EFFECTS OF WHOLE GROUP INSTRUCTION AND SPACED PRACTICE TEACHING TRIALS TO TEACH SCHOOL READINESS SKILLS TO CHILDREN WITH DEVELOPMENTAL DISABILITIES IN A PRESCHOOL CLASSROOM

by

JULIA ESTES

(Under the Direction of JESSICA TORELLI)

ABSTRACT

The Preschool Life Skills (PLS) program is a successful approach to teaching typically developing children social and academic skills and preventing the development of problem behavior. Modifications may be necessary for this program to be more appropriate for children with developmental disabilities and more feasible for special education teachers to incorporate into classrooms. Previous findings suggest children with developmental disabilities require repeated, explicit instruction to acquire and maintain skills taught in the PLS program. This study evaluated the effects of using whole-group instruction and spaced practice teaching trials to teach school readiness skills to three preschool aged children with developmental disabilities. A multiple baseline across skills design showed the instructional method was successful for children to acquire skills including responding to name, completing single-step direction and hand raising. Spaced practice teaching trials were easily integrated throughout the school day.

INDEX WORDS: class-wide instruction, spaced practice, school readiness skills, preschool life skills

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CHAPTER 1

Introduction

Hanley et al. (2007) developed the preschool life skills program (PLS) to teach academic and social skills and prevent the development of problem behavior for typically developing children in nonfamilial childcare settings. Previous research showed a positive association between non-maternal based childcare and the development of problem behavior (National Institute of Child Health and Human Development, 2003). The children who participated in the study were identified as at risk of developing problem behavior due to the substantial amount of time spent at a non-maternal based childcare centers. This population was more susceptible developing problem behavior therefore, Hanley et al. (2007) implemented the PLS program as a preventative action. The program teaches life skills in situations where problem behavior is more likely to occur in hopes that students acquire the skills, thus preventing problem behavior.

Hanley et al. (2007) implemented the instructional program with 16 preschool children between the ages of 3 and 5 years old. All students were typically developing children except one child diagnosed with a non-specified developmental delay. PLS contained four units instruction following, functional communication, tolerance to delays and denials, and friendship skills. The instruction following unit includes three skills: responding to name, complying with single-step instructions and complying with multi-step instructions. Hanley et al. (2007) included three to four skills per unit. Skills were identified as early educational success skills and/or skills taught following functional

assessment of problem behavior. Skills taught following functional analysis were included in the study as a preventative approach to the development of problem behavior.

Hanley et al. (2007) used a class-wide instructional approach combined with behavior skills training to teach each skill. Implementers of the program created evocative situations when problem behavior was more likely to occur. For example, when teaching single-step instructions, the evocative situation would be delivering the single-step instruction such as sit down, stand up, hand me [the object], put [the object] in the bin. Implementers of the program provided more instruction on the first two skills students did not demonstrate mastery on, identified by individual student data. The researchers conducted one-to-one booster teaching sessions to provide additional instruction. Hanley et al. (2007) found a functional relation between the implementation of the life skills program, increased use of skills and reduced problem behavior. Educators who implemented the life skills program reported high satisfaction with the instructional method of class-wide teaching and its results.

Children with developmental disabilities may benefit from receiving PLS instruction since children with developmental disabilities often exhibit deficits in academic and social skill areas taught in the PLS program (Plant & Sanders, 2007). The PLS program includes explicit instruction on life skills which is necessary for children with developmental disabilities to acquire skills. For example, some children with developmental disabilities may not respond or complete single-step directions without receiving instruction. Skills such as completing single step directions are considered pivotal skills for a preschool child's academic and social development. Failure to acquire pivotal social and academic skills may interfere with a child's future success and

development (Olson & Hoza, 1993). Explicit instruction is an effective procedure to teach children with disabilities academic and social skills (Archer & Hughes, 2010). Components of explicit instruction include presentation and rationale of the target skill, demonstration of the target skill, and guided practice with instructor feedback until mastery. Explicit instruction on the target skill should be delivered daily. Wolery & Hemmeter (2011) recommend daily explicit instruction, between 5 to 8 minutes, with response prompt strategies to teach specific target behaviors.

Explicit instruction embeds student practice within the teaching model. Student practice with instructor feedback is a crucial component for student acquisition and success (Archer & Hughes, 2010). The PLS program includes repeated instruction and multiple opportunities for student practice, which is necessary for this population to maintain skills after receiving initial instruction (Christenson & Ysseldyke, 1989). Implementation of the PLS program may be beneficial for children with developmental disabilities to teach social and academic skills and prevent the development of problem behavior. There is a small body of research evaluating the PLS program with children with developmental disabilities.

Falligant and Pence (2017) evaluated the level of instruction required for preschool children with developmental disabilities to acquire four life skills (responding to name, requesting attention, requesting assistance and tolerating delays and denials). Researchers implemented a tiered approach to instruction, following the Response to Intervention (RTI) framework, based on student performance. Instruction included class-wide, small group and one-to-one booster teaching sessions. Results of this study suggest the tiered approach was effective in teaching the targeted life skills. The level of

instruction needed varied between participants and the skill being taught. The majority of participants required more explicit instruction (small group and one-to-one) to acquire skills. Specifically, two of the eight participants required individualized instruction with modifications to meet mastery criteria. These findings suggest preschool children with developmental disabilities may require individualized instruction to acquire skills taught in the PLS program.

Robison et al. (2020) implemented the life skills program with nine children with developmental disabilities and autism in a private school setting. Similar to Falligant and Pence (2017), they used a tiered approach to instruction. Four units of life skills were taught that included three to four skills per unit. Results from Robison et al. (2020) suggest participants acquire and maintained the life skills. Although most participants acquired skills with class-wide instruction, booster sessions were also necessary to maintain the skills over time. Although a tiered approach successfully taught students life skills, this approach may not be feasible to special education teachers due to the amount of time needed to implement one-to-one booster sessions to maintain skills.

A limitation found in previous research is that some skills taught in the PLS program may not be appropriate for preschool aged children with developmental disabilities. Skills, such as complying with multi-step instructions, may not be appropriate for some preschool children with developmental disabilities. Research on age-appropriate and attainable skills within the PLS program is needed. For preschool children with developmental disabilities, a unit of school readiness skills should be incorporated into the PLS program. Skills such as responding to one’s name and

following directions should be prioritized to prepare preschool children for elementary school.

Previous research suggests using spaced practice to teach academic skills to children with disabilities may be effective (Hughes & Lee, 2019). Specifically, the efficiency of spaced practice may be due to the distributed intervals and repeated practice of the target skill. With spaced practice, students are provided with distributed opportunities to practice the target skill with instructor feedback. Spaced practice is time efficient and can easily be integrated into the school day because sessions are brief, no more than 10 minutes long. (Hughes & Lee, 2019).

Spaced practice addresses another limitation to teaching life skills using the existing approaches. Conducting repeated one-to-one booster sessions until the student masters the skill may not be feasible. Teachers may not have the flexibility to set the amount of instructional time aside to implement the PLS program. Additionally, special education classrooms may not have the staffing to regularly conduct one-to-one booster sessions. Spaced practice within the PLS program may be an efficient alternative approach to teach social and academic skills to children with disabilities, but research is needed evaluating its effects.

My study aimed to address limitations found in previous research and extend the research on PLS for children with developmental disabilities. Specifically, I evaluated the effects of using whole-group instruction and one-to-one spaced practice with feedback to teach school readiness skills to preschool aged children with developmental disabilities. The school readiness unit includes four skills that have been adapted from the instruction following unit of the original PLS program conducted by (Hanley et al., 2007; Robison et

al., 2020). I implemented whole-group instruction first followed by spaced practice that were integrated throughout the school day. The research question I addressed were:

1. Does teaching school readiness skills using whole-group instruction and spaced practice increase the use of school readiness skills during probes for preschool children with developmental disabilities in a special education classroom?
2. Does teaching school readiness skills using whole-group instruction and spaced practice decrease class-wide problem behavior for preschool children with developmental disabilities in a special education classroom?

CHAPTER 2

Method

Participants

Three preschool students between the ages of 4 and 5 years old who attend a university-affiliated preschool participated in this study. Informed consent was obtained from the parents of the participants prior to the study being conducted. There were five students in the preschool classroom. I excluded two students from the study. One was excluded because they only attended school two days per week. The second student was excluded due to significant problem behavior, which required intensive treatment and did not provide time for study procedures, particularly given their inconsistent attendance.

Tate was a 5.7-year-old Black male at the time of the study. Tate's family spoke English at home. Tate scored 16.5 out of 170 on milestones, 46 out of 96 on barriers, 33 on transitions on the Verbal Behavior- Milestones and Placement Program (VB-MAPP; Sundberg 2008). Tate's scored lowest in areas of social skills and social play, generalization and retention of new skills. The VB-MAPP is criterion-referenced assessment tool and scoring on each portion varies. The milestones portion assesses the child's ability to mand, tact, respond to others, visual perception, play behaviors and motor imitation, echoic behavior and spontaneous verbal behavior. Lower scores on the milestones indicate the child does not demonstrate the skills assessed. The barriers portion of the VB-MAPP evaluate the child's problem behaviors, instructional control, mand repertoire, tact repertoire and motor imitation. High scores on the barriers indicates

the child exhibits difficulty with learning and language acquisition and/or the child engages in consistent problem behavior. The transition portion of the VB-MAPP assess the child's independence, generalization, range of reinforcers, rate of acquisition of new skills and retention of new skills. A lower skill on the transition portion indicates the child requires more support and individualized instruction. Tate scored 1% out of 100% on the Early Echoic Skills Assessment (EESA; Esch 2008). Instructional goals for Tate included receptive identification of reinforcers from an array of three, matching items in an array of six and completing a three-piece puzzle. Tate used Picture Exchange Communication System (PECS; Bondy and Frost, 1994) to communicate and was proficient up to Phase 3B. Phase 3B teaches discrimination between two pictures, gradually increasing up to five pictures on the PECS book.

Clayton was a 4.0-year-old male at the time of the study. Clayton's family spoke English at home. Clayton scored a 16.5 out of 170 on the milestones, 46 out of 96 on the barriers and 33 on transitions on the VB-MAPP. Clayton's scored lowest on classroom routines, social skills and social play and generalization that suggest deficits in these areas Clayton's Early Echoic Skills Assessment (EESA) was a score of 1% out of 100%. Instructional goals for Clayton included receptive identification of reinforcers from an array of two, receptive identification of objects from an array of four, imitating gross motor movements, and completing a three to four-piece puzzle. Clayton used Picture Exchange Communication System (PECS) to communicate and was proficient up to Phase 4. Phase 4 teaches the learner to place the 'I want' picture plus the desired picture icon on the sentence strip to exchange to the communication partner. In Phase 4, the leaner can discriminate between 12 to 20 different pictures.

Hank was a 4.0-year-old male at the time of the study. Hank's family spoke English, Urdu, and Kannada at home. Hank scored 22.5 out of 170 on the milestones, 36 out of 96 on the barriers, 38 on the transition portion of the VB-MAPP. Hank scored the lowest in areas of social skills and social play as well as classroom routines. Hank's Early Echoic Skills Assessment (EESA) was a score of 1% out of 100%. Instructional goals for Hank included receptive identification of objects from an array of three, matching identical items from an array of three, imitating gross motor movements, and imitating pre-writing strokes. Hank used Picture Exchange Communication System (PECS) to communicate and was proficient in up to Phase 3B.

Settings and Arrangements

This study took place in a university-affiliated preschool classroom. The classroom was in the southern region of the United States. The classroom served preschool-aged children with developmental disabilities. Two board-certified behavior analysts who were also doctoral students served as the lead teachers. The classroom was also staffed by university students pursuing master's degrees in applied behavior analysis. There was at least one behavior analyst, and six staff members always present in the room.

Data collection sessions occurred in different areas of the classroom (9.14 m by 8.60 m) and throughout the school day. Class-wide instruction took place at the front of the classroom. The students sat in plastic chairs on a rug (1.93 m by 1.47 m) facing a drop-down projector screen and the lead teacher. The play center measured to be 2.68 m by 2.31 m. Two wooden cubby storage cabinets (2.3622 m by 0.3683 m) on the left and right side encompassed the play center. Several toys such as Legos, magna tiles, puzzles,

books and musical toys were in the play center. Snack occurred in the center of classroom at 3 small (0.762 m by 0.762 m) tables pushed together. With the small tables pushed together, created one large table measured to be 2.286 m by 2.286 m. The students sat in plastic chairs facing each other. A staff member was paired with each student and sat behind the student.

Experimental Design

A multiple baseline across skills design evaluated class-wide acquisition from the effects of class-wide instruction and spaced practice teaching trials from the PLS program. A multiple baseline across skills design assessed acquisition of skills for each individual participant. I taught each skill in a staggered procedure.

I used visual analysis to evaluate trends and levels of class-wide data. Visual analysis of class-wide data impacted data-based decisions I made to change from baseline to intervention. First, I collected baseline data on the first skill, *responding to name,* until responding was stable. After consistent responding in baseline, I implemented class-wide instruction followed by spaced practice teaching trials with instructor feedback. Following the staggered nature of the design, the first skill remained in the intervention condition while the other three skills remained in the baseline condition. Once responding was stabilized in the intervention condition for skill one, I implemented intervention for skill two, *completing single-step directions*. Once intervention data stabilized for skill two, I implemented intervention for skill three, *hand raising*. Skill four, *choice making*, remained in the baseline condition for the duration of this study.

Response Definitions and Measurement System

The primary dependent variable is percentage of correct life skill use responding to name, completing single step directions, hand raising or choice making) from the school readiness unit adapted and modified from the PLS program for students with developmental disabilities (Robison et al., 2020; Torelli et al., under review). Researchers collected data using paper/pencil data sheets. I used trial-by-trial event recording for data collection on baseline and probe sessions. The data collector scored correct skill use (+) if the participant demonstrated the target skill correctly within 5 seconds of the task direction being delivered or after an evocative situation was contrived. The data collector scored incorrect (-) if the participant did not demonstrate the target skill correctly or the participant did not respond.

The secondary dependent variable is occurrences of problem behavior that included aggression (biting, scratching) and elopement. Biting was defined as any instance or attempt where the student's mouth opens and closes around another person's body. Scratching was defined as any instance or attempt where the student's nails contacted another person's skin or clothing and resulted in broken skin or redness. Elopement was defined as any instance or attempt where the student was more than an arm's length away from their designated area. The data collector scored any occurrences of problem behavior with a (+).

Interobserver Agreement

The implementer trained staff members to collect reliability and procedural fidelity data. A secondary observer collected data to evaluate IOA. I calculated trial-by-trial IOA by taking the total number of trials with agreements and dividing by the total number of trials, multiplied by 100 to get the percentage (Cooper et al., 2020).

Reliability data was collected for 60% of baseline sessions for skill one, *responding to name,* across participants. The mean agreement for baseline sessions was calculated to be 100%. Reliability data was collected for 57.14% of intervention sessions for skill one, *responding to name*, across participants. The agreement for intervention sessions was calculated to be 100%.

Reliability data was collected for 50% of baseline sessions for skill two, *completing single-step directions*, across participants. The agreement for baseline sessions was calculated to be 100%. Reliability data was collected for 66.67% of intervention sessions for skill two, *completing single-step directions*, across participants. The agreement for intervention sessions was calculated to be 100%.

Reliability data was collected for 61.54% of baseline sessions for skill three, *hand raise*. The agreement for baseline sessions was calculated to be 100%. Reliability data was collected for 50% of intervention sessions. The average agreement was calculated to be 90.74% across participants.

Reliability data was collected for 57.89% of baseline sessions for skill four, *choice making*. The agreement for baseline sessions was calculated to be 100%.

Procedural Fidelity

Observers collected procedural fidelity on baseline sessions across all participants; 60% of sessions for skill one, 40% of sessions for skill two, 53.85% for skill three and 47.37% for skill four. Procedural fidelity was 100% across all sessions.

Observers collected procedural fidelity on intervention sessions. Procedural fidelity was collected for an average of 47.44% of intervention sessions for skill one, *responding to name.* Procedural fidelity was 99.63% across intervention sessions for skill

one. Procedural fidelity was collected for an average of 53.52% of intervention sessions for skill two, *completing single-step directions*. Procedural fidelity was 99.48% across intervention sessions for skill two. Procedural fidelity was collected for an average of 29.79% of intervention sessions for skill three, *raise hand.* Procedural fidelity was 100% across intervention sessions for skill three.

General Procedures

For this study, I conducted one unit from the preschool life skills. I adapted the instruction following unit from the preschool life skills program (Hanley et al., 2007; Robison et al., 2020) to compose the school readiness unit. The school readiness unit included four life skills: responding to their name, completing a single-step direction, hand raising to participate in instruction, and choosing between two preferred stimuli. Intervention included two components, class-wide instruction and spaced practice teaching trials. I used behavior skills training (BST) to teach each skill during class-wide instruction. BST consisted of the instructor providing a description of the skill, modeling the skill with another adult, and allowing students to practice the skill while the instructor gives descriptive feedback.

I implemented class-wide instruction (approximately 10 min) at the beginning of the day during morning circle. Each student was paired with one staff member who sat behind or next to them. Probes and teaching trials for each skill took place in different areas of the classroom, including morning circle (hand raising), the play center (responding to name, single-step directions, choice making) and the table during snack time (choice making).

Probes

To conduct a probe trial, the implementer created an evocative situation and then allowed five seconds for the student to respond. For example, to conduct a probe trial for completing single-step directions, the implementer engaged with the participant with play items and attention before stating the task direction of the single-step direction. The implementer stated the task direction such as "stack the blocks" or "place this item in the container." The implementer allowed five seconds for the target response to be emitted. If the student demonstrated the skill correctly, the implementer provided descriptive verbal praise. If the student did not demonstrate the skill correctly or did not respond, the implementer did not deliver a consequence. The implementer conducted two or three trials for each skill. If the participant responded correctly or incorrectly on the first two trials, a third trial was not conducted. If the participant responded correctly on only one of the first two trials, a third trial was conducted (Robison et al., 2020).

Baseline

The baseline condition assessed the participant's current level of knowledge of each skill prior to intervention. Students did not receive instruction during baseline to evaluate their knowledge before implementation of the PLS program. The implementer did not provide prompts during the baseline condition.

Intervention

Class-wide Instruction

Implementers conducted class-wide instruction at the beginning of the day during morning circle. The participants sat in chairs on a rug facing the instructor. The instructor secured the participant's attention by stating, "All eyes on me," and waited for each student to look or to orient his body towards the instructor. After the instructor secured

the participants attention, the instructor delivered specific verbal such as “Great job looking at me!”. The instructor provided a short description of the life skill and when it would be appropriate to use the life skill. The instructor provided a model of the life skill with a staff member. After watching the model, each student role-played the life skill with a staff member. The student practiced the skill one to three times during role-play until the student emitted the correct response. If the student demonstrated the life skill correctly, the instructor delivered descriptive praise. If an error occurred during role-play, the instructor used least to most prompting (verbal, model, physical) to teach the student the skill. The instructor provided prompts until the student demonstrated the skill correctly.

Spaced Practice Teaching Trials

The purpose of spaced practice was to incorporate explicit instruction (teaching trials) of the PLS program into the typical school day routine. Implementers conducted a total of three trials integrated throughout the school day. The trials did not have to occur at the same time or in the same area of the classroom. The setting and time varied. Spaced practice teaching trials used least to most prompting (verbal, model, physical) to teach the skill.

Before teaching trials began, the instructor provided a skill review to the participant. The instructor reminded the student how and when to use the skill. For example, for the skill review for responding to name, the instructor reminded the student: “Remember when a teacher calls your name, you can turn and look towards them.” The instructor then created an evocative situation for the life skill. The instructor allowed five seconds for the participant to respond before providing least to most prompting (verbal,

model, physical). If the student responded correctly and demonstrated the life skill appropriately, the instructor delivered the consequence of specific verbal praise such as, “Great job looking at me when I called your name” or “Great job raising your hand to pick a song at the board.” If the student responded incorrectly or did not respond, the instructor provided a verbal prompt and waited five seconds for the student to respond. The instructor moved up the prompt hierarchy (model, physical) until the student demonstrated the life skill correctly.

CHAPTER 3

Results

Figure 1 displays class-wide data during baseline and intervention across skills. Data for the first skill, *responding to name,* showed no students correctly used the skill during baseline. Low levels of responding were stable in the baseline condition. After students received intervention, skill use immediately increased to about 50% correct during the first six probe sessions and then showed an increasing trend and stabilized at 100%. During baseline and intervention, problem behavior did not occur.

Skill two, *completing single-step directions,* showed low levels of correct responding with some variability during baseline, with responding ranging from 14–100% (*M* = 38.69%). After introducing intervention, results showed an immediate increase in the level of correct skill use and stabilized at 100% correct (*M* = 98.42%). During baseline and intervention, problem behavior did not occur.

Skill three, *hand raising,* showed low levels of correct responding during baseline (*M* = 1.95%). Problem behavior occurred at low levels ranging from 0% to 16.67% (*M*=2.13%) in baseline. Correct skill use showed an immediate increase when intervention began, though with lower accuracy than the first two skills (*M* = 43.49%). A gradual increasing trend in correct skill use occurred during the intervention condition. During the intervention condition, problem behavior only occurred during one session (40%). Problem behavior did not occur for the remainder of the condition.

Skill four, *choice making*, showed high levels of correct skill use during baseline condition with consistent responding at 100% for the final four sessions. Because accuracy was high for this skill, I did not intervene on it. Very little problem behavior occurred during baseline.

To infer the presence or absence of functional relations, I used summative visual analysis of graphed class-wide data. Results from two skills, *responding to name* and *completing single-step directions*, demonstrated an immediate change in level.

Visual analysis of class-wide data indicated consistent changes in level of correct skill use, across all three skills, from the baseline condition to intervention condition. Findings from this study suggest three potential demonstrations of effect represented across three skills. Results from class-wide data demonstrated a functional relation between the implementation of whole-group instruction and space practice and an increase in school readiness skills.

Visual analysis of class-wide problem behavior indicated low or zero levels of problem behavior during baseline and intervention and across skills. Results from class-wide indicated an absence of a functional relation between the effects of whole-group instruction and space practice and class-wide problem behavior.

CHAPTER 4

Discussion

This study evaluated an adapted version of the PLS program using whole-group instruction and spaced practice teaching trials to teach three life skills to three children with developmental disabilities. Overall, the implementation of class-wide instruction and spaced practice led to an increase in correct skill across participants. Class-wide data reflects an increase in correct skills use among all participants from baseline to intervention. Findings from this study suggest that space practice helps maintain life skills for children with developmental disabilities.

Additionally, this study evaluated the effects of whole-group instruction and spaced practice on class-wide problem behavior. Zero to low occurrences of problem behavior occurred throughout the study. Previous research has demonstrated a functional relation between the implementation of the PLS program and a decrease in problem behavior (Hanley et al., 2007). However, because I observed low or no occurrences of problem behavior across conditions, I could not infer the presence or absence of a functional relation between problem behavior and the Life Skills Program.

Findings from this study demonstrated the effectiveness of using whole-group instruction and spaced practice to teach life skills to preschool children with disabilities. Students acquired three school readiness skills during intervention and demonstrated mastery of the fourth skill in baseline. For this study, I modified one unit of the instruction following unit from the original PLS program to include more appropriate

skills that focus on school readiness. I added two new skills, *hand raising* and *choice making.* Implementers of future PLS programs should consider skill three, *hand raising*, as an appropriate school readiness skill that could be added to the PLS program for children with disabilities. As stated previously, students demonstrated mastery in baseline for skill four, *choice making*. Teachers may not need to provide explicit instruction on the skill; however, we need to evaluate it further with different populations and demographics. Researchers should continue investigating and evaluating different school readiness skills that are appropriate for children with developmental disabilities.

For this study, we implemented class-wide instruction and spaced practice teaching trials. We investigated using a more time-efficient instructional approach to teach life skills. Findings in previous PLS literature warranted research on a more time-efficient approach to teaching life skills due to the limitations of using a tiered approach with frequent booster sessions (Robison et al., 2020). A tiered approach could be considered time-consuming and not feasible for a classroom teacher to implement when frequent booster sessions are needed. Therefore, we investigated using a more time efficient instructional approach to teach life skills—use of spaced practice.

Findings showed spaced practice increased and maintained high accuracy of life skill use. All participants demonstrated higher levels of correct skill use in the intervention condition when receiving spaced practice. Space practice provided students with repeated practice, which is necessary for many children with developmental disabilities to acquire and maintain skills (Archer & Hughes, 2010; Hughes & Lee, 2019). While spaced practice was effective in this study, the approach was also time efficient by easily being integrated throughout the school day. Sessions did not have to occur in one

block of time and could be dispersed throughout the day. This may be a practical technique for special education teachers to implement when teaching life skills.

The literature on the PLS program with children with developmental disabilities is limited. Results suggest additional research on spaced practice is warranted. The study's findings suggest that space practice successfully teaches school readiness skills, however future research is needed. Systematically replicating this study could potentially strengthen the reliability of spaced practice. Extending research with different populations could potentially demonstrate the generality of spaced practice.

Future research should examine the PLS program in other settings, such as special education classrooms. Additionally, special education teachers should implement the program in their classrooms to evaluate the effectiveness of using class-wide instruction and space practice to teach life skills. This study was conducted in a university-affiliated classroom. It is important to extend the PLS research to different settings. Typical classrooms or classrooms not affiliated with a university may not have behavior analytic support or expertise in the PLS program. Therefore, it is important to evaluate how the program is implemented without direct support from behavior analysts or individuals with research experience at the collegiate level.

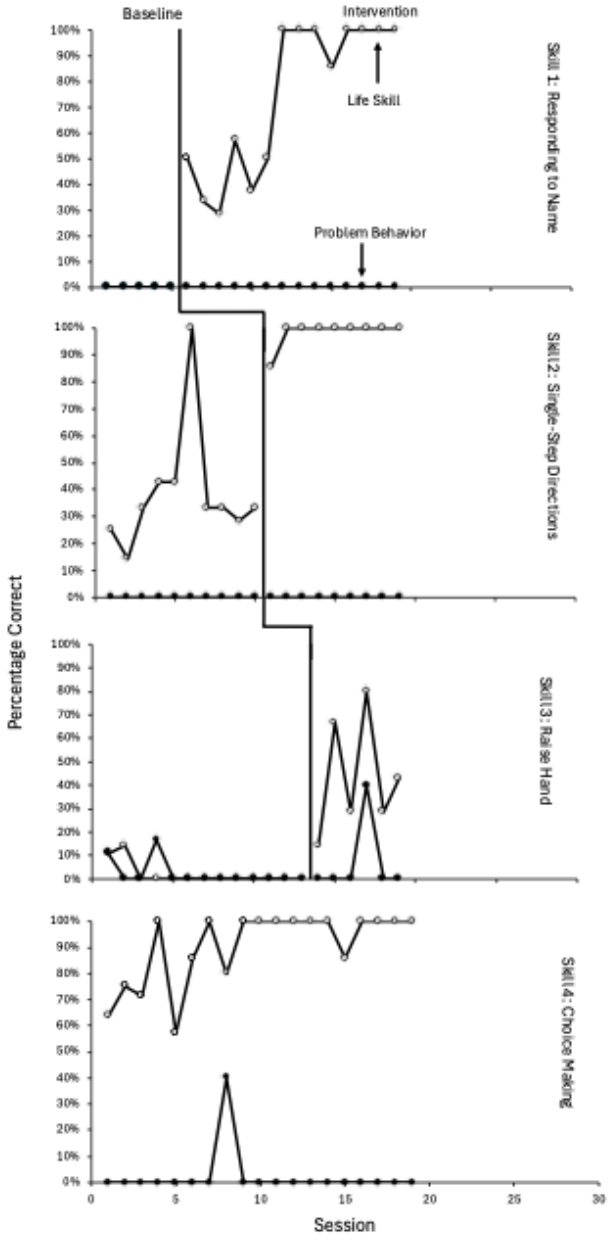
I recommend future research on spaced practice in special education classrooms, focusing on its implementation by special education teachers. Specifically, this research should assess how feasible it is for special education teachers to implement spaced practice. Space practice aims to address the limitations of previous PLS literature; therefore, further evaluation on the time efficiency of this method is needed. Additionally, social validity surveys should be collected from teachers who implement

the program. Social validity data can inform future research on the acceptability and practicality of the program from special education teachers.

Skill four, *choice making*, did not require intervention due to high levels of correct skill use in the baseline condition. This could be due to all participants receiving PECS practice and training outside of this study. Each participant used PECS as their communication modality throughout the school day. Before this study, each participant demonstrated proficiency in Phase 3B, discrimination between two preferred items. Phase 3B teaches the student to discriminate between picture icons and request preferred items from up to an array of five. All participants mastered this phase and were able to discriminate between two preferred items outside of the study. Therefore, high levels of correct skill use in baseline could be due to PECS proficiency.

One limitation of this study is the lack of data for skill three, *hand raising*, following a procedure modification for Tate. During intervention, Tate hesitated against physical prompting. Tate did not demonstrate correct skill use across five intervention sessions therefore, I modified the response requirement to accepting the phrase "my turn" from Tate's speech generating device. This study is limited due to the lack of data following this procedure modification, as only session 19 reflects data with this modification. With only one data point, I am unable to determine the effects of the modification. Additional data was not collected due to Tate's school absences at the end of the study therefore, I am unable to determine how this change may have impacted Tate's responding.

Figure 1: Percentage of class-wide use skill use and problem behavior during baseline and intervention probes.



Note: Tate's procedure modification (response requirement for skill three) changed on session 19.

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