4-12-2014

The Combined Effects of Picture Activity Schedules and Extinction Plus Differential Reinforcement on Problem Behavior During Transitions

Jessica Hurdelbrink
Western Michigan University, jessicahurdelbrink@gmail.com

Follow this and additional works at: https://scholarworks.wmich.edu/honors_theses

Part of the Applied Behavior Analysis Commons

Recommended Citation

The Combined Effects of Picture Activity Schedules and Extinction Plus Differential

Reinforcement on Problem Behavior During Transitions

Jessica Hurdelbrink

Western Michigan University

Undergraduate Thesis

April 25, 2014

Abstract

To decrease problem behaviors and increase compliance during transitions, a treatment package consisting of a picture activity schedule combined with extinction and differential reinforcement of other behavior was implemented. The study consisted of baseline and the intervention. Based on previous studies involving picture activity schedules, Gina Cross wrote the protocol for the teaching of the activity schedule and the transition protocol. The teaching protocol was made up of four stages of most-to-least prompting, and involved teaching the child to move the picture icon to the bottom of the schedule independently. The transition protocol gave instructions on how the tutor and staff were to implement the picture activity schedule during transitions, including prompts and correction procedures. Correction used when the child did not comply during the transition included of repeating the prompt, extra learning opportunities, and the removal of attention. The study contributes to the child's future by increasing compliance and decreasing problem behaviors during transitions. It also adds to the knowledge of gaining compliance in the field of behavior analysis.   Using the intervention package, a four year old female diagnosed with autism showed a slight decrease in problem behaviors during transitions. Future studies may add to these results by utilizing the procedures with other participants.

The Combined Effects of Picture Activity Schedules and Extinction Plus Differential

Reinforcement on Problem Behavior During Transitions

Numerous studies have supported the use of visual stimuli, such as photographs, lines,

words, and symbols, as an effective prompt for children with autism (Bryan & Gast, 2000).

Picture activity schedules, "sequences of visual prompts to communicate what and how much

work is to be completed," are one technique that utilizes visual prompts to increase independence

and compliance (Bryan & Gast, 2000, pp. 554). Studies have found that children with autism

may be inconsistent and unfocused during activities and engage in problem behaviors during

transitions, and the use of a picture activity schedule may increase consistency and appropriate

behaviors (Bryan & Gast, 2000, pp. 554). Problem behavior is often evident during transitions,

especially during transitions from areas that are highly preferred to areas that are low or

moderately preferred.

Children may encounter numerous transitions daily. By increasing compliance during

transitions, the child may receive more learning opportunities, and their compliance may also

increase the quality of interactions they have with others. The purpose of this project is to

increase compliance during transitions and decrease problem behaviors by using a picture

activity schedule and extinction plus differential reinforcement on problem behaviors during

transitions.

There have been multiple studies that aim to decrease problem behaviors during

transitions using picture activity schedules, and this literature extends to typically developing

individuals and to children diagnosed with autism. A study by Pierce and Schreibman (1994)

provides data to support the effectiveness and generalization of picture activity schedules. In the

study, the researchers taught three children a sequence of daily living activities, some including

making the bed, setting the table, and getting dressed, by using a visual schedule. When the picture activity schedule was implemented, problem behavior decreased significantly, and on-task behavior increased drastically compared to baseline (Pierce & Schreibman, 1994). Generalization was shown by children responding correctly to novel orders of the images. The study by MacDuff, Krantz, and McClannahan (1996) also produced similar results. The combination of a picture activity schedule with extinction and differential reinforcement on problem behavior was also used in the 2009 study conducted by Waters, Lerman, and Hovanetz. The data indicates that extinction and differential reinforcement of other behaviors was successful in decreasing problem behavior (Waters, Lerman, & Hovanetz, 2009). These results suggest that a picture activity schedule alone would be ineffective, but using it in conjunction with extinction and differential reinforcement on problem behavior may significantly decrease problem behavior during transitions (Waters, Lerman, & Hovanetz, 2009).

Based on the results of this literature, visual activity schedules combined with extinction and differential reinforcement on problem behavior may be effective in increasing compliance during transitions, while also generalizing to new schedules. This study aims to decrease problem behavior during the transitions of a preschool child diagnosed with autism who demonstrates a high frequency of problem behaviors.

Method

Participants

The participant in the study was one four year old female with a diagnosis of Autism Spectrum Disorder. She was enrolled in an early childhood special education classroom, which was the setting the study took place, as well as an inclusion criterion. Additional inclusion criteria include the participant demonstrated a significant amount of problem behavior (such as

kicking, hitting, crying, screaming, eloping, or flopping to the floor) during transitions and was approximately the same age as the other children in the classroom. Exclusion criterion include not having demonstrated significant problem behavior during transitions, not enrolled in the early childhood special education classroom, or being older or younger than the average age of children in the classroom.

The inclusion and exclusion criteria were established in order to select a participant who would most likely benefit substantially from the implementation of a picture activity schedule during transitions. The criteria of having a diagnosis and age that is similar to children enrolled on the classroom was set in order to allow for generalization of the study beyond the benefit for the participant involved. The participant involved in the study was selected because she met the criteria described and did not meet any of the exclusion criteria. She was also referred for the study by supervisors in the early childhood special education classroom who recognized her notably frequent problem behaviors during transitions.

Design

The study utilized an AB design, consisting of baseline and the intervention. The independent variable was the picture activity schedule plus differential reinforcement on alternative behavior during transitions. The schedule was presented during transitions from one location to another location. The dependent variable was the duration (in minutes) of problem behaviors during transitions. The study involves teaching the child to use a picture activity schedule during transitions from one location to another location, usually from highly preferred to less preferred. The treatment package was made up of two different protocols that were used simultaneously. The transition protocol made up how the picture activity schedule was to be

implemented during transitions, while the picture activity schedule protocol stated how the icons

on the schedule were to be moved. The picture activity protocol consisted of four phases.

During the baseline phase, data was collected on transitions in which problem behaviors

occurred. The tutor recorded the beginning location and the ending location of the transition,

what problem behaviors occurred, and the consequence of the problem behaviors (for instance,

tangible, attention, or ignoring). During the intervention, the tutors used the two protocols

simultaneously and recorded data on if the trial was correct (no problem behaviors seen), the

time of day, duration of problem behavior, ending location, if child ran away from the

tutor/booth, consequence and behaviors exhibited.

Setting and Materials

This study took place at WoodsEdge Learning Center in a special education classroom

with discrete trial training. The setting also extended to the child's booth, bathroom, the

common area (featuring various play equipment), and the reinforcer room. The classroom and

transition locations were areas the child was already familiar with prior to the study. The child's

booth is separated from other booths in the classroom by a divider and is a small area containing

one table and two chairs. The bathroom is located across the classroom and contains two toilets,

two sinks, soap, and paper towel dispensers. The common area is made up of a large castle play

structure, a ramp, a large wooden sailboat, bikes, scooters, and other various toys, and the

reinforcer room is a small storage room connecting to the common area which houses rows of

toys for the children to select each morning and afternoon as reinforcers for the day.

Materials utilized in the study include a picture activity schedule which was made up of a

laminated manila folder (5 by 7 inches) with six Velcro strips: three small Velcro squares on the

top section, and three small Velcro squares on the bottom section. The bottom of the schedule

was green and had the word "finished" written on it. Other materials include icons

(approximately 2 by 2 inches) of different transition locations. The icons were made up of the

picture of the activity or location and the word of the location or activity above the picture. They

were laminated and contained a small square Velcro backing. Additional materials include data

sheets, stopwatch timer, and tangibles that are highly preferred by the child.

Procedures

The procedure for using a picture activity schedule during transitions was broken into

two separate, but related protocols: the transition procedure and the teaching of the activity

schedule procedure.   The protocols were implemented and data was collected five days a week

during every transition. The transition procedure consisted of one phase. Before every

transition, the tutor made eye contact with the student and presented the activity schedule prior to

each transition. The tutor said, "First, _____," while pairing each location with an icon. If the

child transitioned within five seconds, social praise was given and the child was given access to a

highly preferred reinforcer for one minute. However, if the child did not transition within five

seconds, the tutor gave a gestural prompt and repeated, "First, _____." If the child transitioned

within five seconds after the gestural prompt, the child was given social praise and access to a

reinforcer for thirty seconds. In the instance that the child did not transition after the gestural

prompt within five seconds, the tutor gave the child extra learning opportunities (ELOs) such as

"high five" or "touch nose" and then repeated the gestural prompt and "First, _____." If the

child transitioned within five seconds of the second gestural prompt, the tutor gave the child

access to a reinforcer for fifteen seconds along with social praise. However, if the child still did

not comply with the transition, the gestural prompt is repeated for the third time along with

"First, _____." After five minutes of problem behaviors and noncompliance, a tutor called over

a supervisor to guide the child to the desired location. For data collection, tutors recorded a plus

(+) when the child transitioned and demonstrated no problem behaviors at any time during the

transition. A minus (-) was recorded when the child exhibited problem behaviors at any time

during the transition or demonstrated noncompliance.

The procedure for teaching the picture activity schedule was made up of four phases.

During phase one, two icons are placed on the activity schedule. Once the activity was

completed, the tutor pointed to the first activity's picture icon and says, "_____ is all done."

The tutor then full physically prompted (hand over hand) the child to move the icon to the

bottom of the activity schedule labeled "done." After the icon was moved to the bottom of the

schedule, the tutor pointed to the second icon and said, "First, _____." The tutor implemented

the same procedure that was used for the first icon when the second activity is complete. If the

child did not resist the full physical prompt, a plus (+) is recorded on the data sheet. For all

phases, if a response was correct and a plus was recorded, the child was given social praise and a

highly preferred tangible for the duration indicated on the transition protocol. If the child

resisted the prompt, a minus (-) was recorded on the data sheet and the tutor continued full

physically prompting followed by "good" in a neutral tone. When both icons were moved to the

"done" section, the tutor selected two new icons to put on the picture activity schedule. Each

icon was considered one trial and all the trials for the day were recorded in one column on the

data sheet.

In Phase two partial physical prompting (at the child's elbow) was used instead of the full

physical prompt.   A correct response was recorded when the child did not resist the partial

physical prompt and moved the icon. An incorrect response was recorded when the child

resisted the prompt and/or did not move the icon to the "done" section of the activity schedule.

For phases one and two the criteria for change was five consecutive sessions at eighty percent or greater.

In phase three, the tutor pointed to the icon of the activity the child had just competed and said, "_____ is all done." Afterwards, the tutor used a gestural prompt by pointing to the "done" section. After the child moved the first icon, the tutor pointed to the second icon and said, "First, _____." A correct response was recorded if the child moved the icon to the "done" section. An incorrect response was recorded if the child did not complete the action of moving the icon to the bottom "done" section on the picture activity schedule. The tutor corrected an incorrect response by giving a partial physical prompt. A full physical prompt was used if needed to get the child to move the icon from the top of the activity schedule to the bottom. The tutor finished by saying "good" in a neutral voice.

Phase four is the phase in which the child should complete all steps independently without prompts. In this phase, the tutor did not point to the icon before saying "_____ is all done." The tutor also did not give a gestural prompt for the child to move the icon to the "done" section, but did point to the second icon when saying "First, _____." The other difference was in the correction procedure. When a child made an incorrect response, the tutor gave a gestural prompt followed by a partial physical and full physical prompt as needed followed by a neutral "good." The criteria for change in phases three and four were ten consecutive sessions at or above eighty percent.

These two procedures were used throughout the child's school day. The child was presented with the picture activity schedule during all of her transitions at the school, from when

she stepped off the bus to when she went home. It was not included in her written schedule for the day but was naturally implemented during daily transitions.

Results

The hypothesis was that the use of a picture activity schedule combined with extinction and differential reinforcement on problem behavior would decrease problem behaviors and increase compliance during transitions. This was supported by our data, but not significantly. Prior to the intervention, the duration of problem behaviors during transitions were variable, ranging from zero to fifteen minutes, with the average being 4.64 minutes over the course of 26 occurrences. When the intervention of the treatment package was implemented, the duration of problem behaviors spiked to 30 minutes and then decreased significantly, with an average duration of 3.37 minutes of problem behavior per transition. The data for the intervention consisted of 109 transitions. Figure one shows the duration in minutes that problem behavior occurred for each transition occasion. Obvious variation can be seen throughout the graph. A steadier trend of low durations of problem behaviors is seen in points 42 through 46, followed by significant variability in problem behaviors in points 83 through 109. For the activity schedule protocol, the participant was probed ahead to phase three after she demonstrated independent responses while moving the icon to the "done" section on the picture activity schedule. At the end of the study, she was still on phase three and reliably moving the icon to the bottom of the schedule with only a gestural prompt.

It was also predicted that the use of the treatment package would have an effect on compliance and on-task behaviors in the booth, since instructional time would increase as problem behaviors decreased. Figure 2 shows the percentage of instructional sessions coded as "off task." During baseline, the average of sessions coded as off task was 7.92%. Week 9 shows

the percentage of sessions coded as off task the first week after the intervention was

implemented. The average percentage of off task codes during the intervention was 26.19%.

The data shows that the prediction that the percentage of off task codes would decrease was not

supported.

Duration of Problem Behavior
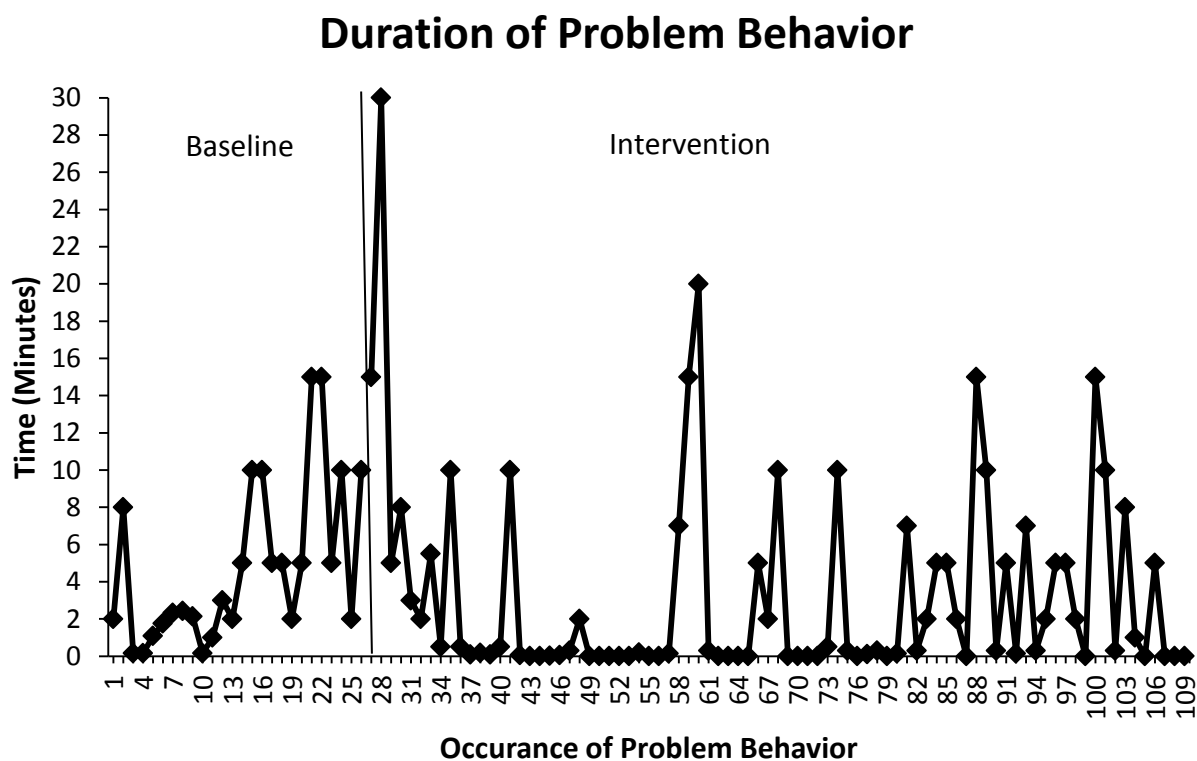
Figure 1. Duration of problem behavior. This graph represents the duration (in minutes) of

problem behaviors during transitions.

Percentage of Off Task Codes
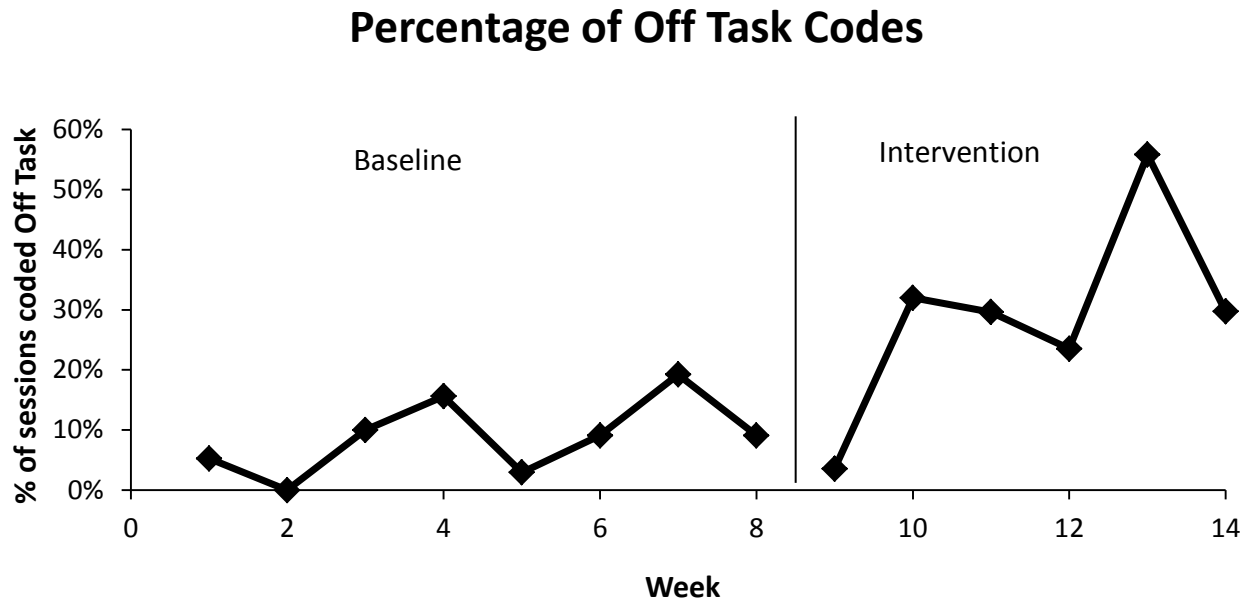
Figure 2. Percentage of off task codes. This graph represents the percentage of instructional

codes that were coded "OT" for "off task" due to problem behaviors.

Discussion

Our theory was that the implementation of the picture activity schedule plus differential

reinforcement on problem behaviors during transitions would increase compliance during

transitions and decrease problem behaviors in both duration (in minutes) and in intensity. This

was correct because the use of the activity schedule did decrease the duration of problem

behaviors during transitions. However, the data was variable and did not show the significant

decrease that was predicted. Furthermore, the theory that increased compliance during

transitions would lead to more instructional control and decreased procedures coded as off task

was found to be incorrect, as the number of off task codes increased during the intervention

phase.

The results obtained were due to many confounding variables that were out of the control

of the researchers. One significant variable was the rules of the special education classroom where the study took place. The transition protocol called for a supervisor or TA to guide the child after the steps were repeated for a total of 5 minutes and compliance was not acquired. However, if the child had flopped to the floor, the supervisors and tutors were not allowed to pick the student up. Therefore, they were not allowed to physically guide the child to the desired location by carrying her. Additionally, it was common for children to be enticed with tangibles to the desired location if a child elopes or flops to the floor. Due to classroom policy, there were some instances when the staff and/or supervisors were unaware of the child's unique protocol, or they failed to implement the protocol precisely and enticement was used. The sharp increase in problem behaviors immediately after the intervention was implemented can be contributed to extinction burst. This is most likely the case because there was a sharp increase in problem behaviors followed by a decrease in the duration of problem behaviors during transitions. The variability in the middle and end of the data, however, may have been influenced by the unclear protocol and misunderstandings or unawareness.

Other extraneous variables were the high turnover rate of tutors and the school schedule. Shortly after the intervention was implemented, the school had an extended break and two new tutors were assigned to work with the participant. While training occurred multiple times for all tutors, the procedure may have had different results if there were only one or two consistent tutors throughout the entire intervention and baseline. This may account for the disproven theory that the implementation of the picture activity schedule would result in decreased problem behaviors during transitions and result in increased instructional time and less procedures coded out as "off task." Due to the high turnover of tutors, the increase in the number of procedures coded as off task may not be related to the duration of problem behaviors during transitions.

While it was predicted that the intervention package would increase compliance during transitions and that the compliance would transfer to increased instructional time, comparing the off task data from baseline to intervention may be misleading. Data from the intervention was taken primarily after an extended break from school, so problem behaviors and compliance issues may have been influenced by those factors.   For the off task data, points 10 through 14 shows the percentage of coded out procedures after the extended break from school and the beginning of new tutors.

Several discrepancies also may have influenced the data from not showing the effectiveness of the activity schedule as suggested in literature reviews. During treatment integrity checks, it was noted that there were some discrepancies with the prompt used. For example, "Let's go play in the booth" was used a couple times instead of the standard "First, ____." The reinforcement protocol was also not always implemented the same throughout tutors. One tutor gave the child a preferred tangible while she recorded data but did not interact as frequently as another tutor. Instances such as these may have influenced the effectiveness of the intervention package and the results obtained. Inadequate or unclear training from the researchers may have contributed to the errors such as deviation from the protocol in the usage of the schedule. This is plausible because a supervisor was also confused on the wording of the protocol at one point. These errors may have led to inconsistency in the presentation of the intervention and/or errors in recording data. For instance, the transition protocol indicated that the tutor should give extra learning opportunities until compliance was gained, but it did not suggest what a tutor should do if he or she could not gain compliance from the child. Additionally, the data sheet for the intervention (seen in appendix B) asked if the child ran away from the tutor or booth. This caused some instances of tutors recording problem behaviors due

to eloping the booth and not strictly during transitions. This was caught a majority of the time by the researchers, but some data may have been influenced by this as well. Future studies should make the protocol more clear to ensure proper implementation.

Some changes that may have increased the effectiveness would be more consistent training for the tutors, classroom staff, and supervisors. A combination of interobserver agreement and treatment integrity checks would also have benefitted the study. We primarily conducted treatment integrity checks consistently on the same day. However, if we were to have the checks on random days and more discretely, we may have obtained a more accurate picture of how the protocol was implemented by the tutors.

While our results showed only a slight decrease in the duration of problem behaviors during the intervention, the literature on picture activity schedules show a significant decrease in problem behaviors. This is significant to the classroom because there are several children who have compliance issues during transitions who may benefit from the usage of a picture activity schedule combined with extinction and differential reinforcement of problem behaviors. By making the protocol more clear, another study may find more significant results. This study is significant to the field because, although the results are somewhat variable, the data does show that the use of the picture activity schedule combined with extinction and differential reinforcement of problem behaviors had an effect on the duration of problem behaviors. It also adds to the field by supporting the use of picture activity schedules to increase compliance. Problem behaviors decreased from baseline by an average of 1.27 minutes per transition. Even a slight decrease in the duration of problem behaviors during transitions has the ability to improve compliance and learning opportunities for the participant involved.

Possible replications include using different icons for novel locations and including more

participants who demonstrate various levels of problem behaviors. This will add more empirical

support to the data that suggests that the usage of the treatment package decreases problem

behaviors during transitions.

References

Bryan, L. C., & Gast, D. L. (2000). Teaching on-task and on-schedule behaviors to high-

    functioning children with autism via picture activity schedules. *Journal of Autism and*

    Developmental Disorders, 30(6), 553-

    567.doi:http://dx.doi.org/10.1023/A:1005687310346

MacDuff, G. S., Krantz, P. J., & McClannahan, L. E. (1993). Teaching children with autism to

    use photographic activity schedules: Maintenance and generalization of complex

    response chains. *Journal of Applied Behavior Analysis, 26*(1), 89-97. Retrieved from

    http://search.proquest.com/docview/618312112?accountid=15099

Pierce, K. L., & Schreibman, L. (1994). Teaching daily living skills to children with autism in

    unsupervised settings through pictorial self-management. *Journal of Applied Behavior*

    Analysis, 27(3), 471-481. Retrieved from

    http://search.proquest.com/docview/618601917?accountid=15099

Waters, M. B., Lerman, D. C., & Hovanetz, A. N. (2009). Separate and combined effects of

    visual schedules and extinction plus differential reinforcement on problem behavior

    occasioned by transitions. *Journal of Applied Behavior Analysis, 42*(2), 309-313.

    doi:http://dx.doi.org/10.1901/jaba.2009.42-309

Appendix A

Duration/Intensity Data Sheet

Purpose: This sheet will be used to measure the amount of time the student engages in tantrum behavior during transitions from activity to another throughout the day. *Please take data from the time of arrival to the time of departure.*

Location Key: BA=Bathroom, CA=Common Area, B=Bus, BO=Booth

Behavior Key: K=Kicking, S=Screaming, C=Crying, TO=Throwing objects, H=Hitting

Consequence key: ELO=Extra Learning Opportunities, A=Attention, T=Tangible, I=Ignore

Date: Tutor Initials: Time:	Amount of time that has elapsed (seconds)	Ending Location	What was the consequence for problem behavior?	Behaviors exhibited by child during tantrum (after child falls to the floor)
		BA CA B BO	ELO A T I	K S C TO H
				Other:
Date: Tutor Initials: Time:		BA CA B BO	ELO A T I	K S C TO H
				Other:

Figure 1A. Baseline data sheet. This data sheet was used by the tutors before the intervention was implemented to record the duration of problem behaviors, ending location, and behaviors exhibited by the child.

Appendix B

Transition/ Picture Activity Schedule Data Sheet

Purpose: This sheet will be used to measure the amount of time the student engages in tantrum behavior during transitions from activity to another throughout the day. *Please take data from the time of arrival to the time of departure. Circle plus or minus if the transition was successful (see protocol for criteria)*

Location Key: BA=Bathroom, CA=Common Area, B=Bus, BO=Booth, L=Lunch

Behavior Key: K=Kicking, S=Screaming, C=Crying, TO=Throwing objects, H=Hitting

Consequence key: ELO=Extra Learning Opportunities, A=Attention, T=Tangible, I=Ignore

	Amount of time that has elapsed (seconds)	Ending Location	Did the child run away from the tutor/booth?	What was the consequence for problem behavior?	Behaviors exhibited by child during tantrum (after child falls to the floor)
Date: Tutor Initials: Time: _____ Trial: + -		BA CA B BO L	YES NO	ELO A T I	K S C TO H
Date: Tutor Initials: Time: _____ Trial: + -		BA CA B BO L	YES NO	ELO A T I	K S C TO H

Figure 1B. Intervention data sheet. This data sheet was used by the tutors to record if the trial was correct, duration of problem behavior, ending location, and the behaviors exhibited by the child.

Appendix C

Treatment Integrity Checklist: Picture Activity Schedule

Data: Put a Y if staff correctly completed a step; a N if staff did not complete a step; and NA
if you don't know or if recording was not applicable
Training: Do until consultant says to stop

Integrity code			Student	Staff	Prep
Y	N	NA	(in room)	Place activity schedule on table or in front of student	
Y	N	NA	(in room)	Eye level to student	
Y	N	NA	Sitting/standing by tutor	Tutor says "First _____."	Teaching Procedures
Y	N	NA	Walks to new location	Gives child tangible reinforcer and/or social praise for 1 minute	
			No problem behaviors	Mark a + on data sheet and remove icon from schedule	
Y	N	NA	**Doesn't transition**	Tutor gives gestural prompt, holding up schedule and pointing to icon	Correction
Y	N	NA	**within 5 seconds**	Repeat "First _____."	
Y	N	NA	Transitions within 5 sec.	Gives child tangible reinforcer and/or social praise for 45 seconds	
Y	N	NA	Doesn't transition within	Gives ELO (Extra learning opportunity; "touch nose," "high-five," etc.)	
Y	N	NA	3 seconds of prompt	Repeat gestural prompt	
Y	N	NA	Doesn't transition	Call over supervisor to guide child back to booth	
			for 2+ minutes	Mark incorrect response on sheet	
Treatment Integrity				Y/Y+N* 100 =	
				Reinforce behavior with 1 piece of an edible, provide social praise, or a	
				preferred leisure item mark a + on data sheet; trial complete	

Figure 1C. Treatment integrity checklist. This is the checklist used during observation and

treatment integrity checks.