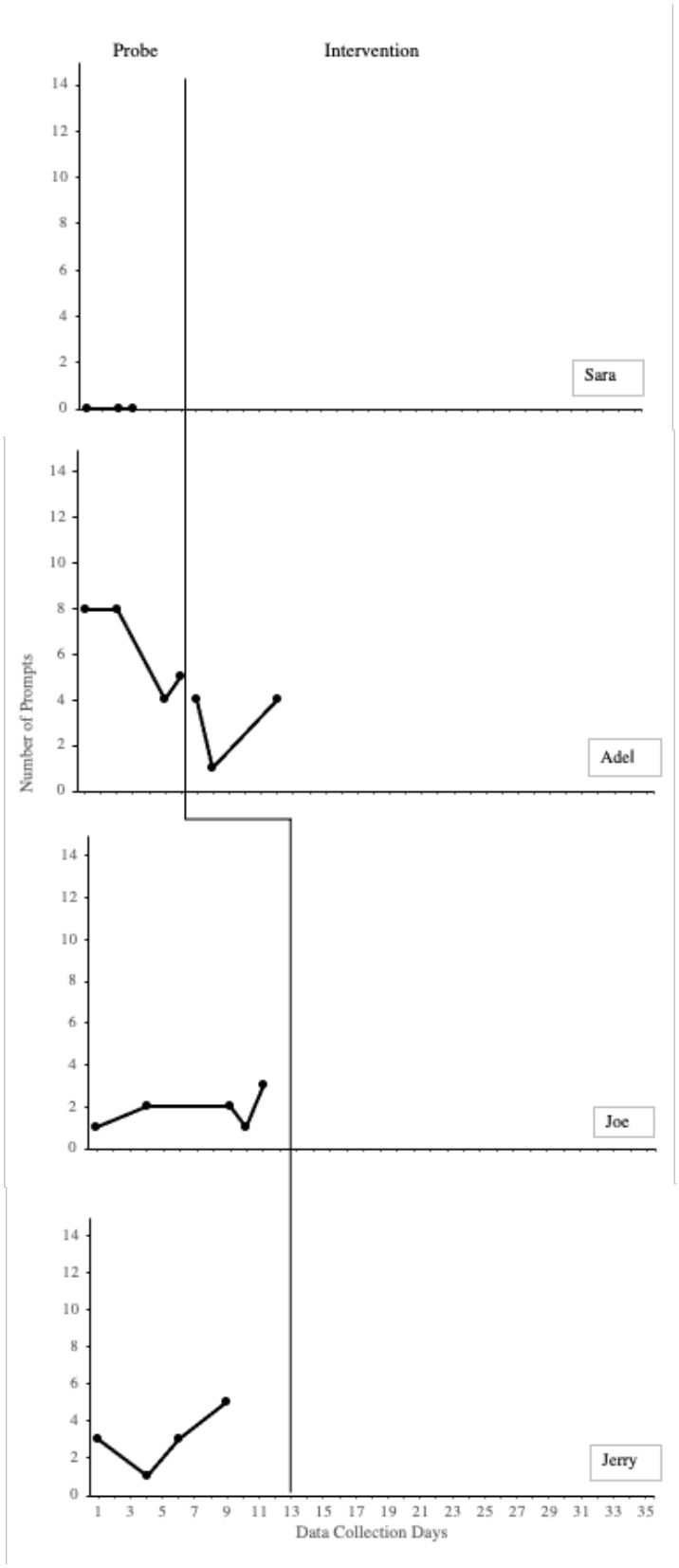
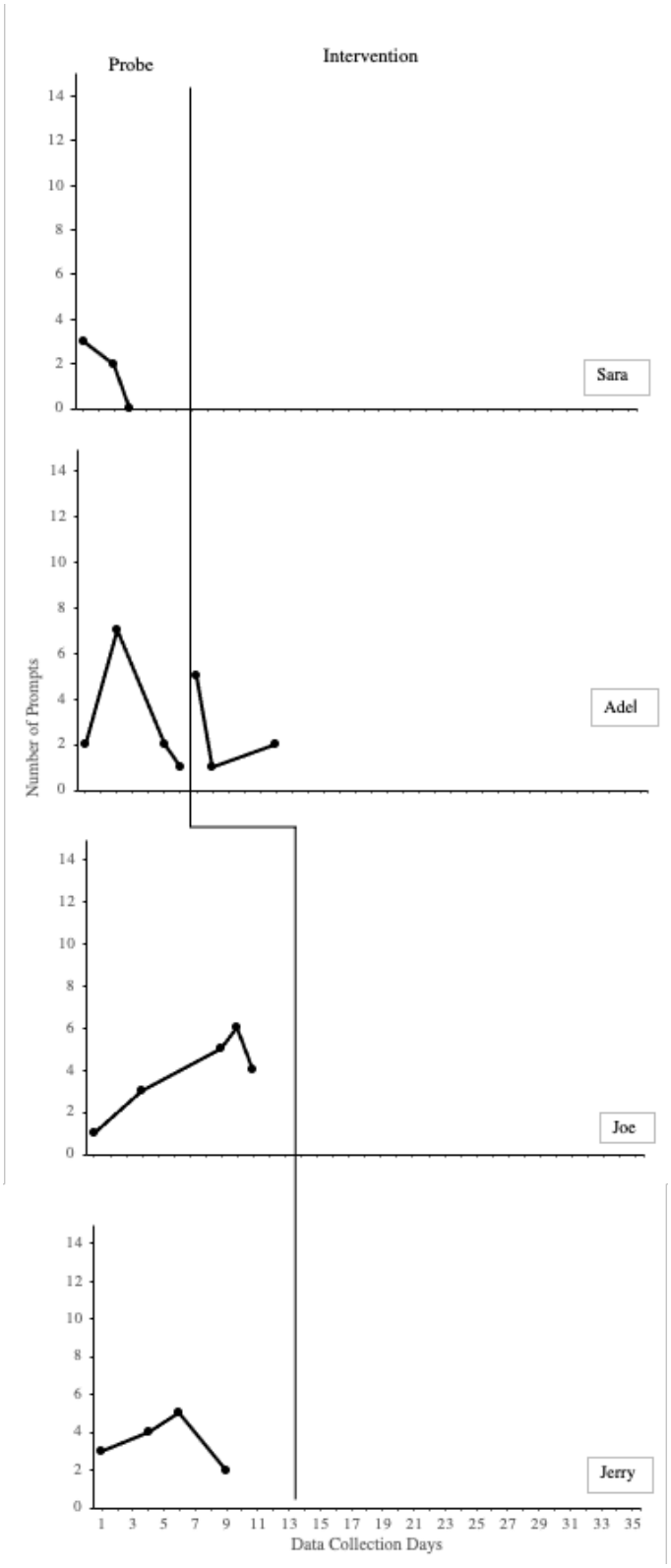


Figure 8 Frequency of verbal Prompting in the Literacy Center



Discussion

This study attempted to fill the gap in the literature regarding utilizing video modeling to aide in transitions with the preschool population. A multiple probe design was utilized with four preschool aged students in a rural setting. Preliminary visual analysis of graphed data indicated that video modeling is an effective intervention in reducing transition durations in preschool-aged students. Specifically, Adel's average transition in the art center went from 217 s with a range of 167-327 s in the probe condition to 98 s with a range of 51-173 s. This is a decrease of 117 s from the average time in the probe condition. In the math center, Adel's average transition was 178 s and she had a range of 148-216 s during the probe condition. Once intervention was implemented the average transition duration became 60 s and the range, 43-87 s. That is still a decrease of 117 s per transition. By decreasing the amount of time, it takes to transition throughout the three classroom centers by 117 s per rotation you are saving approximately 6 min per day which equates to 24 min in a four-day instructional week and 96 min in a month. That is a considerable amount of time considering most public preschool classrooms only have students for 2.5 h a day, four days a week. In addition, intervention was only provided for two out of the three centers. Meaning that the results of this intervention generalized to the third center (literacy) without the teacher ever explicitly teaching the skill with the video supports. Thus, when implementing this intervention, it may not be necessary for it to be embedded into all the transitions, leading to further time saved.

The secondary measures of the amount of verbal prompting, the presence of physical prompting, the presence of unprompted cleaning, whether an adult was needed

to clean, and the amount of time it took to administer the intervention, also indicated improvement from the probe to intervention condition and contributed to the social validity of the study. First, the range and average of verbal prompts required in Adel's probe condition were higher in all three centers than in the intervention condition. This indicated that along with the intervention working to decrease the duration of the transition, it may also made the students more independent in transitioning requiring fewer verbal prompts. Second, the presence of physical prompting in Adel's probe sessions ranged from 0 to 50% of sessions while in the intervention session no physical prompting was required in any session. By reducing the amount of physical prompting required by the classroom teacher and assistants this opens those adults up to other tasks such as facilitating social situations, instruction, and administrative duties. Third, the amount of unprompted cleaning performed by Adel rose from 0%, 50% and 50% to 66.6%, 100% and 66.6% across centers respectively. This means since the implementation of the intervention, Adel began cleaning after the task direction was given, without requiring additional prompting to begin; again, freeing the adults in the room to focus on other tasks. Fourth, in Adel's probe condition, an adult participated in cleaning in 75% of the art and math sessions and 25% of the literacy sessions. Once the intervention was introduced, the adult only participated in cleaning 33.3% of the art sessions and none in the math and literacy sessions. This suggests that the participant required no assistance cleaning in two centers during all the sessions in which secondary measures were collected. The final secondary measure was the duration of the implementation of the intervention when added to the duration of the transition. In Adel's case, in both the art and math centers, those average durations were lower than in the

probe condition. This suggests that the resources required to implement this intervention do not outweigh the benefits.

Limitations and Considerations

The environment in this study was a publicly funded inclusive preschool classroom. Thus, everyday presented different environmental factors that effected the primary measure of duration per transition as well as the dichotomous measures collected. One of these factors were the materials that were available to the participants. Since the materials rotated with the classroom theme biweekly, the amount and type of manipulatives needing to be cleaned often changed as well. This may have produced longer or shorter transition durations depending on the items (i.e., a paper activity may be faster to clean up than paint). However, after visually analyzing the probe data when the materials were changed, this factor does not appear to have impacted the children's durations as there is no evidence of a history threat. Another environmental factor that may influence future research is that the technology required to make and implement a video model is not available in all classrooms. In some states and districts, there are guidelines preventing the inclusion of technology-based supports in early childhood education. To replicate the resources that are typically available to classroom teachers, the video model used in this study was made on the free version of iMovie app and displayed using a device that was already allocated to the classroom.

Another factor that may have influenced results were that the data collectors were not masked to the study conditions nor purpose of the study. This was due to the PI of this study and classroom teacher being the primary data collectors. This was a necessity due to limiting exposure to COVID-19 by reducing the number of individuals in the

room. As well as with the rural location of the school in which the study was conducted. In addition, IOA was not collected on secondary measures. Due to this constraint, we cannot make definitive conclusions from these measures, and the findings should be considered exploratory. Additional studies measuring the secondary variables with IOA should be conducted to verify their validity. Additionally, this study specifically looked at three centers that solely focused on table-top activities. There is a possibility that this study may not generalize to floor centers such as blocks and dramatic play which may be more preferred.

Finally, the classroom teacher and implementor of the intervention in this study was pursuing her master's degree in interdisciplinary early childhood and may not be comparable to many classroom teachers working in early childhood settings as not all are required to have a graduate degree. This may have increased the teacher's competency when it came to data collection and implementing the intervention. While the intervention was feasible for her to implement in her classroom while juggling the demands of teaching, this may not rein true for less-experienced teachers. Additional research is needed to determine whether this intervention in feasible for other types of preschool educators.

Future Directions

Based on the findings within this study, systematic replications of this study are needed to extend the external validity of this study's findings. These studies should occur in publicly funded preschool settings within the context of the classroom's typical routines to determine whether video modeling is an effective intervention for reducing transition durations in preschool classrooms. Also, including participants with a wider

range of identified disabilities, as well as children without identified disabilities, could widen this intervention's reach. In addition, IOA for all measures, including the adult and child related behaviors would be prudent.

To extend this study, more research is needed to determine whether the use of video modeling to aide in transitions is an effective tier 1 or tier 2 strategy in preschool classrooms. Studies focusing on using video modeling as a tier 1 intervention could be conducted at the beginning of the school year during a whole-group circle time when teachers initially review classroom rules and expectation. For ease of implementation, the video model could be projected on a screen for the whole class to view and more specific. In addition, more specific guidelines could be added regarding the type and frequency of adult prompting.

Conclusion

Preliminary data of a multiple probe design across participants demonstrates that video modeling is an effective intervention for reducing transition durations within the context of a preschool classroom. Following the study's completion, the absence or presence of a functional relation will give us a definitive answer regarding its effectiveness. More research is needed to extend this study's external validity and test this intervention's effectiveness with children with and without disabilities.

APPENDICES

APPENDIX A. VIDEO MODEL SCRIPT

Directions: Approximately one minute before you intend to give the task direction to "clean up" in the art or math center, bring to tablet over to the participant, hit play on the video and narrate the video mentioning each of these four items:

1. The doorbell will ring soon
2. Then I will say, "it's time to clean up"
3. Explain how to clean up the items (i.e., reference the items they have out and how they should be put away)
4. Remind them to sit down at the table when all items at the center were put away so you know they're ready

APPENDIX B. PI DATASHEET

PI Data Sheet

Data Collector: AD Student Initials: _____ Date: _____

(Acquisition) Center Name: Art				
Steps		Did It Occur?	Duration of Intervention:	
1	Shows video model	Y / N	Duration of transition:	
2	Narration describes ringing bell	Y / N	# of verbal prompts:	
3	Narration describes task direction	Y / N	Did physical prompt occur?	Y / N
4	Narration describes putting items where they go	Y / N	Child cleaned up at least 1 item?	UP / P / N
5	Narration describes sitting down	Y / N	Adult cleaned up at least 1 item?	Y / N
6	Rings Bell	Y / N		
7	Task direction to clean up	Y / N		
	Percentage correct:		**IOA: Y / N**	**%=**

(Acquisition) Center Name: Math				
Steps		Did It Occur?	Duration of Intervention:	
1	Shows video model	Y / N	Duration of transition:	
2	Narration describes ringing bell	Y / N	# of verbal prompts:	
3	Narration describes task direction	Y / N	Did physical prompt occur?	Y / N
4	Narration describes putting items where they go	Y / N	Child cleaned up at least 1 item?	UP / P / N
5	Narration describes sitting down	Y / N	Adult cleaned up at least 1 item?	Y / N
6	Rings Bell	Y / N		
7	Task direction to clean up	Y / N		
	Percentage correct:		**IOA: Y / N**	**%=**

(Generalization) Center Name: Literacy				
Steps		Did It Occur?	Duration of transition:	
1	Shows video model	Y / N	# of verbal prompts:	
2	Provides narration	Y / N	Did physical prompt occur?	Y / N
3	Rings Bell	Y / N	Child cleaned up at least 1 item?	UP / P / N
4	Task direction to clean up	Y / N	Adult cleaned up at least 1 item?	Y / N
	Percentage correct:		**IOA: Y / N**	**%=**

APPENDIX C. TEACHER DATASHEET

Data Sheet

Data Collector:___ Student Initials:____ Date: ________________

Art Center (Acquisition)	
Duration (s)	
Math Center (Acquisition)	
Duration (s)	
Literacy Center (Generalization)	
Duration (s)	

Date: ________________

Art Center (Acquisition)	
Duration (s)	
Math Center (Acquisition)	
Duration (s)	
Literacy Center (Generalization)	
Duration (s)	

Date: ________________

Art Center (Acquisition)	
Duration (s)	
Math Center (Acquisition)	
Duration (s)	
Literacy Center (Generalization)	
Duration (s)	

Date: ________________

Art Center (Acquisition)	
Duration (s)	
Math Center (Acquisition)	
Duration (s)	
Literacy Center (Generalization)	
Duration (s)	

Date: ________________

Art Center (Acquisition)	
Duration (s)	
Math Center (Acquisition)	
Duration (s)	
Literacy Center (Generalization)	
Duration (s)	

APPENDIX D. SCREENING DATASHEET

Screening Datasheet

Data Collector: _____

Date:					
Child Initials:					
VM 1					
VM 2					
VM 3					
VM 4					
VM 5					
Percentage Correct					

Key: + = imitated video model correctly, - = did not imitate video model correctly or did not respond

Data Collector: _____

Date:					
Child Initials:					
VM 1					
VM 2					
VM 3					
VM 4					
VM 5					
Percentage Correct					

Key: + = imitated video model correctly, - = did not imitate video model correctly or did not respond

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