TRAINING PARENTS OF CHILDREN WITH AUTISM SPECTRUM DISORDER TO SYSTEMATICALLY ASSESS AND USE THEIR CHILD'S HIGHLY PREFERRED ITEMS TO BOTH CUE AND REINFORCE DESIRED BEHAVIOR RESPONSES IN COMMUNITY SETTINGS

by

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Presented to the Faculty of the Graduate School of
The University of Texas at Arlington in Partial Fulfillment
of the Requirements
for the Degree of

MASTER OF SCIENCE IN PSYCHOLOGY

THE UNIVERSITY OF TEXAS AT ARLINGTON
AUGUST 2009

ACKNOWLEDGEMENTS

First, I would like to thank my Faculty Mentor and Thesis Committee Chairman, James Kopp, Ph.D., B.C.B.A, for his guidance and encouragement throughout this endeavor. Special thanks are also extended to Rebecca Morgan, M.S., BCBA, Carrie Greer, M.S., BCBA, Kecia Adams-Wright, M.Ed., BCBA, Julie Griffith, M.S., BCBA, and Jessie Whitesides, B.S. of the DFW Center for Autism in Grapevine, Texas for the supervision and direction they have provided me within the field of Applied Behavior Analysis (ABA). I would also like to acknowledge the help of my Committee Members, Jared Kenworthy and Rebecca Morgan, and thank them for their invaluable contributions.

My family, friends and peers have provided me with such support and kindness over the past two years, and for that I am very appreciative. I would especially like to thank my dad, Eugene Shirley, who displayed a sincere interest in this project throughout its entirety. I would also like to thank my mother-in-law, Royce Ann Wiggins, for all of her technical support. Lastly, I would like to thank my husband, Rick. I am so very grateful, not only for your patience, but also for your support and encouragement.

July 16, 2009

ABSTRACT

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The current study assessed the effectiveness of a training procedure used to teach parents to conduct a preference assessment and use the most highly preferred items to guide the behavior choices of their child with autism spectrum disorder (ASD) who display undesirable behaviors when in community settings. The participants were one parent and a child with ASD from three different families. The child had been observed to display undesirable behaviors in at least two community settings prior to the intervention. An A-B-A-B reversal design was used in which the duration of continual desired behaviors was the dependent (outcome) variable. The study examined a procedure involving DRI and DRA. The results were that all three children reached their treatment goal in two community settings, each for two consecutive sessions. This outcome was taken to validate the parents' assessment of their child's highly preferred items and their utility in reducing the frequency of the child's undesirable behaviors. Brief reversals of contingencies were used to demonstrate experimental control of the intervention procedures.

TABLE OF CONTENTS

LIST OF ILLUSTRATIONS

Figure Page

LIST OF TABLES

CHAPTER 1

INTRODUCTION

Research indicates that lifelong specialized services required for most people with an autism spectrum disorder (ASD) will cost upwards of $4 million in the absence of effective early intervention (Jacobson, Mulick, & Green, 1998). Effective early intervention can greatly reduce that cost by reducing the need for specialized services later. However, millions of dollars are spent annually on ASD interventions that have little or no empirically supported efficacy. Findings show that for early intervention to be effective, it must meet five essential criteria: it must be 1) comprehensive, 2) intensive, 3) extended over time, 4) individualized, and 5) delivered directly to children (Guralnick, 1998; Ramey & Ramey, 1998). Intensive early interventions that utilize the principles and methods of applied behavior analysis (ABA) meet these five criteria and can produce substantial benefits for children with autism (Anderson et al., 1987; Birnbrauer & Leach, 1993; Fenske et al., 1985; Lovaas, 1987; McEachin, Smith, & Lovaas, 1993).

Jacobson, Mulick, and Green (1998) found that ABA produced the best outcomes if it was used year round, was begun prior to the child reaching the ageof six, and included a minimum of 30 hours per week for two to three years. In fact, 47 percent of children who received 40 hours a week of ABA were later able to function independently and successfully in regular classrooms (Lovaas, 1987; McEachin, Smith, & Lovaas, 1993). Of the remaining children, around 40 percent made substantial improvements, yet still required some specialized intervention. Only around 10 percent of children made minimal gains and required continued intensive intervention.

Research analyzing the estimated ABA financial costs and benefits based on

information from the state of Pennsylvania (Jacobson, Mulick, & Green, 1998) indicates that high-quality ABA is likely to result in a great pay off for the various systems that provide services to individuals with ASD. Estimates of overall average savings range from $1 million to over $2 million per individual over his or her lifespan. Thus, ABA is financially beneficial to society as a whole, since taxpayers would otherwise absorb the costs. However, families of those who have a child receiving ABA services still must absorb a financial burden of $50,000 or more per year. Many of these families resort to mortgaging their homes and utilizing funding to pay for therapy that would otherwise go toward the education of their unaffected children (Autism Speaks, 2007).

In the last few years, the number of insurance companies providing coverage for behavior analytic treatment has increased, with some insurance plans providing full coverage for ABA services (Texas Legislature Online, n.d.). However, not all insurance companies provide full or partial coverage of ABA services. Therefore, families with only partial treatment coverage or those who are not insured for behavioral treatment still incur substantial treatment costs for ABA services. Since ABA is currently the only empirically based treatment that meets the criteria for effective early intervention (Op. cit.), parents are faced with the dilemma of providing their child with a beneficial treatment at a cost that can be difficult to afford.

The cost of ABA would be reduced by having family members of children with ASD implement the ABA programs. Making ABA more affordable would potentially increase the likelihood of children with ASD receiving this beneficial treatment. Anyone who is adequately trained in the practice of ABA and is under direct supervision of a Board Certified Behavior Analyst (BCBA) (Behavior Analyst Certification Board [BACB], n.d.) can provide this beneficial treatment. Additionally, research indicates that training parents of children with ASD to provide their children's ABA treatment can be quite

successful (e.g. Lafasakis & Sturmey, 2007; Love, Watson, & West, 1990; Phaneuf & McIntyre, 2007).

The use of positive reinforcement to elicit behavior change requires careful attention to reinforcer quality. Mason, McGee, Farmer-Dougan, and Risley (1989) found that the use of the items selected through systematic assessment to reinforce appropriate behaviors virtually eliminated nontargeted problem behaviors, such as self-injurious (e.g., eye poking & hand biting), self-stimulatory (e.g., hand flapping & noises), and aggressive behaviors. Baseline levels of problem behaviors of three children ranged from 44 percent to 63 percent and dropped to a range of 1 percent to 7 percent when a daily reinforcer assessment was incorporated into the children's treatment day.

The use of individualized reinforcement was greatly expanded when the value of various sensory events as reinforcing stimuli was discovered (Bailey & Meyerson, 1969; Ferrari & Harris, 1981; Rincover & Newsom, 1985; Rincover, Newsom, Lovaas, & Koegel, 1977). For instance, Ferrari & Harris (1981) found that contemporary music, a globe light, and a back massager increased rates of responding. Assessment of sensory preferences to identify reinforcers prior to the actual intervention resulted in more accurate reinforcer selection when compared with preference predictions based on casual observations (Green et al., 1988). In the Green et al. study, items that were identified through a preference assessment typically functioned as reinforcers whereas the items reported as preferred items by caregivers did not function as reinforcers, unless they were also found to be preferred during a preference assessment. Additionally, Farmer-Dougan and McGee (1986) found that children's preferences vary across sessions and teachers, indicating the need for a practical reinforcer assessment package that encompasses a presession mini-assessment (Mason, McGee, Farmer-Dougan, & Risley, 1989). When Farmer-Dougan and McGee (1986) used a time-efficient presession

mini-assessment, there were only four instances out of 49 in which the children selected the same array of items. These results provide support for the need to frequently assess preferences in order to prevent satiation and account for idiosyncratic preferences across time.

Once highly preferred items have been identified through a preference assessment, it is important to determine an appropriate method of reinforcement delivery based on the target behaviors. In situations where a child is required to interact with his or her environment by engaging in a specific set of behaviors, offering choices of highly preferred items immediately following the child's engagement in the set of behaviors can be an effective means of reinforcement delivery. Although, when the child is limited in the number of appropriate behaviors to engage in, as a result of his or her environment, then the items from the preference assessment that were found to be highly preferred to the child have the potential of being effectively used as both the item that the child engages with (the child's engagement with the item being an appropriate behavior or set of behaviors) and the reinforcer for choosing to engage in desirable behaviors. When a child goes into a store, there is typically very little within the store that provides a child appropriate stimulation that will sustain desirable behavior for any extended period of time. However, the parent goes into a store with a purpose that involves interaction with the store's environment. Also, when a child is taken to a restaurant, he or she may not spend the entire time eating or may not eat while in the restaurant due to being on a special diet or being limited in the types of foods that he or she will eat. Therefore the child ends up in a similar situation as he or she would be in a store, being limited in appropriate behaviors to engage in. It would be interesting to determine, when a setting is not directly conducive to a child with ASD's appropriate behaviors, if offering the highly preferred items would serve as the discriminative stimulus and reinforcement for

engaging in desirable behavior to the exclusion of undesirable behavior.

In a setting where a child is required to engage in a specific set of behaviors that are incompatible with undesirable behavior, the technique known as differential reinforcement of incompatible behaviors (DRI) would be the method of reinforcement delivery; reinforcement of a behavior or set of behaviors that cannot occur simultaneously with the undesirable behaviors (Cooper, Heron, Heward, 2007). For instance, to reduce the occurrence of a child laying on the floor, one could reinforce instances of sitting upright in a chair because it would be a behavior that cannot occur simultaneously with laying on the floor. When a child is limited in the number of appropriate behaviors to engage in, as a result of his or her environment, then items extrinsic from the environment can be brought in to increase the opportunities to make desirable behavior choices. The reinforcement of desirable behaviors such as these is known as differential reinforcement of alternative behaviors (DRA) where alternatives to the undesirable behaviors are being reinforced. With DRA, alternative behaviors are occupying the time that undesirable behavior would ordinarily use. An example of DRA would be a child being reinforced for playing with toys within a setting where screaming usually occurs. The various different forms of differential reinforcement are among the most effective, widely known, and commonly used techniques used to reduce undesirable behavior.

It is not uncommon for children with ASD to engage in undesirable behaviors in various settings outside of the home. The possibility of the child engaging in undesirable behaviors can prevent families from taking children with ASD into public settings. This can prevent the child from becoming socially integrated and lead to isolation for the child (Carr & Carlson, 1993) and other family members as well.

Community-based interventions designed to reduce undesirable behavior in children with disabilities has proven successful, but research on the topic is quite limited

(i.e., Carr & Carlson, 1993; Koegel, Koegel, Hurley, & Frea, 1992). Carr & Carlson (1993) used a multicomponent approach to reduce the undesirable behavior in shopping settings in three participants ranging in age from 16 to 18 years of age by teaching them shopping skills. Koegel Koegel, Hurley, and Frea's (1992) study consisted of a self-management intervention method teaching children with ASD to appropriately respond to questions asked of them in the home, school, and other community settings, as opposed to engaging in undesirable behavior. There is no research however, that examines the effect of a treatment method across multiple community settings for children with ASD who engage in undesirable behaviors and, at the same time, is a treatment method implemented by parents. There is also no research as to whether offering items found to be of high preference to child, based on a preference assessment, would serve as not only the reinforcement, but also the discriminative stimulus to engage in desirable behaviors (i.e. engagement with the highly preferred items) in the first place.

With the parent being the likely one to take their child with ASD into community settings, it is prudent to develop a treatment package that can easily be implemented by the parents in order to minimize their child's undesirable behaviors in those settings. The importance of a preference assessment, compared to casual observation, that examines various different potential reinforcers should be explained to them. A preference assessment that examines various different sensory categories will allow parents to effectively identify multiple items highly preferred by their child and thus, increasing the likelihood of bringing about and maintaining desirable behavior.

The present study examined the effectiveness of training parents to conduct a preference assessment and implement an intervention where highly preferred items, based on the preference assessment, were used to prompt and reinforce the behavior choices of their children with ASD who displayed undesirable behaviors in at least two

community settings. One of two methods of reinforcement delivery (DRI or DRA) was chosen for each participant based on the set of behaviors that were considered to be appropriate for the particular setting. The intervention that involves DRI has been extensively research and has been found to be successful, however the published research on community settings in general is rather limited. The intervention that involves DRA is an intervention that has not been previously researched, but has the potential to bring about positive behavior change in children with ASD in community settings where the environment is not necessarily designed for a child to interact with it.

CHAPTER 2

METHOD

2.1 Particpants

This study included three children, each four years of age, who were diagnosed with ASD. They each met the criteria of displaying undesirable behavior (e.g., crying, screaming, rolling around on the floor) when in at least two community settings, being able to make choices among items presented to him or her, as part of a preference assessment inventory, and having one of their parents who was willing to participate throughout the entire course of the study. Additionally, each parent signed the appropriate consent form (see Appendix A) in order for the parent and child to take part in the study. The first three sets of participants who met the qualifications were selected for the study.

2.1.1 Emily

Emily's mother chose for her and her daughter to participate in the study due to Emily's inability to go into various community settings without engaging in undesirable behavior. Her mother had stated that she and her family had not gone out to eat together for the past two years because of her daughter's dining-out behavior. When trying to seat Emily in her chair at a restaurant, she would stiffen her body while screaming and crying. Emily's mom also reported that she was no longer able to go into department stores with her daughter. Emily would sometimes enter the store before engaging in undesirable behavior otherwise the behavior would occur between the car and the store's entrance. In these instances, Emily would also stiffen her body while screaming and crying.

When in a restaurant, Emily would spend minimal time eating if she would eat at all. In stores, she would either sit in her stroller or walk with her mother while her mother shopped. Therefore, in both of these settings, there was very little stimulation that sustained Emily throughout her time within these settings. As a result, the second reinforcement method was chosen for her to examine whether the preferred item choices would serve as both the discriminative stimulus for her to engage in appropriate behavior and as the reinforcement for making the choice among the items and sustaining her engagement with the items.

2.1.2 Ruperto

Ruperto's mother was able to take him into most community settings, however in the present instance she wished for him to take part in story telling at a local library and book store. When she had previously taken Ruperto to the story telling events, he would not remain seated as the other children attending the story time were doing. Instead of sitting appropriately on the floor, he would engage in various behaviors such as laying down, rolling around on the floor, crawling around in the story time area, and become distracted by items in the immediate vicinity. Ruperto's mother chose for him to take part in the present study as a result of his seeming inability to sit during story time without engaging in undesirable behavior.

With Ruperto needing to engage in more specific behaviors that are part of sitting and listening to a story teller during a public story time, DRI was the reinforcement delivery method chosen for him. This method involved the delivery of his highly preferred item following his engagement with the specific set of behaviors. In this way, a more traditional approach of reinforcement delivery was tested for its effectiveness in community settings.

2.1.3 Kade

Kade's mother had decided that her and her son would participate in the study due to his inability to go into a particular restaurant that contained an arcade area without engaging in undesirable behavior. At some point during a visit to the restaurant Kade would attempt to go into the arcade area. If the mother assented, the boy would behave nicely in the arcade area, but would have difficulty when it came time to leave. He would begin to scream and cry when his mother asked him to come with her and sometimes dropped to the floor, not willing to get up and walk. Kade's mother had also reported that he had difficulty going into department stores. He would usually scream and cry within a few minutes of entering the store.

Kade would eat for a portion of the time that he is in a restaurant, but he requires additional stimulation to maintain his appropriate behavior throughout the duration of his time in the restaurant. When in a store, Kade would sit in a stroller while his mother shopped. In both settings, Kade did not obtain the appropriate amount of stimulation to sustain him for the duration of his visits. Therefore, the reinforcement method where the preferred item choices were tested on their effectiveness to serve as both the discriminative stimulus to engage in appropriate behavior and as the reinforcement for making the choice among the items and sustaining his engagement with the items was chosen for Kade.

2.2 Settings and Materials

2.2.1 Settings

The experiment took place in the participants' homes and the community settings identified by the parents as a location in which their child engaged in inappropriate behavior. Portions of the parent training and preference assessments were conducted in the home. The remaining portions of the parent training were conducted at

the location in which the child participant's behavior was troublesome.

2.2.2 Materials

Items used during the preference assessment were items that fell within one of the five categories derived from Mason, McGee, Farmer-Dougan, & Risley's (1989) ongoing reinforcer assessment. Other materials needed for the study included a bag, clipboard, paper, pen, digital timer, video recorder, video tapes, and DVDs.

2.3 Design and Dependent Measures

2.3.1 Design

This study used an A-B-A-B reversal design (Cooper, Heron, Heward, 2007) to obtain repeated measures of the target behavior in each designated setting. The first of the four phases was the initial baseline (A) condition. During baseline, behavior measures were taken while the independent variables (preferred items from the reinforcer-preference assessment) were absent and until steady state responding was achieved. Next was an intervention phase (B) in which the independent variables were introduced and remained in contact with the behavior throughout. The third phase, following the intervention phase, was a return to baseline phase; the independent variables were withdrawn and measurement, as in the original baseline condition, continued until steady state responding was achieved. Last, the intervention phase was reintroduced in order to replicate the treatment effect and therefore strengthen the demonstration of experimental control.

2.3.2 Dependent Measures

The dependent behavior measure was duration measured in seconds during which the child engaged in desirable behavior during the intervention. The second dependent measure was based on the parent's behavior and consisted of the number of times that the parent was observed delivering preferred items for appropriate behavior.

2.4 Procedures

Potential participants were recruited through the distribution of flyers at the DFW Center for Autism in Grapevine, Texas and the Families for Effective Autism Treatment of North Texas (FEAT-NT) Community Center in North Richland Hills, Texas. Interested parents contacted the experimenter and the first three sets of parent-child participants that met the participant criteria were selected for the study.

During the first training session, the experimenter explained the baseline procedures to the parent and answered questions until the parent stated she was ready to begin the baseline procedure.

The second session was conducted at the first community location where baseline measures were recorded. The experimenter was readily available to provide feedback and answer any of the parent's questions. This process continued until three baseline measures were obtained for this location.

2.4.1 Emily's First Baseline Location

Because of Emily's undesirable behavior in restaurants, her first location was at a fast food restaurant. She usually would engage in appropriate behavior while walking into the restaurant; however she would resist sitting down at the table throughout the duration of the meal. Her mother indicated during the initial training segment that a typical meal out with the family would last approximately 30 – 40 minutes. Therefore, Emily's target behavior of remaining seated at the table without engaging in undesirable behavior was set at 40 minutes.

During the first baseline measure at the restaurant, Emily's mother was to attempt to have Emily sit at the table where the duration of sitting was to be recorded. Parent questions and experimenter feedback would occur as necessary. This was to be followed by the second and third baseline measures, carrying them out in the same

manner as the first.

2.4.2 Ruperto's First Baseline Location

Ruperto's mother stated that her son was unable to sit appropriately during the five minutes that a story teller spent reading to children at a local library. Therefore, Ruperto's first location was at a library where his target goal of remaining seated during the story telling was set at six minutes.

The mother began the first baseline trial by prompting her son to sit down while a story was read to him. The duration of time from when Ruperto sat down until he engaged in any behavior other than sitting and facing the direction of the story teller was recorded. Questions were then answered and any necessary feedback was given to the parent by the experimenter. The second and third baseline measures were carried out in the same manner as the first.

2.4.3 Kade's First Baseline Location

Kade's undesirable behavior occurred in one specific restaurant that contained an arcade area and so it was chosen as his first location. Kade would engage in appropriate behavior while walking into the restaurant; however, he would then attempt to go to the arcade and if successful, resist leaving that area by engaging in undesirable behavior. Kade's mother estimated that a typical family meal at this restaurant would last approximately 45 minutes. Kade's target goal of remaining seated at the table without engaging in undesirable behavior was therefore set at 45 minutes.

Kade's first baseline duration measure began when he entered the restaurant with his family and stopped when he began engaging in undesirable behavior. Questions were then answered and any necessary feedback was given to the parent by the experimenter. The second and third baseline measures were then carried out in the same manner as the first.

2.5 Preference Assessment

Once the initial three baseline measures for the first locations were complete for each set of participants, each of their next sessions began with the experimenter conducting the preference assessment training with the parent. This training occurred in a similar fashion as the baseline training; the experimenter explained the process of conducting the assessment and the parents' questions were answered. The parent then conducted the preference assessment with the child. This process occurred by having the parent use items that the experimenter provided as well as identifying items that the child participant already had that fell within each of five predetermined categories. These categories included gustatory (consumable), visual, auditory, and tactile items, as well as items that contained letters and numbers. The parent then presented the items to the child, taking note of the items of which the child indicated an interest. As always, the experimenter was present to provide feedback and answer questions.

The items that were determined to be of interest to the child were used during the intervention phases of the study and were not made available to the child outside of those times. Additional items were continually assessed throughout the study.

2.6 Intervention

Based on the target behavior or set of target behaviors within the particular community setting, one of two reinforcement delivery methods was chosen for each individual participant. In a setting where a more specific set of behaviors was considered appropriate, the delivery of preferred items immediately followed the desired behaviors. Where the setting was not directly conducive to a child with ASD's appropriate behaviors, the highly preferred items were offered up front to encourage the child to choose to engage in appropriate behaviors that involved the preferred items and as a result, decrease the number of undesirable behaviors that the child engaged in. With this

method, offering the preferred items choices to the children was to serve as the discriminative stimuli to interact with and manipulate the item(s) chosen. The interaction and manipulation of these items, without being accompanied by undesirable behaviors, were appropriate behavioral responses. The preferred items or the interactions and manipulations of these items were likely to serve as reinforcement as well.

The intervention took place, at the first location designated for each child, during the session that followed the preference assessment. In this phase of the experiment, the parent brought the items that were found to be highly preferred during the preference assessment. The child learning to sit appropriately during story time was reinforced engaging in behaviors incompatible with laying on the floor and rolling around. The remaining two children were immediately given a choice among the preferred items once they were able to reach the point to where the duration recording began, without engaging in undesirable behavior. All three parents continued to intermittently provide their child with choices among the preferred items up to the point that their child reached the duration goal without engaging in undesirable behavior. If, during any trial, their child was not able to go the entire duration without engaging in undesirable behaviors, the present trial would end and a new trial would begin when their child reached the point where the duration recording was set to begin and was not engaged in undesirable behavior.

These same intervention procedures were implemented at each scheduled session until the child was able to reach his or her duration goal on two separate, consecutive occasions without engaging in undesirable behavior.

The same design and procedures that were used to carry out each phase of the experiment at the first location were also used to carry out the experiment at the second location.

2.7 Second Location Baseline Measures

2.7.1 Emily

Emily also engaged in undesirable behavior while in retail and department stores and therefore a department store was chosen for her second location. She began to engage in inappropriate behavior at some point between exiting the car and within five minutes of being in the store. With her mother stating that she would not expect to be in a store for more than 20 minutes with a child of her daughter's age, Emily's target goal of entering and remaining in the store without engaging in undesirable behavior was set at 20 minutes.

The experimenter met the parent and child participant at the participants' car outside of the department store. At which point, the mother began her first attempt at having her daughter exit the vehicle. The time from when the mother opened the car door where her daughter was seated to the point where her daughter engaged in inappropriate behavior was recorded. Questions were then answered and any necessary feedback was given to the parent by the experimenter. The second baseline measure was then carried out, in the same manner as the first, followed by the third measure being carried out in the same fashion as the previous two.

2.7.2 Ruperto

Ruperto's mother desired for the second location to be one where her son could continue to work on the same target behavior as he did at the first location, yet in a similar, but different setting. Therefore, Ruperto's second location was at a book store where the story time lasted for approximately five minutes and the same target goal of remaining seated during the story telling was set at six minutes.

The experimenter met the parent and child participant in the children's area at the designated book store. The mother began the first baseline trial by having her son sit

down while a story was read to him. The time from when the mother sat him down up to the point where her son engaged in any behavior other than sitting and facing the direction of the story teller was recorded. Questions were then answered and any necessary feedback was given to the parent by the experimenter. The second baseline measure was then carried out, in the same manner as the first, followed by the third measure being carried out in the same fashion as the previous two.

2.7.3 Kade

Kade engaged in undesirable behavior while in retail and department stores, just as the first participant, and therefore a department store was chosen for his second location. He began to engage in inappropriate behavior within approximately five minutes of entering the store. His mother stated that she would like for him to be able to appropriately remain in the store for 30 minutes. Therefore, Kade's target goal of remaining in the store, while in his stroller, without engaging in undesirable behavior was set at 30 minutes.

The experimenter met the parent and child at the participants' car outside of the department store. At which point, the mother placed her child in the stroller, walked into the store where the first baseline measure began. The time from when the mother entered the store with her son in his stroller to the point where he engaged in inappropriate behavior was recorded. Questions were then answered and any necessary feedback was given to the parent by the experimenter. The second and third baseline measures were then carried out, in the same manner as the first; experimenter recorded the time from when the mother entered the store with her son in his stroller to when the child began to engage in inappropriate behavior.

Following the completion of the baseline measures for each of the three sets of participants at the second location, the intervention took place at each of their

respective second locations. The intervention was carried out in the same manner as it had been at the first location.

2.8 Interobserver Agreement

Interobserver agreement (IOA) was assessed by having the experimenter and research assistant independently record (via DVD and videotape recording) the number of times that the parent offered a preferred item choice to the child for engaging in desirable behaviors (see Appendix B). Agreements were defined as both observers scoring the same number of responses during each session. Agreement for each session was calculated by dividing the total number of agreements by the total number of agreements plus disagreements and multiplying by 100. Agreement was assessed during one fourth of the intervention sessions for all three participants.

CHAPTER 3

RESULTS

3.1 Preferred Items

3.1.1 Emily's Preferred Items

Emily showed strong preference for items from all categories with the exception of the letters and numbers category. She preferred French fries (gustatory) and Boz books, a pair of inflated balloons, DVD player and movies, mini-viewfinders, and matching bobble-head cats (visual). She also enjoyed auditory items, such as a tape with Christmas songs that were played in her tape player, along with the DVD player and movies. She also had a preference for squishy balls and other squishy toys (tactile).

3.1.2 Ruperto's Preferred Item

Because Ruperto's target behavior was sitting appropriately during story time in a public setting where other children would be within his immediate vicinity, items that were chosen among the five categories were those that could be delivered discretely in order to avoid distracting the other children around him. The items presented to him were small in size and made minimal to no noise. With the combination of his interests, dietary limitations, and the limitation of the types of items that could be used in the assessment, his assessment resulted in one highly preferred item. His highly preferred item was cookies that were able to be easily broken into bite size pieces to prevent quick satiation and distraction for him and other children during story time.

3.1.3 Kade's Preferred Items

Kade's preferred items fell within four of the five categories. He enjoyed reading and therefore he had a preference for various books and interactive toys that

involved reading. Within the visual category, he also preferred magnet letters and numbers, a mini-magnifying glass, and slinky. The interactive toys also had an auditory component to them as well. All of the items listed above also fell within the tactile category since he physically engaged with each of them. He also sought out attention and interaction with his mother, usually involving one of his preferred items.

3.2 Intervention Results

3.2.1 Emily's First Location Results

During the first phase of the experiment at the fast food restaurant, Emily was not able to sit down at the table prior to engaging in undesirable behavior for each of the three baseline measures (see Appendix C, Figure 2). During the intervention phase, Emily's mother provided choices of preferred items and continued to intermittently provide choices with the goal of providing items to Emily before she became satiated with the present item. Emily achieved her goal of sitting at the table for 40 minutes during both the first and second intervention trials. When there was a return to baseline in the third phase and no preferred items were used, the first trial resulted in a duration measure of three minutes, the second measure was 22 seconds, and the third measure was eight seconds from the time that she was seated until she engaged in undesirable behavior. This type of trend is expected as reinforcement was used during the two trials from the previous phase; when the reinforcement was withdrawn, the undesirable behavior gradually reemerged. The fourth and final phase for this location, where the intervention was reintroduced, resulted in Emily achieving her goal of sitting at the table for 40 minutes without engaging in undesirable behavior during both the first and second trials of the fourth phase.

3.2.2 Emily's Second Location Results

During the first phase of the experiment at the department store, Emily was not able to be placed in her stroller prior to engaging in undesirable behavior for each of the three baseline measures (see Appendix C, Figure 3). During the intervention phase, given that Emily was not engaged in undesirable behavior when her mother opened the car door, she was given a choice among the preferred items. Her mother continued to intermittently provide choices to her among the items that were found to be of high preference to her during the preference assessment. Emily achieved her goal of remaining within the store for 20 minutes without engaging in undesirable behavior during both the first and second intervention trials. When there was a return to baseline and no preferred items were used in the third phase, the first trial resulted in a duration measure of four minutes and 55 seconds, the second measure was one minute and 10 seconds, and the third measure was one minute and three seconds from the time that she was seated in the stroller until she engaged in undesirable behavior. When the intervention was reintroduced, Emily achieved her goal of remaining within the store for 20 minutes without engaging in undesirable behavior during both the first and second trials of the fourth phase.

3.2.3 Ruperto's First Location Results

During the first phase of the experiment at the library, Ruperto was only able to stay seated and face the story teller for five seconds prior to engaging in undesirable behavior for the first of three baseline measures (see Appendix C, Figure 4). He resisted sitting for the second and third baseline measures during the first phase. During the intervention phase, when Ruperto was offered his preferred item, he sat appropriately. His mother continued to intermittently provide him with bites of his preferred cookies. Ruperto achieved his goal of remaining seated and facing the storyteller for six minutes

without engaging in undesirable behavior during both the first and second trials. When there was a return to baseline and no preferred items were used in the third phase, the first trial resulted in a duration measure of 25 seconds, the second measure was 10 seconds, and the third measure was 0 seconds from the time that he was seated until he engaged in undesirable behavior. This type of trend is expected since he was receiving reinforcement during the two trials from the previous phase; once he began to realize that the reinforcement was withdrawn, the undesirable behavior reemerged. When the intervention was reintroduced, Ruperto achieved his goal of remaining seated and facing the storyteller for 6 minutes without engaging in undesirable behavior during both the first and second trials of the fourth phase.

3.2.4 Ruperto's Second Location Results

During the first phase of the experiment at the book store, Ruperto was able to stay seated and face the story teller for three minutes and 16 seconds for the first baseline measure and six seconds for the second baseline measure prior to engaging in undesirable behavior (see Appendix C, Figure 5). He was not able to be seated for the third baseline measures during the first phase. During the second phase, the intervention phase, when Ruperto was offered his preferred item, he sat appropriately. His mother continued to intermittently provide him with bites of his preferred cookies. The goal for his mother was to provide cookie bites to him prior to him engaging in undesirable behavior. Ruperto achieved his goal during both the first and second trials. When there was a return to baseline and no preferred items were used in the third phase, the first trial resulted in a duration measure of one minute and 33 seconds, the second measure was one minute, and the third measure was 25 seconds from the time that he was seated until he engaged in undesirable behavior. When the intervention was reintroduced, it mirrored that of the first intervention phase; Ruperto achieved his goal of sitting appropriately for

six minutes during story time for both the first and second trials of the fourth phase.

3.2.5 Kade's First Location Results

During the first phase of the experiment at the restaurant, Kade was not able to sit down at the table prior to engaging in undesirable behavior for the first of the three baseline measures (see Appendix C, Figure 6). He was able to sit at the table for six minutes and five seconds for the second trial and for five seconds during the third baseline measure. During the second phase, the intervention phase, when Kade was provided with a choice among the preferred items, he made a choice for which he continued from right inside the door of the restaurant to sitting in his chair once at the table. His mother continued to intermittently provide him with choices among the items that were found to be of high preference to him during the preference assessment. The goal for Kade's mother was to provide him with choices prior to him becoming satiated with the present item and in turn engaging in undesirable behavior. Kade achieved his goal, of remaining in the restaurant for 45 minutes without engaging in undesirable behavior, during both the first and second trials. When there was a return to baseline and no preferred items were used in the third phase, the first trial resulted in a duration measure of one minute and six seconds, the second measure was 38 seconds, and the third measure was zero seconds from the time that he walked into the restaurant until he engaged in undesirable behavior. The fourth and final phase for this location, where the intervention was reintroduced, mirrored that of the first intervention phase; Kade achieved his goal of remaining in the restaurant for 45 minutes without engaging in undesirable behavior during both the first and second trials of the fourth phase.

3.2.6 Kade's Second Location Results

During the first phase of the experiment at the department store, Kade was able to remain within the store while sitting in his stroller for 10 seconds during the first trial, 25

seconds during the second trial, and 10 seconds for the third baseline trial (see Appendix C, Figure 7). During the second phase, the intervention phase, when Kade was provided with a choice among the preferred items, he made a choice for which he continued from right inside the door of the department store while sitting in his stroller. His mother continued to intermittently provide choices to him among the items that were found to be of high preference to him during the preference assessment. The goal for his mother was to provide him with choices prior to him becoming satiated with the present item and in turn engaging in undesirable behavior. Kade achieved his goal, of remaining in the restaurant for 45 minutes without engaging in undesirable behavior during both the first and second trials. When there was a return to baseline and no preferred items were used in the third phase, the first trial resulted in a duration measure of five minutes and 48 seconds, the second measure was five minutes and 50 seconds, and the third measure was 57 seconds from the time that he entered the department store while in his stroller until he engaged in undesirable behavior. The fourth phase mirrored that of the second phase; Kade achieved his goal of remaining in the restaurant for 45 minutes without engaging in undesirable behavior during both the first and second trials of the fourth phase.

3.3 Interobserver Agreement

The IOA for the target behaviors of Emily's mother in the first setting was 80 percent. The IOA for the second setting was 99 percent. The interobserver agreement based on the target behavior of Ruperto's mother was 100 percent for both settings. The IOA for the target behavior of Kade's mother was 88 percent for the first setting and 100 percent for the second setting (for the raw IOA data see Appendix D).

CHAPTER 4

DISCUSSION

The intervention in the present study was successful at reducing inappropriate behaviors of three children with ASD in various community settings. By using the items from the preference assessment that were found to be highly preferred, to guide the behavior choices of the children with ASD, the occurrence of inappropriate behaviors was eliminated during the intervention trials. For Ruperto, DRI was effective at eliminating undesirable behaviors within the story telling settings. Ruperto sat and faced the direction of the story teller, behaviors that were incompatible with laying on the floor and rolling around. DRA eliminated Emily and Kade's undesirable behaviors during the intervention trials within each of their respective restaurant and department store settings. Additionally, the parents offering of the preferred items to their children successfully served as the discriminative stimuli for their children to make a choice among the preferred items and to interact with the item. Making a choice among these items and the children's engagement with the item, without engaging in inappropriate behaviors, were the desired behaviors. Because the desirable behaviors were maintained throughout the duration of the trials where the preferred items were presented, they also served as reinforcers.

This study supplements previous research in which parents have successfully Implemented applied behavior analysis (ABA intervention procedures with their child (e.g. Lafasakis & Sturmey, 2007; Love, Watson, & West, 1990; Phaneuf & McIntyre, 2007). When parents receive adequate training and supervision they can implement ABA with their child just as effectively as professionals working under the direct supervision of a Board Certified Behavior Analyst (BCBA) (Behavior Analyst Certification Board [BACB],

n.d.). Because the parents are the ones who typically take their child into community settings, it was prudent for them to be directly providing the intervention in this experiment. This form of intervention increases the likelihood that the parents and children will continue to engage in the behaviors targeted for increase, beyond the time frame of this study.

Even with the passing of HB1919 (Texas Legislature Online, n.d.), many families are still without insurance coverage for ABA. Therefore, with the financial burden that family members of a child with ASD incur (see Autism Speaks, 2007), parents may increasingly seek to provide their child's ABA treatment in order for it to be made more affordable.[1] Additionally, by making ABA more affordable, there is the potential of increasing the number of individuals who will receive ABA. [1] This is critical since ABA is currently the only empirically based treatment that meets the criteria for effective early intervention and thus reducing the need for lifelong specialized services (see Jacobson, Mulick, & Green, 1998) that may have otherwise been needed.

Two of the three parents completed a feedback survey where they provided their opinion on the effectiveness of the research (to view the research feedback form see Appendix E). Beyond the data indicating that the child was successful at going into various community settings without engaging in undesirable behavior, the parents' opinions were valuable in further determining the success of the present study. Based on the feedback, the parents strongly agreed that the present research 1) equipped them to assess high preference items and use them to bring about positive behavior change, 2) was successful at helping their children go into community settings without engaging in undesirable behavior, 3) was overall beneficial for both the parent and child, and 4) has continued to benefit them beyond the time frame of the study. To further elaborate on this fourth point, one parent indicated that she was able to use what she learned during the

research to help make her son's first plane ride successful by him not engaging in any undesirable behavior.

With positive reinforcement being a key component of bringing about desired behavior change, it is necessary to identify items of high preference to an individual. In doing so, research indicates that a comprehensive assessment is more accurate at reinforcement selection when compared with preference predictions based on casual observations (Green et al., 1988). Having taken a systematic approach to select items of potentially reinforcing value, the present intervention eliminated nontargeted undesirable behavior just like that of Mason, McGee, Farmer-Dougan, and Risley in their 1989 study. The present study also used their reinforcer assessment as a guideline of categories from which to select items, allowing for the incorporation of various sensory items that have been found to increase the value of individualized reinforcers (Bailey & Meyerson, 1969; Ferrari & Harris, 1981; Rincover & Newsom, 1985; Rincover, Newsom, Lovaas, & Koegel, 1977). Previous research indicates that children's preferences are likely to vary across sessions (Farmer-Dougan, & McGee, 1986), and ongoing reinforcer assessments significantly reduce undesirable behaviors (Mason, McGee, Farmer-Dougan, & Risley, 1989). As a result, the parents in the present study continued to assess additional items with their child throughout the intervention. As Mason, McGee, FarmerDougan, & Risley (1989) stated, reinforcer assessments may have primed the children for engagement and focused engagement is functionally incompatible with undesirable behavior. In the present study, the environmental stimuli that triggered Emily and Kade's undesirable behavior during baseline was most likely still present during the intervention, however,

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[1] See Guralnick1998; and Ramey & Ramey, 1998 for the essential criteria for effective early intervention. Based on the research of Anderson et al., 1987; Birnbrauer & Leach, 1993; Fenske et al, 1985; Lovaas, 1987; McEachin, Smith, & Lovaas, 1993, ABA produces substantial results for children with ASD & meets the criteria for effective early intervention.

their focus was directed to the preferred item choices and not left to their own devices. With childrenbeing efficient at selecting items that have a reinforcing value to them, it demonstrates the ease of conducting regular preference assessments; the positive effects demonstrate their necessity.

One of the children had a preference for toys that had a combination of an auditory and visual component. When it came time to conduct the preference assessment, the child's mother pulled out various items to include in the assessment, to include auditory and visual toys that the family possessed but that they had stored away. From this the mother began to rotate the availability of his toys, based on his present preferences. The boy's mother also indicated on her research feedback that the most beneficial aspect of the research was discovering different types of toys her son engaged with and realizing that she needed to change them often to avoid boredom from them.

Additionally, the same mother independently chose to make purchases of items that the experimenter included in the preference assessment and were found to be preferred by her child. These items consisted of various tactile (squishy balls and items made of various materials/textures) auditory and (small party favor toys and maracas) and visual (magnifying glass, slinky, and pinwheel) items. During another child's initial assessment, the parent noticed a particular book for which her child had previously demonstrated a preference. After the experimenter and mother discussed the possibilities of why her daughter may have preferred this book, the mother purchased additional books that included the likely preferred content and found that her daughter indeed liked those books as well. This same process occurred with CDs of music. In this way, the parents independently made choices that resulted in an increase in their child's desirable behavior.

Just as the completion of a preference assessment was important, so was the choosing of appropriate methods of reinforcement delivery. Differential reinforcement was successfully used with all three participants; DRI was used with Ruperto and DRA was used with Emily and Kade. Ruperto was reinforced for engaging in behaviors that could not occur simultaneously with the undesirable behaviors. During the baseline measures, he would lay or roll around on the floor while the storyteller would read. Therefore, his target behaviors were sitting upright and facing in direction of the storyteller. Emily and Kade were reinforced for engaging in alternatives to the undesirable behaviors where the alternative behaviors occupied the time that undesirable behavior would have occurred. Because Emily and Kade did not have a direct purpose for being in their designated settings, they were provided with choices of preferred items of which to engage with. By stating that the children were *reinforced* for engaging in the target behaviors, it can be concluded that the present study was successful at eliminating the undesirable behaviors of the child participants during the intervention trials within the various community settings. The present study helps to further support the statement that differential reinforcement is one of the most effective techniques used to reduce undesirable behavior (Cooper, Heron, Heward, 2007).

Also, with Emily and Kade's intervention locations limiting them in the number of appropriate behaviors to engage in, their high preference items, based on the preference assessment, successfully served as both discriminative stimuli and reinforcers for choosing to engage in desirable behaviors. Because this intervention was successful for both Emily and Kade, it has the potential of being effective with other children in settings that are not designed to appropriately engage a child. Also, the way that this intervention is designed, the parent does not have to wait for the completion of an interval in which the child does not engage in undesirable behavior; the

parent is able to present the discriminative stimuli (the preferred item choices) prior to the point at which the child is likely to engage in undesirable behavior.

Ferrari and Harris (1981) pointed out a limitation within their study that is also a limitation for the present study; the reinforcements that were explored in each of these studies are not naturally a part of the environments were the research took place. One parent noted in her research feedback that, in spite of its effectiveness, the least beneficial aspect of the research was having to bring along a bag of her child's preferred items every time that they planned to go into a community setting. Even though the present study examined ways to supplement environments that were not conducive to the appropriate engagement of children, perhaps future research could examine ways to address this concern.

Even though the parents delivered preferred item choices prior to their child engaging in undesirable behavior, the experimenter provided occasional verbal prompts to the parent to deliver these choices. It is unknown as to whether the parents would have provided preferred item choices at an appropriate rate otherwise. Future research could examine the effectiveness of a procedure where the experimenter is able to fade the number of prompts that she provides to the parent. One way that this might be done is by providing the parent with a timer that is designed to clip onto the waistband of their pants and is equipped to vibrate on a set interval schedule, prompting the parent to provide preferred item choices to their child. The parents could provide choices aside from the set intervals; the timer would just serve as a prompt for the minimum number of necessary prompts.

The present intervention was successful at reducing undesirable behaviors in three same-age children. This limits a discussion of the age range and settings for which the intervention might be expected to be effective. However, the effectiveness of

the techniques used in this study, with the exception of the intervention involving DRA, have been demonstrated across a wide range of individuals in the studies referenced in this research (Op cit.). Thus, it is expected that the present treatment would be successful among individuals who fall outside the characteristics that define this study's participant population, but replication among children of varying ages would be beneficial.

With this study's results, the number of community-based interventions that were successful at reducing undesirable behavior has increased (Carr & Carlson, 1992; Koegel, Koegel, Hurley, Frea; 1992). Many children with ASD all too often engage in undesirable behavior in public settings and increase the likelihood of facing isolation and decrease their chances of social integration. It is key for families to integrate their child with ASD into settings outside of the home in order for the child with ASD and his or her family to maintain a healthy quality of life.

APPENDIX A

INFORMED CONSENT

Informed Consent Form

Before agreeing to your child's participation in this research study, it is important that you read and understand the following explanation of the purpose and benefits of the study and how it will be conducted.

Title of Study
Training Parents to Implementation Preference Assessments & Graduated Exposure with Children with Autism in Community Settings

Principal Investigator
The Principal Investigator of this study is *James Kopp, Ph.D., BCBA,* an associate professor at the University of Texas at Arlington (UTA) Department of Psychology.

Purpose of the Study
You are being asked to participate and to allow your child to participate in a research study which focuses on you obtaining and utilizing the necessary skills to assist your child in the reduction of undesirable behavior while increasing the appropriate approach behavior when in community shopping settings. This study is proposed to directly follow on previously published research. The purpose of the study is to evaluate a method that will decrease your child's undesirable behavior in shopping settings as well as reducing the cost of therapy without having to reduce treatment hours. I intend to utilize Honardar's (2007) preference assessment to determine items that are of high preference to the child in order to reinforce the child's appropriate behavior throughout the graduated exposure procedure. I hope that you are able to implement the skills that you learn in order for your child to approach and remain within particular shopping settings that he or she presently attempts to avoid.

Study Procedures
The study will require three sessions a week for approximately two hours each session. Overall, the study will last approximately 6-10 weeks. You will be asked to take part in instructional sessions where you will learn to complete baseline measurements, a preference assessment and a graduated exposure procedure with your child. Under the guidance of the experimenter, you will then be asked to implement these protocols with your child. Your child will be asked to walk with you in the direction of each predesignated location. During each preference assessment and shortened preference assessment your child will also be asked to

choose items according to their preference. If your child engages in the appropriate behavior in response to the designated location, he or she will receive access to the highly preferred item that he or she has chosen. If your child does not engage in the appropriate approach behavior, the child will immediately return to the vehicle with you, without receiving any of the high preference items.

Foreseeable Risks

Potential risks from participation in the study would include brief periods of no reinforcement for moments when the child is not engaged in the target behaviors, or the child possibly becoming frustrated. If the child becomes frustrated, the child will be allowed to immediately discontinue the target behavior for a period of time to reevaluate the child's preferences.

Benefits to the Subjects or Others

It is expected that the research will benefit you by equipping you with the skills needed to assist your child in engaging in approach behaviors within shopping settings. Your child is expected to benefit from this study by increasing his or her engagement in the target responses, thus reducing his or her engagement in undesirable behavior, at shopping settings.

Procedures for Maintaining Confidentiality of Research Records

You and your child's confidentiality will be maintained at all times during this study. All information that is obtained in connection with this study will be maintained by the Principal Investigator and key personnel involved with the study and will remain confidential. However, information gained from this study will be published as a thesis, presented in the presence of a thesis committee from the University of Texas at Arlington Department of Psychology, and may also be published or presented in professional contexts. Other information of this study, such as datasheets and graphs, may be presented at academic conferences; however, you and your child's identity will be withheld by using a false name. Video recordings of you and your child's sessions will be used for educational purposes only. The confidentiality of you and your child's individual information will be maintained in any publications or presentations regarding this study.

Questions about the study

If you have any questions about the study, you may contact *Shana Wiggins* at telephone number (817) 899-8081, or thesis advisor, *Dr James Kopp,* UTA Department of Psychology, at telephone number (817) 272-3237.

Review for the Protection of Participants
This research study has been reviewed and approved by the UTA Institutional Review Board (IRB). The UTA IRB can be contacted at (817) 272-1235 with any questions regarding the rights of research subjects.

Research Participant's Rights
Your signature below indicates that you have read or have had read to you all of the above and that you confirm all of the following:

- Shana Wiggins has explained the study to you and answered all of your questions.
- You have been told the possible benefits and the potential risks and/or discomforts of the study.
- You understand that you do not have to take part and allow your child to take part in this study, and your refusal to take part and to allow your child to participate or your decision to withdraw you and your child from the study will involve no penalty or loss of rights or benefits. The study personnel may choose to stop you and your child's participation at any time as well.
- You understand your rights as a research participant and as the parent/guardian of a research participant and you voluntarily consent to you and your child's participation in this study.
- You have been told you will receive a copy of this form.

_____
Printed Name of Parent or Guardian

_____
Signature of Parent or Guardian Date

For the Principal Investigator

I certify that I have reviewed the contents of this form with the parent or guardian signing above. I have explained the possible benefits and the potential risks and /or discomforts of the study. It is my opinion that the parent or guardian understood the explanation.

_____
Signature of Principal Investigator Date

APPENDIX B

IOA DATASHEET

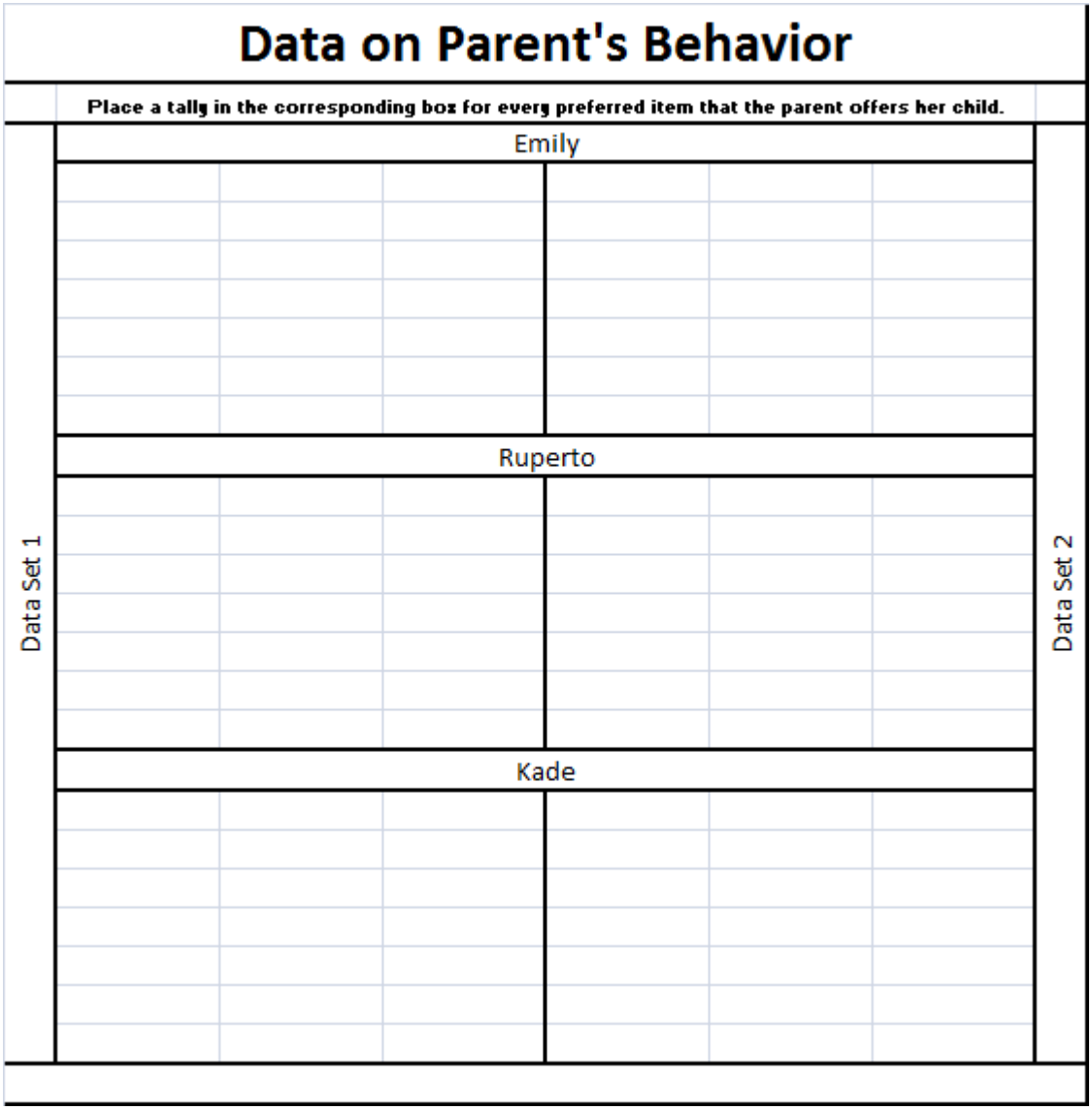
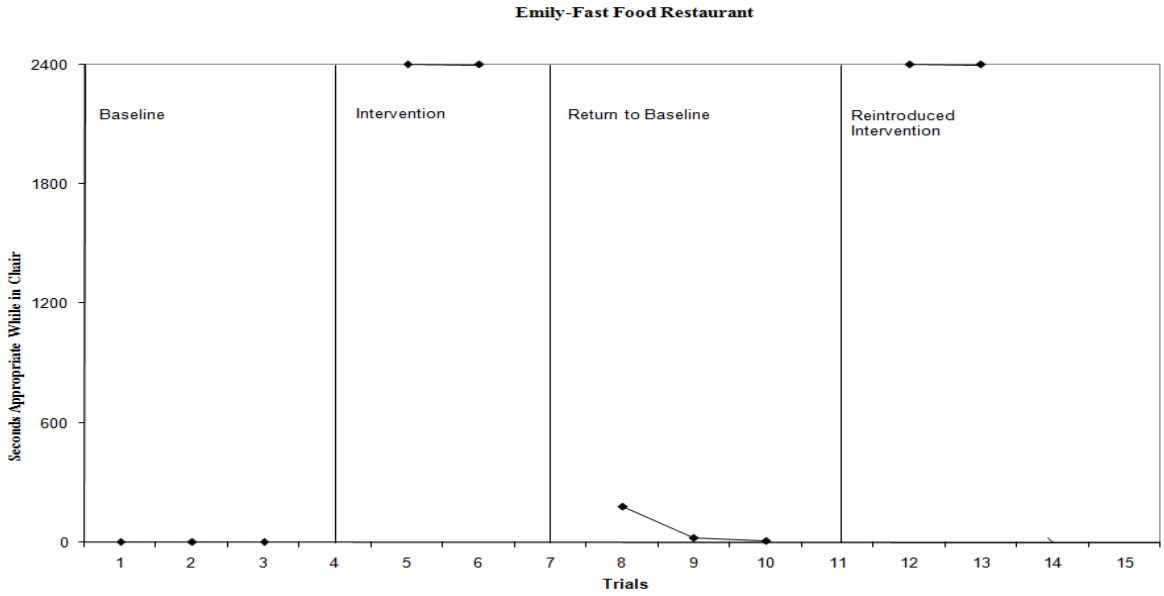


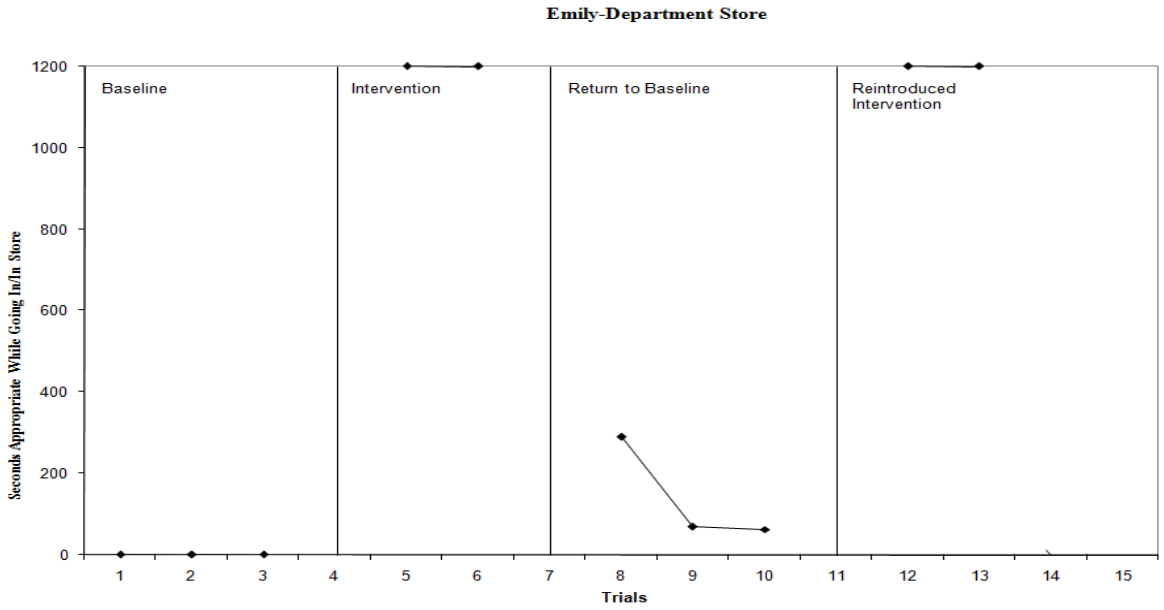
Figure B.1 Data sheet to tally IOA data on each participant

APPENDIX C

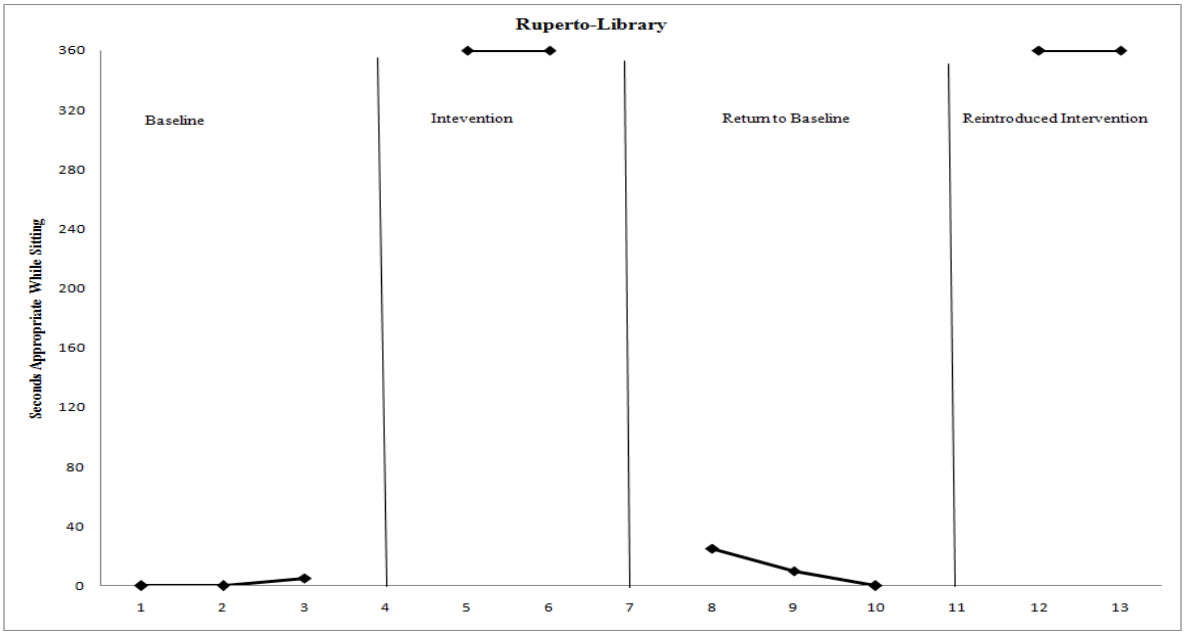
DURATION OF DESIRABLE BEHAVIORS



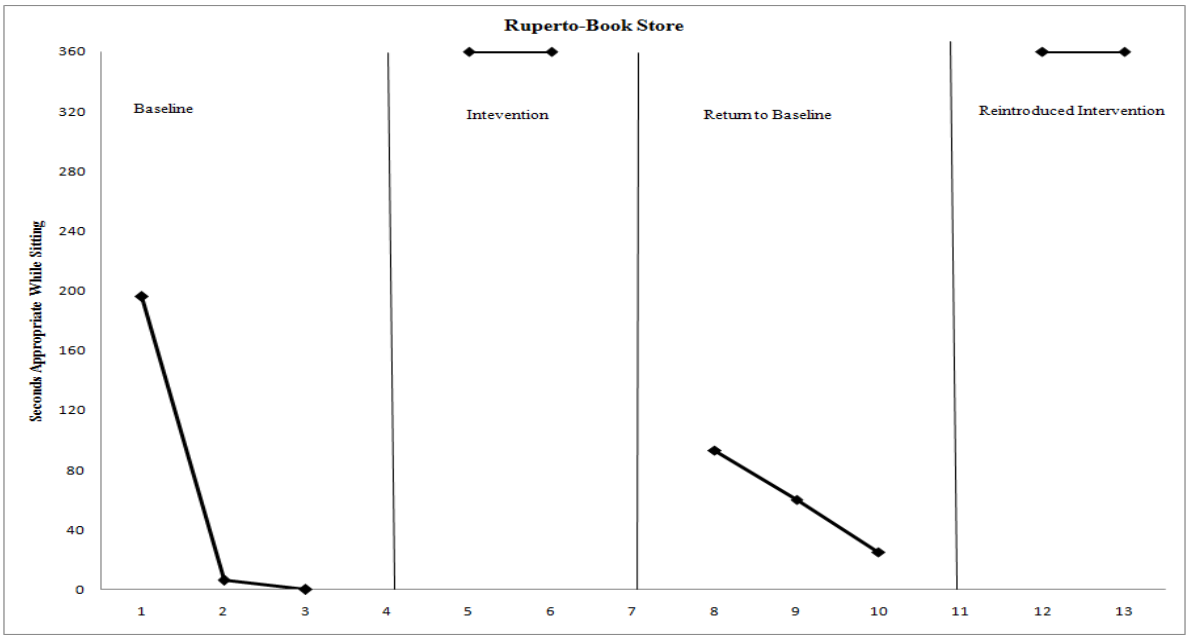
Figures C.1 Number of seconds the child was engaged in behavior other than inappropriate behavior at a fast food restaurant



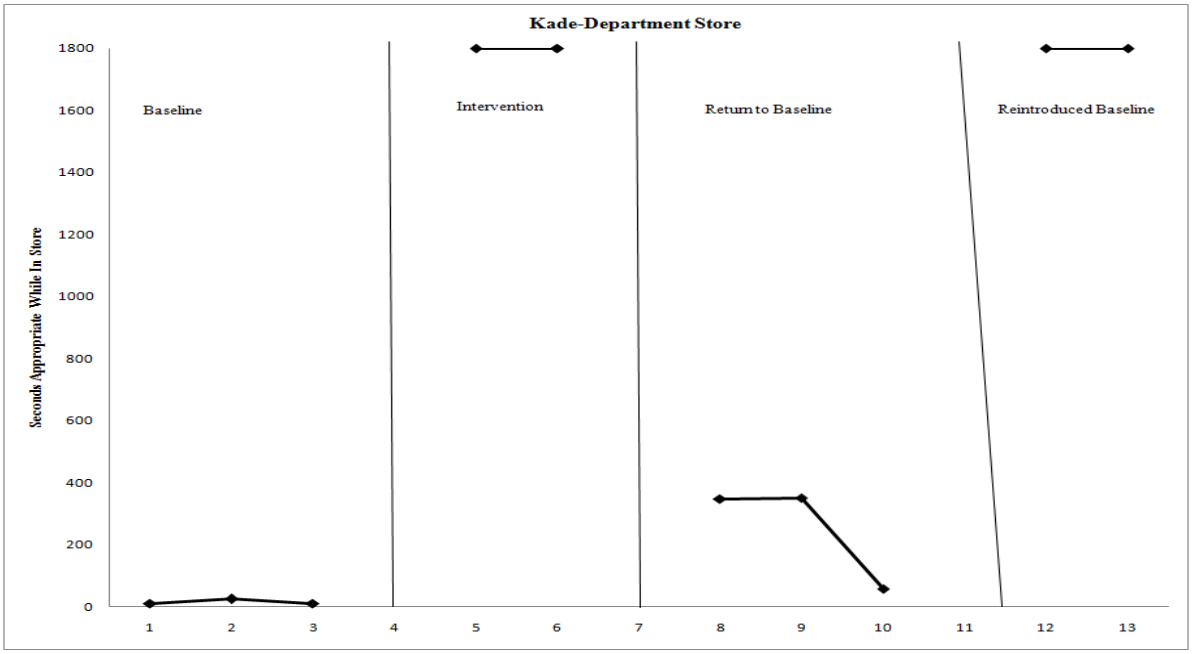
Figures C.2 Number of seconds the child was engaged in behavior other than inappropriate behavior at a department store



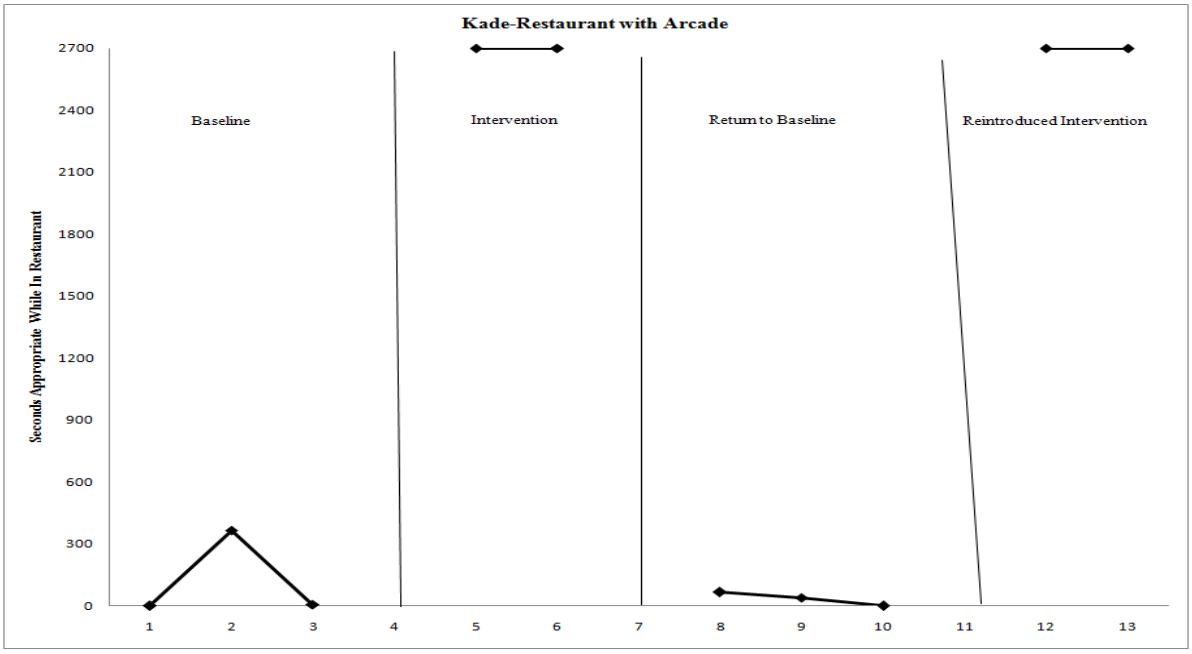
Figures C.3 Number of seconds the child was engaged in behavior other than inappropriate behavior within the library



Figures C.4 Number of seconds the child was engaged in behavior other than inappropriate behavior within the bookstore



Figures C.5 Number of seconds the child was engaged in behavior other than inappropriate behavior at a department store



Figures C.6 Number of seconds the child was engaged in behavior other than inappropriate behavior at a restaurant with an arcade

APPENDIX D

IOA RAW DATA

Table D1. IOA of the Number of Times that the Parent Offered a Preferred Item to Their Child for Desirable Behaviors

		Experimenter	Research Assisstant
Emily			
	Location 1	5	4
	Location 2	76	75
Ruperto			
	Location 1	4	4
	Location 2	7	7
Kade			
	Location 1	7	8
	Location 2	4	4

APPENDIX E

RESEARCH FEEDBACK FORM

Research Feedback

By using the key below, please fill in the blank that corresponds to each question, the number that best represents your opinion concerning the research of which you and your child took part.

1	2	3	4	5
Strongly Disagree	Somewhat Disagree	Neutral	Somewhat Agree	Strongly Agree

_____ My participation and training in the research equipped me to effectively identify items (and categories of items) that were presently of high preference to my child and to use them as reinforcers to bring about positive changes in my child's behavior within community settings.

_____ The research was beneficial, in that my child was able to go into the community settings and engage in the desired behaviors.

_____Overall, the research was very beneficial for me and my child.

_____ The research has continued to benefit me and my child beyond the time frame of the study.

The most beneficial aspect of the research:

The least beneficial aspect of the research:

Other comments:

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BIOGRAPHICAL INFORMATION

Shana Wiggins graduated from Bruceville-Eddy High School in 1995. After serving for six years in the United States Marine Corps, she went to college and obtained a B.A. in Psychology at the University of Texas at Arlington in August, 2004. She has been in the field of Applied Behavior Analysis (ABA) since 2004, where she specializes in the treatment of children with autism spectrum disorder (ASD). Shana completed graduate level courses in ABA at the University of Houston-Clear Lake from 2005 to 2006 and became certified as a Board Certified Assistant Behavior Analyst in 2006. Following the award of the M.S. in Psychology based on this project, she will continue working at the DFW Center for Autism in Grapevine, Texas where she has worked since 2006. She will also continue her volunteer work as a Service Coordinator in the Side-by-Side Ministry, a ministry for children with special needs, at Fellowship Church in Grapevine, Texas where she has been a member since 2006. Shana has been married to Rick Wiggins since 2006 and presently resides in Arlington, Texas.