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Using Acoustical Feedback to Improve Elementary School Student Behavior during Transitions

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Using Acoustical Feedback to Improve Elementary School Student Behavior during Transitions

by

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A thesis submitted in partial fulfillment
of the requirements for the degree of
Master's of the Arts in Applied Behavior Analysis
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Abstract

Behavior during transitions in classrooms is an area in need of additional supports in order for teachers to effectively manage classrooms. Extended transition durations, particularly transition periods between one activity and another are related to problem behavior among children in educational settings. This study evaluated the use of acoustical feedback aimed to improve transition behaviors of elementary school students, using a multiple-baseline design across participants. Teachers were trained to implement the acoustical feedback procedure. Data on teacher treatment fidelity, student transition behavior (transition duration and problem behavior), generalization probes, and social validity were collected to examine the feasibility and potential efficacy of acoustical feedback. The results indicated that the participating teachers successfully implemented the acoustical feedback procedures with high levels or moderately high levels of fidelity and their implementation of the intervention was successful in reducing problem behavior and transition duration for all three participating children. Support for generalization was strong for two teachers and their students and minimal for one teacher and her student.

Chapter 1:

Introduction

Transitions are a natural part of everyday activities in classrooms when moving from one activity to another. The lack of effective transition strategies may promote a chaotic environment in a classroom. As many as 70 minutes per day can be spent in transitions, and students can experience as many as 15-20 transitions per day between times allocated for learning activities (Ardoin, Martens, & Wolfe, 1999; Fisher, C. W., Berliner, D. C., Filby, N. N., Marliave, R. S., Cahen, L. S., Dishaw, M. M., 1980). The percentage of time spent in transitions during a day is about 18-25% (Schmit, Alper, & Raschke, 2000), and 85% of teachers in preschool and kindergarten classrooms identified independent in-class transitions as a critical key to success (Sainato, D., & Lyon, S., 1983; Wilder, Chen, & Atwell, 2006). This indicates transition is an area in need of additional supports in order for teachers to effectively help children adjust to classroom routines. Spending too much time in transitions takes away from learning opportunities for the entire classroom and individual students, and it is important to effectively move children between activities to maximize learning time (Wilder et al., 2006). Problem behavior exhibited by children is often the cause of extended transition duration and can hold a multitude of functions depending on each individual child, the antecedents, and prior reinforcement history (Flannery & Horner, 1994; (Schreibman & Whalen, 2000).

Current literature on transition interventions has focused mostly on antecedent-based strategies such as safety signals or transition warnings (Cote, Thompson, & McKerchar, 2005;

McCord, Thomson, & Iwata, 2001; Tustin, 1995; Wilder et al., 2006), visual supports (Dettmer, Simpson, Myles, & Ganz, 2000; Waters, Lerman, & Hovanetz, 2009), priming (Schreibman et al., 2000), and high-probability instruction sequences (Ardoin et al., 1999). For example, (Dettmer et al., 2000)) evaluated effects of visuals on transition behaviors in two elementary school children diagnosed with autism by measuring latency between a verbal prompt to begin an activity and the initiation of a new activity by the participant. Latency was assessed in phases with and without visual supports (i.e., visual schedules, portable schedules, and a finished box routine sub-schedule). Results showed that visual supports did display a reduction in latency between activities.

While these antecedent-based interventions are commonly effective, there is limited research on the use of consequence-based strategies that address problem behavior during transition periods in classrooms. Waters et al. (2009) indicated that a visual schedule alone was ineffective in decreasing aggression and disruption maintained by escape from non-preferred activities and access to preferred activities in two elementary school children diagnosed with autism. The researchers demonstrated that a consequence manipulation of differential reinforcement of other behaviors (DRO) combined with extinction plus the visual schedule was more effective than visual schedule alone in decreasing transition problem behavior. (Cote et al., 2005)) examined the effects of a 2-minute warning and extinction on problem behaviors displayed by three preschool children. The researchers demonstrated that antecedent interventions alone had little impact on increasing compliance during transitions. However, once an extinction component was introduced levels of compliance during transitions improved. These studies are a few of the limited research showing the potential utilization of consequence-based interventions pertaining to transitions.

Recently, the use of an acoustical stimulus such as a clicker has been used as a consequence-based strategy in the field of sports to provide feedback immediately after a target behavior occurs and to increase athletic performance. In particular, the use of TAGteach, which stands for Teaching with Acoustical Guidance and which utilizes a tagger (clicker) as a conditioned reinforcer, (TAGteach International, 2012) has been examined in a few studies (Fogel, Weil, & Burris, 2010; Quinn & Miltenberger, in press; Scott & Scott, 1997; Stokes, Luiselli, Reed, & Fleming, 2010). This click sound serves as an example of acoustical feedback. Currently, demonstrations incorporating use of TAGteach on improving student behavior in educational settings are not available in the literature. However, given the immediate feedback and efficiency of TAGteach, the relatively short time necessary to train a teacher, and the need for an efficient and effective strategy for classroom transitions, TAGteach may be a promising strategy for teachers to utilize as an intervention specific to transitions. Early literature on behavior suggests that in order for a reinforcer to be most effective it should be delivered immediately after the response. For example, Skinner (1951) states that the latency between an appropriate behavior and the delivery of a conditioned reinforcer (clicker) must be as minimal as possible to be most effective.

Although the number is small, studies on TAGteach have shown promising results as being an effective strategy to reinforce desired behaviors more immediately. For example, Stokes, Luiselli, Reed, and Fleming (2010) tested TAGteach as part of a treatment package, utilizing a multiple baseline design across participants, to improve pass-blocking skills of high school football players. The other components of the treatment package included descriptive feedback and video feedback. Results indicated that descriptive feedback plus video feedback increased correct pass blocking skills and TAGteach even further increased those skills.

Fogel, Weil, and Burris (2010) evaluated the impact of TAGteach on skill acquisition of learning to swing a golf club, using a multiple baseline design across skill sets. The researchers taught each component in the task analysis for swinging a golf club to a novice golfer. The results from this study indicated that TAGteach was effective in teaching 4 out of 5 skill sets required to swing a golf club. High social validity scores from the study also showed that the intervention was extremely acceptable to the participant. The most recent application of TAGteach by Quinn et al., (2015) focused on improving dance movements of four dance students, ages 6-9 years in a community dance studio. A multiple baseline design across behaviors was employed, measuring the proficiency of dance movements from baseline to intervention phases. Dance instructors were trained in the TAGteach intervention prior to the intervention phase to tag the dancers' movements. Results indicated that TAGteach was successful in improving dance movements in all children. Results also showed a high level of social validity. The author also noted that instructors were trained in a relatively brief time period. While TAGteach is based on behavior-analytic principles, more empirical evidence is needed to establish as an evidence-based procedure, particularly, as an intervention to improve student behavior in educational settings. Given its foundation in positive reinforcement, high social validity, effective outcomes thus far, and ease of implementation, TAGteach has the potential to improve transition behaviors in classrooms.

As indicated in the literature, school-based interventions should be socially valid to teachers in order for treatment integrity to remain high for any transition strategies used by teachers (Harn, Parisi, & Stoolmiller, 2013; Witt, Martens, & Elliott, 1984). Harn et al. (2013) suggest that interventions should be adaptable to changing variables in a school setting in order to remain effective and promote sustained implementation. Thus far, TAGteach has displayed

high levels of social validity when using acoustical feedback. Thus, acoustical feedback has the potential to become socially valid in educational settings due to its ease of implementation.

Therefore, the purpose of this study was to examine the potential outcomes of implementing acoustical feedback with classroom teachers and students in an elementary school. Specifically, this study evaluated the use of acoustical feedback by teachers for improving student behavior during transitions. This research addressed the following questions: a) to what extent can the teachers implement acoustical feedback procedures? ; b) will the implementation of acoustical feedback decrease duration of the targeted in-class transition time and problem behavior in students?; and c) will teachers generalize the acoustical feedback intervention to a non-trained transition resulting in collateral changes in student behavior during transitions?

Chapter 2:

Method

Setting

The study took place in three K-2 general education classrooms of an urban public elementary school that served approximately 740 students in grades Pre-K through 5 with 88% of the students described as minority (45.3% Black and 36.4% Hispanic). Each classroom served approximately 18 to 20 students. The school was a Title I school where 97% of the students were eligible for free or reduced price lunch. The school had been implementing school-wide Positive Behavior Support (PBS) for 5 years. In the 2013-2014 school year the school received a score of 86% on their Benchmarks of Quality (Kincaid, Childs, & George, 2010), which is indicative of high fidelity implementation of school-wide PBS procedures. For the 2013-2014 school year, the school reported 58% of the students received 0-1 Office Discipline Referrals (ODRs), 28% of the students received 2-5 ODRs, and 12% of the students received 6 or more ODRs.

Participants

Participants in the study included three students and their teachers from three separate classrooms. Only one student per classroom was recruited for the study. Students were selected based on the criteria that he or she: (a) was between the ages of 3 and 11 years enrolled in grades K-3; (b) engaged in problem behavior that disrupts or prolongs the transition period; (c) was teacher nominated; and (e) had no prior exposure to acoustical feedback interventions. Teachers were selected based on the criteria that he or she: (a) was a K-3rd grade teacher; (b)

gave consent to participate in all aspects of the study including training on intervention implementation; (c) held no prior experience implementing acoustical feedback; and (d) was experiencing extended transition durations due to student problem behavior during at least one transition period daily.

The researcher used a brief questionnaire (see Appendix A) to interview teachers in order to identify the need for transition supports. The following information was identified through the interview: (a) the problematic transition(s); (b) the type(s) of problem behavior; (c) the student engaging in problem behavior; (c) the current duration of the transition; and (d) the desired duration for the transition as identified by the teacher. The amount of time to conduct this interview was 10-15 minutes. The interview results indicated that the children in each classroom had difficulty transiting from the walk from breakfast to morning arrival in the classroom (i.e. the transition was from the time the student opened the door to the classroom to the time the student sat in his seat).

The researcher also conducted a one-time direct observation during the transition routines indicated by the teacher to be problematic to confirm the occurrence of extended transitions and students engaging in problem behavior. At the onset of the transition the duration was recorded by starting a timer at the time the teacher initiated the transition (either by verbal or visual cue) and ended the timer once the potential target child completed the transition. The researcher observed the transition using 10-s partial interval recording system to document occurrences of problem behavior of the potential student participants. Student participation in the study was finalized once at least one transition was observed to exceed the desired duration and the potential target student(s) engaged in problem behavior during over 60% of intervals observed.

Quincy was a 6 year-old Hispanic male enrolled in a 1st grade diagnosed with Attention Deficit Hyperactivity Disorder (ADHD). At the time of the study he was prescribed Concerta to treat symptoms of ADHD, however there were reports from home that the medication was not administered regularly. According to testing from the current school year he was below grade level in reading and math subjects. He had received eight office discipline referrals (ODRs) from a period of eight weeks for inappropriate behavior. Three of these resulted in out of school suspension and the remaining five resulted in parent pick-up from the school. He was often removed from his classroom several times per day by the behavior specialist, being requested by his teacher for engaging in problem behavior. He often engaged in dropping to the floor, refusal to comply, hissing at the teacher, crawling under desks, and elopement to another area of the classroom away from the teacher during in-class transitions. Areas needed for improvement as indicated by the teacher were following directions, working without disruptions, working well with others, self-control and completing assignments. Quincy's teacher was a 24 year-old Caucasian female with Master's Degree in Elementary Education with approximately one and a half years teaching experience.

Jaden was a 7 year-old Hispanic male enrolled in 2nd grade. He has no medical diagnosis, although his mother reported that during the prior school year he was taken to a doctor and prescribed medication for ADHD with no formal diagnosis. At the time of this study he was not on medication, but was still suspected of displaying symptoms associated with ADHD. For the current school year he was on grade level in reading and below grade level in math. He had no ODRs for the current school year. His teacher described him as being very distracted. He would often fidget with and chew on (non-food) items, and stare off into a distance rather than completing assignments. His teacher reported that he often would not

complete his work and would take a full school day to complete an assignment at his desk. He displayed a long history of refusal to comply with teacher instructions. When the teacher gave instructions to transition he would fidget with inappropriate items and materials in his desk or around the room, stare out the window, wander the classroom, disrupt other students that were working, and/or stand in place and refuse to move. As a result, he would not begin his assignments, and a single assignment would often not be finished until the following school day. Jaden's areas needed for improvement as indicated by the teacher included following directions, listening attentively, working without disruptions, doing his best work, and self control. The teacher reported that she tried implementing a behavioral progress chart to improve motivation to complete tasks, but his behavior did not improve and he did not seem motivated. The progress chart was then discontinued in use. Jaden's teacher was a 26 year-old Caucasian female with a Bachelor's Degree in education. She had 2 years substitute teaching in grades 3-9 and 3 years teaching experience at the school where the study took place.

Samuel was a 5 year-old African American male enrolled in kindergarten with no medical diagnosis. He was below grade level in reading and math according to scores from the current school year. He had received one ODR for inappropriate behavior for the school year. His teacher describes his behavior as non-compliant and attention seeking. His teacher reported that Samuel would often arrive in the classroom in the morning yelling across the room to the teacher, throwing his backpack on the floor, disrupting other students, making faces at other students, hitting or kicking other students, refusing to comply with teacher instructions, and/or wandering around the classroom. This behavior would result in other students becoming upset and complaining to the teacher that he was "bothering" them, resulting in a chaotic classroom environment. He was often out of control in the classroom and would not comply with

instructions- instead displaying some variation of these problem behaviors. His teacher indicated his needs for improvement in following directions, self-control, working with others and working without disturbing others. Samuel's teacher was a 24 year-old Caucasian female with a Bachelor's degree in education and three years of teaching experience, all of which were at the same school that the study took place.

Materials

The materials used for this study included a customizable soundboard application installed on the teacher's cell phone. This was used as the acoustical feedback device (sound machine). The PI installed the application on the cell phone and installed the three sounds used in the study in the soundboard application. All observers used digital timers to record transition duration and a paper data sheet and checklist to collect data on problem behavior and treatment fidelity.

Data Collection

The dependent variables for this study included transition duration in minutes, problem behavior measured as percentage of intervals, and treatment fidelity measured as percentage of intervention steps implemented correctly by teacher. The researcher and six trained research assistants collected data during targeted transitions. The research assistants were currently enrolled in or had completed Applied Behavior Analysis undergraduate or graduate courses and were trained by scoring YouTube videos of classroom behavior. Each research assistant was required to obtain above 90% agreement for all variables out of three opportunities when scoring videos prior to serving as a data collector. Data collection occurred 3-4 times per week per participant during baseline and intervention. All observations took place during the school day at any time from 7:30 a.m. to 2:15 p.m. All data were collected from live observations.

Transition duration. Observers recorded the duration of the targeted in-class transition time from onset to offset with the target student (see Appendix B). The onset of the transition was defined as the beginning of instructor signals to the children that an activity has ended and it is time to switch to a different activity. If a morning arrival transition was targeted, the onset of the transition was defined as the moment the student walks in the door or the beginning of teacher instructions. An example of this would be a teacher stating, “Ok class, art time is over. Please clean up your art materials and line up at the door for lunch.” The teacher initiation was verbal through vocalization, gesture, or visual representation. The offset of a transition was defined as the target student has ended engagement in the prior activity or completed the transition task and engaged in or was ready for the next activity (i.e., listening and directing attention to the teacher speaking, following teacher directions) without engaging in problem behavior. When a transition had ended, the teacher should have been able to begin instruction on the activity without disruption. During the baseline phase observers recorded the offset of the transition when the target child had complied with all teacher directions during the transition and during the intervention the offset was recorded once the final tone occurred.

Problem behavior. Observers collected data on target students’ problem behavior during the targeted transition using a 10-s partial interval recording procedure (see Appendix B). Problem behavior during a transition was defined as any variation of refusal to comply with teacher demands (e.g., verbally stating, “no”, standing still when instructed to move), refusal to leave an activity (e.g., staying in an activity when the teacher has instructed to leave the activity and/or move to another activity), screaming, crying, hitting or kicking the teacher or other children, property destruction (e.g., tearing up papers and chewing on non-food items), and/or

dropping to the floor. Observers recorded an occurrence any time the student engaged in a problem behavior during an interval.

Treatment fidelity. Observers completed a treatment fidelity checklist that included procedural steps to implement the acoustical feedback intervention (see an example checklist in Appendix C) during 100% of intervention and generalization probe sessions. This was to measure the extent to which the teachers implemented the intervention steps consistently and correctly as planned during each observation. The treatment fidelity checklist was developed based on the specific individualized task analysis involved in each target transition and scored using a yes/no format. Each step of the intervention was scored by observers. Depending on the classroom, between five and eight steps were developed. The total number of “yes” was divided by the total number of items and the number was then be converted into a percentage.

Social validity. Teachers were asked to fill out an adapted Intervention Rating Profile-15 (IRP-15; Martens, Witt, Elliott, & Darveaux, 1985; Appendix D) following the intervention phase. The adapted IRP-15 questionnaire included 14 items designed to measure acceptability of behavior interventions. A Likert-type rating scale ranging from 1 (strongly disagree) to 5 (strongly agree) was used to rate each item. Each item on the scale assessed the extent to which teachers found the acoustical feedback intervention acceptable, effective, efficient, and fair. The IRP-15 is reported to have an internal consistency of .98 indicating a high degree of reliability (Carter, 2007; Martens et al., 1985). The modifications made to the original IRP-15 were limited to changing wording to refer to the acoustical feedback intervention.

Student participants also completed a brief questionnaire at the end of the intervention condition (see Appendix E). They responded to four yes/no questions that were

developmentally appropriate to indicate whether they liked the intervention, whether they found it helpful, and whether or not they felt it improved their behavior.

Interobserver agreement (IOA). A second observer scored each session simultaneously but independently to assess IOA. The second observer recorded the transition duration and problem behavior for at 33% of the sessions distributed across phases, participants, and measures, and teacher treatment fidelity for 100% of the sessions. Percentage of agreements for duration was calculated by dividing the shorter duration by the longer duration recorded and multiplying this number by 100. Percentage of agreements for problem behavior was calculated by dividing the number of intervals with agreement by the total number of intervals, and multiplying by 100. Percentage of agreement for treatment fidelity was calculated by dividing the number of points on which observers agreed by the total number of points possible and multiplying by 100. Overall, average IOA across all sessions was 98%, 96% (range = 93-100%) for transition duration, 98%(range = 90-100%) for problem behavior, and 100% for implementation fidelity. For Quincy, the mean IOA for both transition duration and problem behavior was 100% both in baseline and intervention. For Jaden, the mean IOA was 97% for transition duration and 93% for problem behavior in baseline and 98% for transition duration and 100% for problem behavior in intervention. For Samuel, the mean IOA was 92% for transition duration and 90% for problem behavior in baseline and 100% for transition duration and 98% for problem behavior in intervention. IOA for implementation fidelity was 100% across teachers both in baseline and intervention.

Experimental Design and Procedures

This study used a non-concurrent multiple baseline design across participants to assess the outcome of the acoustical feedback intervention. Conditions implemented included baseline

(BL) and acoustical feedback (AF). Additional probes were conducted across experimental phases during a secondary problematic transition to assess generalization of teacher use of acoustical feedback and student behavior change.

Baseline. During this condition the teachers were instructed to teach the class as usual, and any class-wide behavior supports that are in place were not changed. The teachers provided verbal reprimand or corrective feedback (e.g., “What are you supposed to do”, “You need to be in your seat, put away your___”) when the students engaged in problem behavior. Baseline data were collected 3-4 days per week for a period of 2-6 sessions during up to 20 min target transition routines depending on the student participant. For all three participants, the targeted transition was morning arrival from breakfast into the classroom, particularly, transition from the time the student walked in the door to the classroom to until they are seated at their desk was observed.

Success point development. The researcher assisted each teacher in selecting a skill set (task analysis) and success points (steps of the task analysis) specific to the transition identified in the initial interview. The teacher was asked why the transition was a problem for the student (i.e., what is the child doing now that you would like to have him or her stop doing?). Then, the teacher was asked to describe how the transition should be performed correctly. From this discussion a skill set and success points were established that were individual to each child and the target transition. The success point met the following criteria: (a) what the teacher wanted to see (as opposed to not see); (b) one behavior; (c) observable and measurable; and (d) five words or less (not including the words “and” or “or”). An example of this would be: after completing a desk activity, the teacher would like the child to line up at the door single file. The first success point would be: stand up. Once that behavior is displayed the teacher would deliver the

acoustical feedback. The next success point would be: push in chair. The teacher continued providing success points for the child to achieve until the skill set (i.e., transition) was complete. Across participants, between five and eight success points were developed. Specific task analyses developed for each participant and the transition is provided in Appendix F.

Acoustical feedback teacher training. The researcher provided training to each teacher to implement acoustical feedback using a behavior skills training (BST) procedure consisting of instructions, modeling, behavioral rehearsal, and feedback. The researcher used a BST checklist during training to ensure all components of the BST were delivered (see Appendix G). Teacher training was conducted during normal PBS and faculty meeting times so as not to require any extra time outside of a normal workday. Training took approximately 30 minutes for each classroom teacher. The training included background information of the acoustical feedback method, and training of the procedures specific to this study. All necessary materials were provided to the teachers at no cost. First, the researcher gave instructions to each teacher on how to use a soundboard application, which was a grid of squares on the screen of a touch screen phone. Each square could contain a separate sound. When each square was pushed, the phone's speaker would emit a sound. The sound emitted by the device substituted as a conditioned reinforcer (rather than other conditioned reinforcers such as verbal praise or edibles). The teacher was given verbal instructions such as, " This device is a soundboard. It emits a recorded sound when pressed, like this (researcher pushes the button on the sound machine). A success point must first be determined prior to using the soundboard with your student. The success point is considered the point at which you will reinforce the appropriate transition behavior. Once the success point is determined you can use the soundboard as immediate feedback to notify the student that they have performed the skill correctly. We are

going to play a game to introduce the procedure to you, and similarly how you would introduce the procedure to your student. I am going to read a passage. When I say the word (specific word determined during training) you will push the button on the sound machine. Only push it when I say this word and do not push it for any other words.”

The researcher explained that the word that was read when the button was pushed on the soundboard was the “ success point” and this indicated that the word was “correct.” The researcher then modeled how to push the button when the success point was read aloud. Once the researcher had modeled the skill, the teacher was asked if he or she had any questions. Questions were addressed and then the researcher instructed the teacher to rehearse the skill previously modeled. The same word was used as the success point and the teacher was required to deliver the sound when it was read aloud from the passage. Descriptive feedback was given to the teacher for each trial. The teacher was required to correctly deliver the reinforcer sound for 3 trials to earn 100% criterion mastery. Once the teacher reached 100% criterion he or she was asked if they had any additional questions regarding the use of the sound machine or how to deliver the sound to a success point. The application was installed on the teacher’s phone with all sounds installed in the application, or a temporary phone was given upon the teacher’s request at no cost.

Acoustical feedback implementation. Prior to the first implementation session of acoustical feedback, teachers were instructed to introduce the target student to the acoustical feedback method and the soundboard via verbal instructions (see Appendix H). The student was asked to choose from a sample of three different sounds: “Applause”, “Woo Hoo!”, or “Mario power up”. Whichever sound the student chose was the sound that was used for the entirety of the intervention. The teacher then used the game previously described in the teacher training

BST steps to model delivering the sound to a success point by having the student read a passage aloud to the teacher. The teacher delivered the sound after a pre-determined word every time the student read it. Then the student delivered the sound when the teacher read the same word. The student practiced this at least three times. Another game that was used similar to the previous game was the finger game in which the student delivered the sound only when the teacher held up a predetermined number of fingers. Throughout the games whenever the student delivered the sound after the behavior of the teacher correctly, the teacher provided verbal praise and a backup reinforcer. The use of a backup reinforcer was provided to pair with the sound to establish the sound as a conditioned reinforcer and was specific to each child's preferences. Once the sound was established as a conditioned reinforcer verbal praise and the backup reinforcer were faded out. Thus, the sound represented a correct behavior and the absence of the sound meant, "try again."

The intervention consisted of the teacher providing the cue to begin the transition (the cue normally used during transitions), the name of the lesson, the instructions on how to perform the behavior, and then provide the success point. An example of this would be: "Ok, we're going to line up for lunch. When I tell you, I want you to push in your chair. The success point will be chair pushed in." The teacher did not use any other verbal instructions or visual cues to help the child through the transition. Once the student engaged in the success point the teacher delivered the sound. If the student did not perform the success point, the teacher waited for the child to try again (count to 5 seconds). After three attempts if the student did not achieve the success point the teacher gave the instructions again and the process was repeated until the success point was achieved and the sound was delivered. The teacher then instructed the student on the next success point. If at any time during the intervention phase of the study the teacher's

treatment fidelity fell below 80% (one session) a booster training was given to the teacher consisting of the BST procedures described previously.

Generalization. To determine if the teachers could successfully implement the acoustical feedback intervention independently and if their implementation resulted in collateral changes in student transition behavior, generalization probes were conducted during a specified non-trained transition across experimental phases in each class. For this transition period, teachers initially independently developed skillsets and success points and implemented the acoustical feedback procedure without the researcher's help. The researcher then assessed the success points the teacher had developed and then reviewed and revised them with the teacher. Once the list was finalized, generalization data collection took place. The generalization probes were conducted during the classroom to lunch transition for Quincy, during the specials (art, music, or P.E.) to classroom transition for Jaden, and during the science to centers transition for Samuel.

Chapter 3:

Results

Teacher Treatment Fidelity

Figure 1 depicts the treatment fidelity across teachers during intervention. The triangles represent the fidelity. Both Quincy's and Jaden's teachers implemented the acoustical feedback procedures with 100% fidelity in all sessions. Samuel's teacher implemented the intervention with an average 69.5% fidelity. Her fidelity was between 78% and 91%, barring one session. Samuel's teacher implemented the intervention procedures with 22% fidelity in the second session, which required a booster training session. Following the booster, treatment fidelity increased to 91%.

Student Transition Behavior

Figure 1 also displays data on transition duration and problem behavior in baseline and acoustical feedback (AF) phases across participants. The squares represent transition duration and the circles represent the percentage of intervals with problem behavior. Data indicate that for all three students, the acoustical feedback led to a decrease in duration of transition time and problem behavior. All three students engaged in high levels of problem behavior during prolonged transitions in baseline. When the interventions were introduced, the results were immediate and profound; both transition duration and problem behavior decreased dramatically, and there were no overlapping data points between baseline and intervention conditions for both transition duration and problem behavior across students.

Quincy. Compared to other participants, Quincy displayed the most severe problem behavior during baseline. Due to the urgent need for intervention, intervention was introduced immediately following two baseline sessions. As shown in Figure 1, Quincy engaged in high levels of problem behavior in baseline. The mean percentages of intervals for his problem behavior were 94% (range = 88-100%) and 0% in acoustical feedback intervention. His transition duration in baseline averaged 20 minutes (0 range) and 1.4 minutes (range 1.3-1.5 minutes) in intervention. Although Quincy was withdrawn early from the study due to moving to a different school, the two data points collected during intervention showed an immediate and sharp decrease in both target areas.

Jaden. As shown in Figure 1, the mean percentages of intervals for Jaden's problem behavior were 65% (range = 62-71%) in baseline and 0% in acoustical feedback intervention. He did not engage in any problem behavior during intervention. Jaden's transition duration in baseline averaged 14.3 minutes (range = 8.8-20 minutes) and 1.4 minutes (range .8-2.2 minutes) in intervention. Data were stable and consistent throughout the intervention phase.

Samuel. Samuel's baseline mean percentages of intervals for his problem behavior were 64% (range = 56-77%) and 13.5% (range = 0-46%) during acoustical feedback intervention. His average transition duration was 7 minutes (range = 5-10.8 minutes) in baseline, and it decreased to 3.3 minutes (range = 2.2-4.3 minutes) during intervention. Overall, his data were stable barring one session.

Generalization Probes

Figure 2 displays generalization data on teacher treatment implementation fidelity and student transition behavior. Only one or two probes were conducted across students and phases. The data indicate high levels of implementation fidelity for both Jaden's and Samuel's teachers

and moderately high levels of fidelity for Quincy's teacher, while reflecting high levels of collateral effects on student transition behavior for Jaden and Samuel. Teacher implementation of the acoustical feedback with moderate fidelity had no impact on Quincy's behavior during the non-targeted transition.

For Quincy, the non-targeted transition was classroom to lunch. His teacher implementation fidelity was low at 67%. The baseline data show a high level of problem behavior and transition duration, averaging 78% of intervals with problem behavior and 5.2 minutes in transition duration. Quincy's levels of problem behavior and transition duration during the non-targeted transition were similar to those of the targeted transition. During intervention, Quincy's problem behavior decreased to 67% of intervals, but transition duration increased to 20 minutes.

For Jaden, the non-targeted transition was specials to classroom. His teacher implementation fidelity was 100% for all sessions. Results indicated a similar impact on his targeted transition behavior. In baseline, transition duration was at 11.7 minutes and 73% of intervals with problem behaviors. Once acoustical feedback was implemented, the transition duration average decreased to 1.5 minutes (range 1.3-1.7) and the percentage of intervals with problem behavior was 0%.

For Samuel, the targeted transition was science to centers. Teacher implementation fidelity was 100% during this non-trained transition. Baseline levels of his problem behavior and transition duration were similar to those of the targeted transition; 9.3 minutes in duration and 80% of intervals with problem behavior. Once acoustical feedback was implemented, duration of the transition decreased to 2.7 minutes and the percentage of intervals with problem behavior decreased to 8%.

Social Validity

Results of the student social validity assessment indicated that the levels of acceptability of the acoustical feedback by participating students were high. Due to Quincy's early withdrawal from the study, social validity was only collected for the other 2 participants, Jaden and Samuel. Both students responded yes to all questions on the questionnaire.

The teachers' ratings results indicated that the teachers rated the acoustical feedback intervention as having high levels of social validity (see table 1). Quincy's teacher's average rating to the questions was a 3.5. The teacher rated the question, "I would be willing to use this intervention again in the classroom setting." as a 5. This was the only question rated as a 5 on the questionnaire. The lowest rated items (scored as a 2) were, "Soon after using the intervention, I noticed a positive change in the problem behavior." and, "Using the intervention improved the child's behavior in the classroom, but also in other settings." This may have occurred due to the question being too general. A better question may have been one that was specific to transitions such as, "Soon after using the intervention, I noticed a positive change in the problem behavior during transitions." Jaden's teacher average rating to the questions was 4.6. Of the fourteen items on the questionnaire, nine of the items were rated as a 5 and the rest were rated as 4. Items rated as a 5 included: "This intervention was appropriate for the behavior problems of my student," "The intervention proved effective in changing the child's problem behavior," "Overall, the intervention was beneficial for the child," and "I would suggest the use of this intervention to other teachers." Samuel's teacher's average rating was 3.9. The one item rated as a 5 was, "I would be willing to use this intervention again in the classroom setting." Of the other items, 10 were rated as a 4, and the remaining items were rated as a 3.

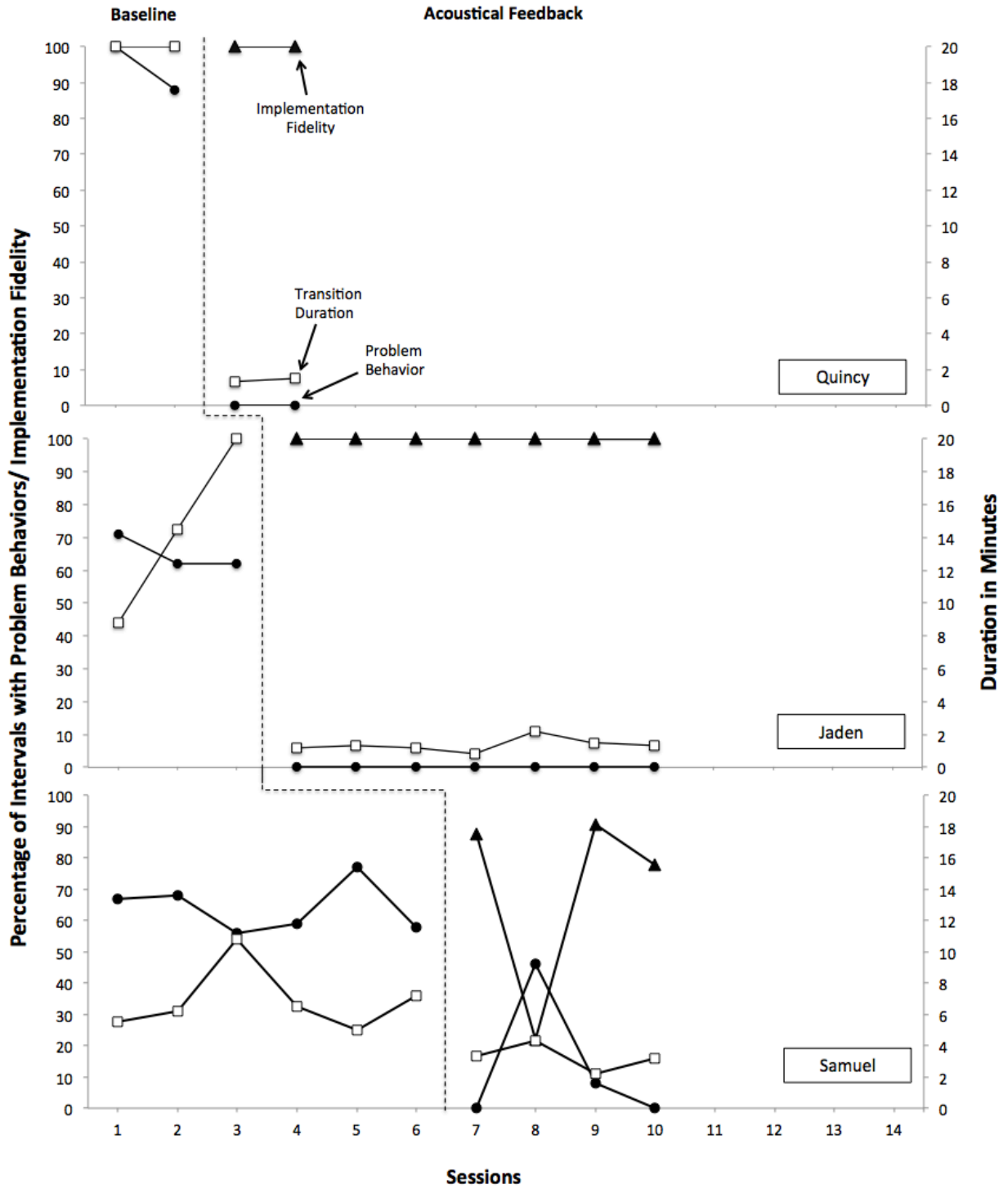


Figure 1. Percentage of intervals with problem behavior, transition duration, and implementation fidelity during each experimental condition across participants.

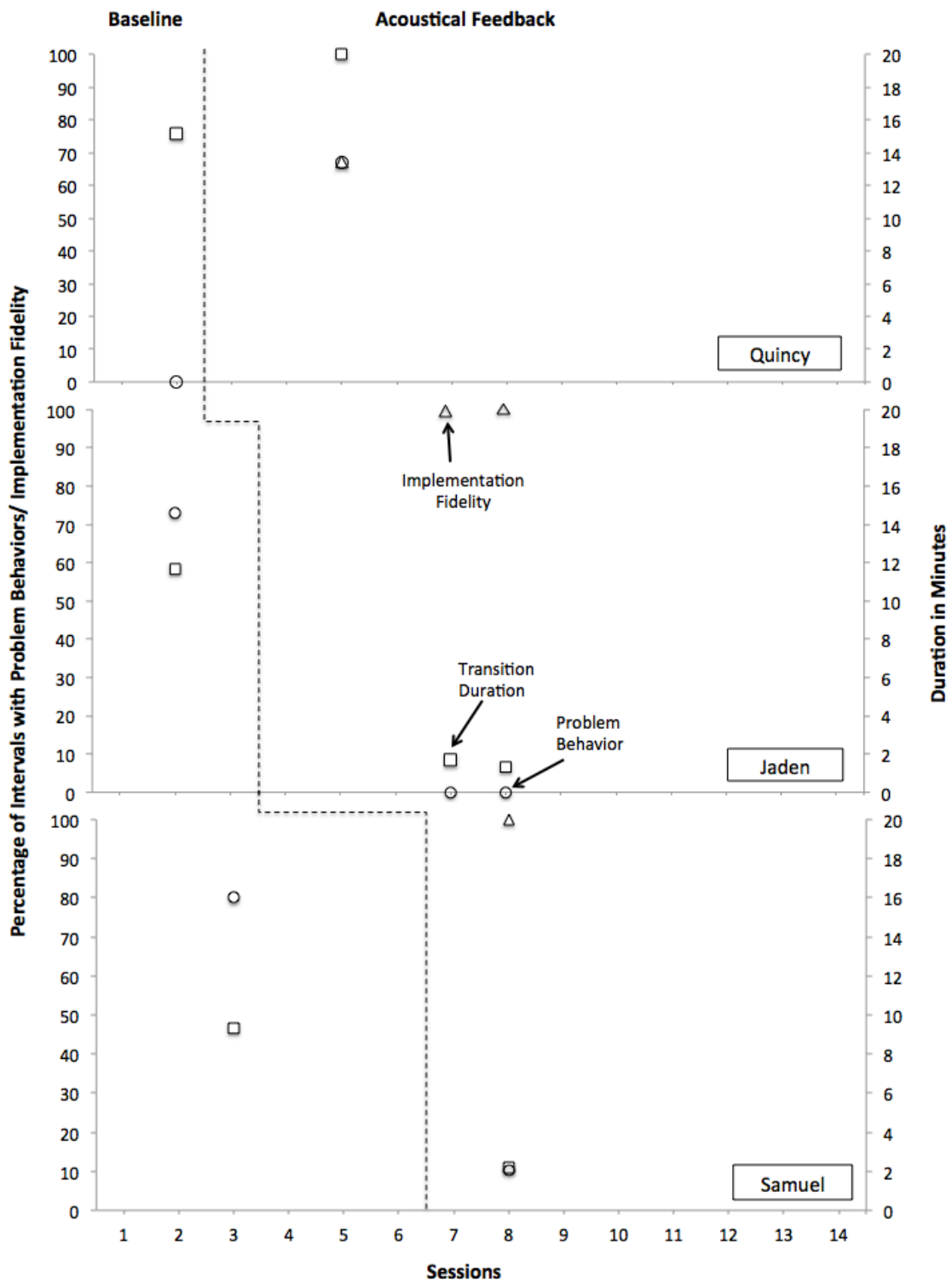


Figure 2. Generalization probes across experimental phases and participants.

Table 1.

Teacher Social Validity Results

	Quincy's Teacher	Jaden's Teacher	Samuel's Teacher	
1. This intervention was appropriate for the behavior problems of my student	3	5	4	
2. The intervention proved effective in changing the child's problem behavior.	3	5	4	
3. I would suggest the use of this intervention to other teachers.	4	5	4	
4. I would be willing to use this intervention again in the classroom setting.	5	4	5	
5. The intervention would be appropriate intervention for a variety of children.	4	5	3	
6. The intervention is consistent with those I have previously used in classroom settings	3	4	3	
7. I like the procedures used in the intervention.	4	5	4	
8. This intervention was a good way to handle this child's behavior problem	3	5	4	
9. Overall, the intervention was beneficial for the child.	4	5	4	
10. Soon after using the intervention, I noticed a positive change in the problem behavior.	2	5	4	
11. Using the intervention improved the child's behavior in the classroom, but also in other settings	2	4	3	
12. I am considering the use of acoustical feedback with other students who have similar problem behaviors in my classroom.	4	4	4	
13. The intervention proved effective in changing the child's transition skills.	3	5	4	
14. Soon after using the intervention, I noticed a positive change in the child's transition skills.	2	4	4	
	Mean:	3.29	4.64	3.86

Chapter 4:

Discussion

The primary aim of this study was to examine the extent of which teachers could implement acoustical feedback with fidelity, the impact of an acoustical feedback intervention on transition problem behavior and duration, and if these results would generalize to another non-targeted transition. The results of the study indicated that the participating teachers successfully implemented the acoustical feedback procedures with high levels or moderately high levels of fidelity, and their implementation of the acoustical feedback intervention was successful in reducing problem behavior and transition duration for all three participating children. Support for generalization was strong for two teachers and their students and minimal for one teacher and her student. When teachers utilized acoustical feedback during a non-targeted transition, a reduction in problem behavior and transition duration was observed. Overall, the acoustical feedback intervention demonstrated moderate to high levels of social validity with the students and the teachers. This makes acoustical feedback a potential effective intervention to use with students at a Tier 2 level in PBS schools, given that more research is conducted on the topic.

The anecdotal observations indicated that the students seemed to find the sound reinforcing before the teacher paired the sound with praise. Initially the teacher presented the soundboard for the students to listen and choose their preferred sound without providing praise. All of the students chose the “Mario power up” sound and responded with excitement. This suggests that the sound may have been a potent reinforcer for the students, and choice of sound

may have enhanced the outcomes of acoustical feedback. The intervention was easy for teachers to implement, and installing and using the sounds on the teachers' phone was a simple process. The results of the study indicated that implementation fidelity was functionally related to decreased student problem behavior transition duration. For sessions conducted with Samuel, an appropriate level of behavior was only observed when teacher implementation fidelity was above 80%. If the implementation fidelity fell below this mark, there was a noticeably large increase problem behavior. This was most noticeable when the implementation fidelity was 22%; Samuel's problem behavior increased from 0% the previous session to 46%. During this session, the teacher stopped the intervention to speak to another student as well as a parent that visited the classroom. This was an extraneous variable that may have had an influence on the fidelity of the intervention. Low implementation fidelity was remediated after a booster training session was conducted. This recovery was evident due to the fact that during the generalization probe later in the same day, Samuel's teacher was able to demonstrate 100% implementation fidelity. During the booster training, the teacher stated that she was confused about how to state the success points and that the booster session was helpful in clarifying this information. For every session observed in both targeted and non-targeted transitions where the fidelity of implementation fell below 80%, an increase in transition duration and/or problem behavior was observed. It is interesting to note that Samuel's teacher ranked the intervention lower than other teachers who implemented the intervention with high levels of fidelity.

As indicated in the literature, the results of the study suggest that larger treatment effects are present when treatment or implementation fidelity is high (Durlak & DuPre, 2008; Telzrow, McNamara, & Hollinger, 2000) and that researchers or behavioral consultants should establish procedures both to support high levels of initial implementation fidelity and to maintain levels

of fidelity over time (Sanetti & Kratochwill, 2008). The study suggests that interventions should be socially valid in order for treatment integrity to remain high (Biggs, Vernberg, Twemlow, Fonagy, & Dill, 2008; Kallestad & Olweus, 2003; Ringwalt et al., 2003). Considering that only few school-based interventions assessed treatment effects in relation to social validity of intervention (Carr, Austin, Britton, Kellum, & Bailey, 1999), future studies should further examine the acceptability and satisfaction with the acoustical feedback intervention in the school setting.

Due to the fact that acoustical feedback utilized in school settings has not been empirically validated by any previous studies to date, there are few comparisons in the literature that can be made. One comparison that can be made is the results from studies that implemented the TAGteach method (acoustical feedback in the form of a click) in the field of sports (Fogel et al., 2010; Quinn & Miltenberger, in press; Scott & Scott, 1997; Stokes et al., 2010).

Similarly to findings of these studies, acoustical feedback was effective at improving a specified area of behavior for individual participants. Moderate to high social validity was also observed in TAGteach studies, similar to the current study. Due to TAGteach having a foundation in behavioral principles, the only difference between the TAGteach procedure and the acoustical feedback procedure described in this study was the sound that was used for feedback, and the teacher involvement in forming the task analysis for transitions. Thus, the parallel can be drawn for its effectiveness when compared to prior TAGteach studies.

Limitations and Future Directions

A few potential limitations of the current study warrant discussion. First, only two data points were collected with Quincy both in baseline and intervention due to urgent need for intervention and an unexpected event that occurred in the middle of intervention, which limits

the external validity of the acoustical feedback intervention in the educational setting. He was also taking Concerta to treat ADHD symptoms, however there were reports that the medication was not being administered regularly. Depending on how the medication was taken, this may or may not have had an impact on Quincy's behavior and was an extraneous variable that could not be isolated. Second, observations took place during the same transition for all three students (morning arrival). A comparison between different students, grade levels, and transition routines may have yielded stronger evidence in support of the potential efficacy of acoustical feedback in the educational environment. Targeting the same transition period also made data collection extremely difficult, as it was necessary to collect data at the same time in three different classrooms, which limited the efficient implementation of the intervention across classrooms and use of concurrent multiple baseline design. Considering that the acoustical feedback may be considered as a secondary tier intervention within the schoolwide PBS system as it was implemented with students at-risk for developing behavioral disorders and during brief time periods, maintaining a focus on efficiency of intervention should be promoted when implementing the acoustical feedback intervention in the school setting.

Third, due to the history of problem behaviors with Quincy and Samuel, limited generalization probes were conducted as they were often being removed from the classroom for being too disruptive. Quincy's behavior became such an issue, that he would be in the front office removed from the classroom almost everyday. His withdrawal from the study was due to zoning issues, and being moved to another school. Samuel's teacher would also often request to have him removed from the classroom prior to the study taking place. The teacher displayed very emotional responses when he displayed problem behavior, and would often state phrases like, "he's just never going to get better, he needs to switch classes." This may have impacted

the overall level of enthusiasm over involvement in the study, which may have impacted social validity and implementation fidelity scores. Fourth, no follow-up data were collected due to time constraint. Future research should examine the maintenance effects of the acoustical feedback intervention to determine whether changes in student behavior continue to maintain without intervention.

Conclusion

Despite its limitations, this study offers a significant contribution to the body of research on school-based interventions for students at-risk for developing severe challenging behavior or behavioral disorders. This study is the first study to examine the potential efficacy of acoustical feedback intervention to address problem behavior within classroom environments. Student reactions to the acoustical feedback were favorable, establishing the sound as a powerful conditioned reinforcer. Further research is important at establishing the intervention as evidence based, making it acceptable to utilize at a Tier 2 level with students in need of additional supports. Acoustical feedback has the potential to become a tool for addressing problem behaviors by reinforcing appropriate behaviors in individual or groups of students, which aligns with the SWPBS model implemented in a growing number of schools throughout the world.

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Appendix A: Questionnaire Used for Initial Teacher Interview

1) Are you currently experiencing difficulty with transitions in your classroom? (circle one)

Yes

No

2) If yes, which transitions are you having difficulty during? (List below)

3) Approximately how long does it take to transition your class during these times?

4) Do you have a student or students that engage(s) in problem behaviors during transitions that make it difficult for a few others or the entire class to properly transition? (circle one)

Yes

No

5) If yes, please list below the children and the problem behaviors you have observed.

6) Do you use any strategies for transitions currently (i.e. visual aids, timers, etc.)? If so please list them below.

7) Have you ever used a procedure that involves sounds as feedback in your classroom or outside of your classroom? If so please describe below.

Appendix B: Data Sheet Used for Observations

Directions:

Participant ID _____

In the chart below, indicate if problem behavior occurred during each 10-second interval.
Circle "Y" for Yes and "N" for No.

10-S		20-S		30-S		40-S		50-S		60-S		
Y	N	Y	N	Y	N	Y	N	Y	N	Y	N	1 minute
Y	N	Y	N	Y	N	Y	N	Y	N	Y	N	2 minutes
Y	N	Y	N	Y	N	Y	N	Y	N	Y	N	3 minutes
Y	N	Y	N	Y	N	Y	N	Y	N	Y	N	4 minutes
Y	N	Y	N	Y	N	Y	N	Y	N	Y	N	5 minutes
Y	N	Y	N	Y	N	Y	N	Y	N	Y	N	6 minutes
Y	N	Y	N	Y	N	Y	N	Y	N	Y	N	7 minutes
Y	N	Y	N	Y	N	Y	N	Y	N	Y	N	8 minutes
Y	N	Y	N	Y	N	Y	N	Y	N	Y	N	9 minutes
Y	N	Y	N	Y	N	Y	N	Y	N	Y	N	10 minutes
Y	N	Y	N	Y	N	Y	N	Y	N	Y	N	11 minutes
Y	N	Y	N	Y	N	Y	N	Y	N	Y	N	12 minutes
Y	N	Y	N	Y	N	Y	N	Y	N	Y	N	13 minutes
Y	N	Y	N	Y	N	Y	N	Y	N	Y	N	14 minutes
Y	N	Y	N	Y	N	Y	N	Y	N	Y	N	15 minutes
Y	N	Y	N	Y	N	Y	N	Y	N	Y	N	16 minutes
Y	N	Y	N	Y	N	Y	N	Y	N	Y	N	17 minutes
Y	N	Y	N	Y	N	Y	N	Y	N	Y	N	18 minutes
Y	N	Y	N	Y	N	Y	N	Y	N	Y	N	19 minutes
Y	N	Y	N	Y	N	Y	N	Y	N	Y	N	20 minutes

Total Duration of Transition: _____ (ex: 10 min 30 s)

Transition Observed: _____ (ex: math to circle time)

Total Number of Intervals Problem Behavior was Observed _____

Appendix C: Sample Fidelity Checklist

Observer _____ Teacher Observed _____
 Date _____ Transition Targeted _____

Circle yes or no to indicate if the teacher completed the step in the intervention. If a step is not necessary (i.e. the child did not need multiple attempts to receive a tag from the teacher) mark an "X" through the section. Once all steps are complete, divide the number of yes scores by the total number of items that were scored then multiply by 100 to receive the final percentage.

Lesson	Gave Lesson?	Success point	Gave Success point?	Sound for Correct Behavior?	Gave Child 3 Attempts?	Repeated Lesson after 3 attempts?
1) When the teacher calls your name, stand up behind chair	Yes	Stand Up	Yes	Yes	Yes	Yes
	No		No	No	No	No
2) Push in chair underneath desk	Yes	Push in chair	Yes	Yes	Yes	Yes
	No		No	No	No	No
3) Walk over to the blue tape by the door, behind your peers	Yes	Walk to tape	Yes	Yes	Yes	Yes
	No		No	No	No	No
4) Stand with feet on the tape	Yes	Stand at tape	Yes	Yes	Yes	Yes
	No		No	No	No	No
5) Walk single file to the lunch room	Yes	Walk to lunch	Yes	Yes	Yes	Yes
	No		No	No	No	No

Total number of yes scores _____

÷

Total number of items scored _____ = _____ X 100 = _____

Appendix D: Social Validity Questionnaire (Teacher Form)

Teacher: _____

Date: _____

This questionnaire consists of 14 items. For each item, you need to indicate the extent to which you agree or disagree with each statement. Please indicate your response to each item by circling one of the six responses to the right. (1= strongly disagree, 2= disagree, 3= neutral, 4= agree, 5= strongly agree)

Questions	Responses				
1. This intervention was appropriate for the behavior problems of my student	1	2	3	4	5
2. The intervention proved effective in changing the child's problem behavior.	1	2	3	4	5
3. I would suggest the use of this intervention to other teachers.	1	2	3	4	5
4. I would be willing to use this intervention again in the classroom setting.	1	2	3	4	5
5. The intervention would be appropriate intervention for a variety of children.	1	2	3	4	5
6. The intervention is consistent with those I have previously used in classroom settings	1	2	3	4	5
7. I like the procedures used in the intervention.	1	2	3	4	5
8. This intervention was a good way to handle this child's behavior problem	1	2	3	4	5
9. Overall, the intervention was beneficial for the child.	1	2	3	4	5
10. Soon after using the intervention, I noticed a positive change in the problem behavior.	1	2	3	4	5
11. Using the intervention improved the child's behavior in the classroom, but also in other settings	1	2	3	4	5
12. I am considering the use of the TAGteach with other students who have similar problem behaviors in my classroom.	1	2	3	4	5

13. The intervention proved effective in changing the child's transition skills.	1	2	3	4	5
14. Soon after using the intervention, I noticed a positive change in the child's transition skills.	1	2	3	4	5

Appendix E: Social Validity Questionnaire (Student Form)

1) Did you like the use of sounds to help you with transitions?

Yes / No

2) Do you think using sounds was helpful?

Yes / No

3) Do you think that the sounds improved your behavior during transitions?

Yes / No

4) Would you like to use sounds to help you do other things better?

Yes / No

Appendix F: Task Analyses

Quincy: Morning Arrival

Skill Set: Morning Arrival	Final Success Point: Read
1) Come in the door and shut the door behind you	Walk In
2) Take your binder out of your backpack and put it in the bin	Binder Away
3) Put your back pack in the tub	Backpack in Tub
4) Walk over to your seat and sit down	Sit at desk
5) Read quietly at your desk	Read

Quincy: Generalization Probe, Classroom to Lunch

Skill Set: Going to Lunch	Final Success Point: Walk to Lunch
1) Put all of your materials away	Materials Away
2) Sit at your desk with hands folded and a quiet mouth	Sit
3) When I call your name, stand up and push in your chair	Stand Up
4) Walk over to your place in line by the door	Walk to Door
5) Walk single file with a quiet mouth to the lunch line	Walk to Lunch

Jaden: Morning Arrival

Skill Set: Morning Arrival	Final Success Point: Read
1) Walk in the door	Walk In
2) Walk over to the cabinets and open your backpack	Go to cabinets
3) Remove your (<u>work that applies for that day</u>)	Take out _____
4) Put your backpack and jacket in the cabinet	Backpack away
5) Grab a pencil from the blue bin	Take a pencil
6) Walk over to your desk	Walk to desk
7) Sit down at your desk	Sit

Jaden: Generalization Probe, Specials to Classroom

Skill Set: Returning to class from specials	Final Success Point: Take out _____
1) Walk in the door quietly	Walk In
2) Walk directly to desk.	Walk to desk
3) sit down in chair.	Sit
4) make sure desk is cleared off and get ready to listen to directions.	Desk is clear.
5) have a pencil ready.	Pencil out.
6) Take out _____.	Takes out _____.

Samuel: Morning Arrival

Skill Set: Morning Arrival	Final Success Point: Sit Down
1) Take off your backpack and open it	Open Backpack
2) Take out your binder	Binder out
3) Choose a new book to put in your binder	Choose a book
4) Put your binder in the basket	Binder in basket
5) Choose a book for Daily 5	Daily 5 book
6) Take Sunshine Journal from table bucket (skip if journal is already on desk)	Grab Sunshine Journal
7) Walk over to your seat	Walk to seat
8) Sit down at your desk	Sit

Samuel: Generalization Probe; Science to Centers

Skill Set: Going to Centers	Final Success Point: Go to Center
1) Choose your job for the next day	Name next to job
2) Choose your first round of daily 5 for the next day	First card next to name
3) Choose your second round of daily 5 for the next day	Second card next to name
4) Choose your third round of daily 5 for the next day	Third card next to name
5) Places stick in desired center in pocket chart	Choose social center
6) Go to the center you chose	Go to center

Appendix G: Behavior Skills Training (BST) Checklist

PI will check off each step as it is completed during teacher training

Instructions:

PI will read the following instructions to the teacher:

“This device is called the sound machine. It emits a clicking sound when pressed, like this (instructor pushes button). A success point must first be determined prior to using the sound machine with your student. The success point is considered the point of success at which you will reinforce the appropriate transition behavior. Once the success point is determined you can use the sound machine as immediate feedback to notify the student that they have performed the skill correctly. We are going to play a game to introduce the sound machine to you, and similarly how you would introduce the sound machine to your student. I am going to read a passage. When I say the word (specific word determined during training) you will push the button on the sound machine. Only push it when I say this word and do not push for any other words. Any questions?”

The PI will explain that the word that is clicked is the success point and this indicates that the word is “correct.”

_____ Instructions have been read to the teacher

_____ Questions from the teacher are addressed

Modeling:

PI will model how to deliver the sound after the success point.

_____ Success point word has been determined with teacher

_____ Teacher has been instructed to read the passage

_____ PI pushed the button on the machine when the success point was read

Rehearsal:

The teacher will then switch roles with the PI and reinforces the success point

_____ PI reads the passage

_____ Teacher delivers sound for the success point

_____ PI gives the teacher descriptive feedback

_____ Teacher has at least 3 opportunities to reinforce the success point

_____ Teacher has achieved 100% mastery criterion on 3 consecutive trials

Feedback:

_____ After 3 trials of correctly reinforcing the success point, the PI has given descriptive feedback to the teacher

Appendix H: Teacher Script to Student

"This is a sound machine. It makes a sound when I push the button. This will help you learn how to do things. First, I will tell you what I want you to do which is called a success point. I will make the sound (pushes the button) once you have done the success point. If I do not push the button, don't worry, that just means to keep trying. If after a few tries you do not hear a sound that means I will teach you again how to do it. Do you understand how the sound machine works? Do you have any questions? (address questions as needed) OK, now I want you to pick the sound that you like the best, and that will be the sound we will use for the next few weeks. Ready? Listen." (Allow student to listen to each sound. If they request to hear again, play the sounds again. Remember which sound the student wants to use so the PI can put it on the sound machine for you).

"Now, we're going to play a game. I have a short story I want you to read. I am going to pick a word that is in the story before you read it. Anytime you say that word, I am going to push the button on the sound machine. Ok ready? We are going to push the button for the word "sleep/sleeping". Ok, start reading.

Passage:

Barry the bat was just three months old. Sometimes when Barry was sleeping snug upside down in his cave he would wake up suddenly and get afraid of the light. Whenever he became frightened like this, he'd give out a short chirp. Mom would come flying over right away, using her sonar to avoid bumping into all the walls of the cave. "Honey, are you all right?" she asked in her lovely high-pitched voice. "Well, I suddenly woke up, and I'm sort of afraid of the light," replied Barry. "Afraid of the light? You don't need to be afraid of the light. Here, why don't we move you over to a darker part of the cave, so that you can feel a little safer." "But mom, can you leave the darkness on all night," chirped Barry. "If I need to get up to go to the bathroom, I don't want it to be all scary and light." "Sure, honey, I'll leave the darkness on all night. That way, if you need to go to the bathroom you can find your way easily by using your sonar." "Thanks Mom. Can you give me a hug before going to sleep?" "Why certainly, I'll give you a hug before going to sleep - - - so long as you immediately hang upside down and go to sleep." You know, I'm feeling so tired that I could just hang upside down and fall right asleep myself. Goodnight honey- bunch." "Goodnight, Mom," chirped Barry as his upside down head swayed off to sleep.

"Great Job! Now let's switch places. I'll read the story, and I want you to push the button for the word 'Mom'. (read the same passage).

"Awesome job!! That's how we use the sound machine! Now, we are going to use it for real."

(go on to describe the lesson and success point of the transition.)