

EFFECTS OF LANGUAGE ON FUNCTIONAL ANALYSIS OUTCOMES: A
SYSTEMATIC REPLICATION

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ABSTRACT

This study evaluated the effects of the type of language used by the therapist during a functional analysis on rates of challenging behavior with individuals who came from families where Spanish was the primary language. Three individuals with autism spectrum disorder who live in a residential treatment facility participated in a multi-element (i.e., demand, attention, play- verbal, and play-nonverbal) functional analysis (FA). The FA was conducted in an ABAB experimental design with the A conditions conducted in Spanish and the B conditions conducted in English. Language did not have an effect on rates of challenging behavior during the FA. One participant displayed no responding across conditions and the other two participants responded similarly during the demand conditions regardless of the language in which the conditions were conducted. Functional communication training (FCT) was conducted for one of these two participants in both languages. The results for this individual that there was no difference according to language in rates of challenging behavior as well as acquisition and maintenance of a functionally communicative response.

Keywords: functional analysis, language, functional communication training, Autism Spectrum Disorder, problem behavior

DEDICATION

This paper is dedicated to my family. Thank you to my husband, Bryan for being so supportive, loving, patient, and always pushing me to do my best. To my son Declan, thank you for making this all worth it. To my mother for being there when I needed you most and to my father for always being there when I needed some sound advice.

Without all of you I would not be where I am today.

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CHAPTER 1

FUNCTIONAL ANALYSIS

Functional Analysis

Skinner (1953) described functional analysis (FA) as a cause and effect relationship between an individual's behaviors and the environment. More recently, FA has been conceptualized as a collection of strategies to assess multiple effects of environmental contingencies on challenging behaviors. Iwata et. al. (1982/1994) published one of the first collections of systematic, analogue FAs used to examine the contingencies maintaining problem behavior. They assessed environmental contingencies on the rate of self-injury in nine participants. Iwata and colleagues suggested a number of conditions to evoke challenging behavior. These conditions were "social disapproval" (or more commonly referred to as attention), "academic demand" (also known as escape or demand), "unstructured play" (control), and "alone." Prior to the introduction of Iwata et al.'s FA in the research literature, contingencies and treatments to reduce problem behavior were often arbitrarily applied (Mace, 1994). In contrast, FAs enable behavior analysts to apply function-based interventions to reduce challenging behavior. Through manipulating variables, behavior analysts are able to analyze data to identify what environmental variables are maintaining behaviors. These standard FAs offer practitioners the potential benefits of isolating the variables that maintain problem behavior (Piazza, Hanley, & Fisher, 1996). Through adaptations of the Iwata et al. (1982) model, practitioners have been able to adapt the FA process to fit a variety of contexts and behaviors (Carr 1994; Hanley et. al., 2003). FAs are the primary mechanism in identifying a function so that effective treatment can be identified.

Alternative Functional Analyses

The function of behavior can be influenced by many variables that are present in the natural environment. FAs have been described in the literature as occurring across a variety of settings, although a common approach is to conduct standard (i.e., demand, attention, etc..) conditions in a setting that is separate from the environment in which problem behavior is typically observed (Hanley, Iwata, & McCord, 2003). In a standard FA, results can be influenced by a myriad of environmental contingencies including settings, therapists, and even language (McAdam, DiCesare, Murphy, & Marshall, 2004; Lang, Reilly, Machalicek, Lancioni, Rispoli, & Chan, 2008; Rispoli, O'Reilly, Lang, Sigafos, Mulloy, Aguilar, & Singer 2011). The use of environmental contingencies in the FA that do not resemble naturally occurring contingencies may not always reliably evoke the challenging behavior (Iwata et al., 1982/1994). Moreover, if contingencies within the FA do not mirror contingencies maintaining challenging behavior in the natural environment this may result in incorrectly identified functions. If treatment is developed according to incorrectly identified functions, problem behavior will continue in the natural environment as the resulting treatment is unlikely to be effective. In contrast, in vivo FA techniques have been developed to capture these natural environment variables. These include the interview-informed synthesized contingency analysis (IISCA), trial-based FAs, and other brief FAs (Carr 1977, Hanley et. al. 2014: Northup et. al. 1991).

The IISCA was formulated to design individualized test-control conditions based on an open-ended interview with caregivers as opposed to the traditional FA model, which relies on a limited number of fixed control and test conditions that do not

necessarily reflect natural contingencies (Hanley et. al. 2014). Given its abbreviated format, the IISCA increases efficiency of the FA process while still identifying the punitive reinforcer through a synthesized test condition. Hanley and colleagues were able to reliably show functions for challenging behavior which were multiply maintained in less time than the traditional FA process. Similarly, trial-based FAs are an alternative way to capture naturally occurring environmental contingencies (Rispoli, Ninci, Burke, Zaini, Hatton, and Sanchez, 2015). Through repeatedly presenting control-test trials in the natural environment, participants are able to respond to naturally occurring stimuli as opposed to contrived conditions as within a standard, analog FA (Rispoli et. al. 2015). Although this study went the more traditional route is it important to highlight ways in which practitioners can make modifications to the FA process to meet the needs of the individual.

A different way to incorporate natural contingencies into the FA process is to explicitly include stimuli from the natural environment in the standard FA. For example, McAdam et. al. (2004) examined whether using the participant's family members as therapists compared to staff members as therapists in FAs showed a difference in participant responding. Through three FAs conducted concurrently with the participant's mother, stepdad, and direct care staff members as therapists, the authors were able to demonstrate that when using parents as therapists there was an increase in challenging behavior compared to when direct care staff were therapists. Specifically, in sessions in which the client's parents were therapists, levels of responding were elevated in both demand and tangible conditions. However, when the direct care staff were therapists, there was no difference between the conditions. Similarly, results of the study indicate

that language could affect challenging behaviors due to the reinforcement history with one therapist (in this case the family member) who spoke one language versus an unknown therapist (or novel staff member) who spoke a different language. Through the isolation of extraneous variables that impact outcomes, such as an extensive learning history as identified in this study, clinicians can provide effective treatment by taking these variables into account when conducting FAs.

Finally, Lang et. al. (2008) compared FA results when the FA was conducted in an assessment room versus the classroom. FA conditions for both participants were alternated across settings using a multielement design. Differentiated results were demonstrated during sessions conducted in the assessment room; however, unclear results were displayed when sessions were conducted in the classroom. The differences in findings could be due to idiosyncratic controlling stimuli which were present in the classroom settings, reinforcement history, or alternative sources of reinforcement (e.g., peer interactions), or other differences across the settings.

Language Effects

Language is a variable that can influence challenging behavior. Researchers have found that language influences challenging behavior in the following ways. Lang and colleagues (2011) conducted an alternating treatment design study to evaluate effects of teaching discrete trial task demands in English versus Spanish. Lower rates of challenging behavior (i.e., tongue clicks) were observed in the Spanish discrete training trials versus the English trials. There were also higher correct responses in the Spanish trials versus the English trials. A drawback to this study was that only one participant

was used. Language is especially important to consider since there has been an increase in students who come from bilingual families (Krogstad & Lopez, 2014).

Language barriers within the U.S. are often not considered, specifically when considering services to those with ASD. 17.6% of individuals within the U.S. identify as exclusively Hispanic or Latino (United States Census Bureau, 2015). In addition, 21% of the U.S. population speaks a language other than English in the home (United States Census Bureau, 2015). Of those who identify exclusively as Hispanic, 74% report speaking a language other than English at home, and 99% say that this language is Spanish (Krogstad and Lopez, 2014). Of the foreign- born Hispanics, 52% report that they only speak Spanish at home (Hakimzadeh & Cohn, 2007).

In 2015, 25% of children were ethnically defined as Hispanic (Child Trends Databank, 2016). These statistics drastically affect school - aged children as they are largely impacted by the differing languages within education settings. Often children from bilingual families have fewer positive outcomes in relation to school in comparison to their peers who only speak one language (Aud, Hussar, Johnson, Kena, Roth, Manning, Wang, Zhang, & Notter, 2012; Prevoo, Malda, Mesman, & van IJzendoorn 2016). This could be due to difficulties in comprehension of the second language, English, in the academic setting.

For typically developing children, language acquisition may occur with little to no difficulty; however, those with developmental disabilities are more likely to have language deficits, in addition to challenges associated with second language acquisition (Mueller et. al. 2004). There is an increase in the prevalence of individuals with developmental disabilities who speak a language besides English at home (Mueller et. al.

2004; Singer et al. 2003; United States Census Bureau, 2007). The primary language in schools within the U.S. is English, when including Special Education classrooms and programs. Classrooms that primarily use English, not only involve teaching in English, but also implementing behavioral interventions and function-based treatments in English.

Once such function based treatment that is commonly implemented is functional communication training. Functional communication training (FCT), a popular function-based treatment strategy, is an intervention to reduce and replace problem behavior with an effective and communicative alternative (Carr & Durand, 1985). This is done by identifying a function through an FA, and replacing the problem behavior with a communicative phrase that serves the same function. Through reinforcement of the communicative response and extinction of the problem behavior, interventionists should expect to see deceleration of the problem behavior.

In particular, Rispoli et al. found that language influenced responding during an FA. Rispoli et. al. (2011) conducted a FA with one participant who spoke primarily Spanish at home but communicated in English at school. In conducting a multi-element FA, by alternating the language across three verbal conditions (play-verbal, demand, and attention) and one non-verbal control condition (play-nonverbal), they were able to demonstrate that English had a differential effect on rates of challenging behavior. Challenging behavior was defined as hitting or throwing things at the therapist. In conditions that included verbal interactions between the therapist and participant, there were elevated rates of challenging behavior in conditions conducted in English. During the same conditions that were completed in Spanish, levels of challenging behavior were undifferentiated as compared to the non-verbal control condition. The authors

hypothesized that increased challenging behavior in the English condition may have been due to the participant not understanding the demand when it was placed in English or differing interactions styles across languages. If an individual has difficulty understanding English, one would expect to see elevated rates of challenging behavior during demands delivered in English due to the averseness of the demands. Demands in English create an establishing operation (EO) for challenging behavior which would make escape from demands more valuable as negative reinforcement. Similarly, if the individual has a history of receiving attention in Spanish from a family member in response to challenging behavior, you would expect to see elevated rates of challenging behavior when attention is provided in Spanish.

The purpose of this study was to replicate and expand on Rispoli et al. study to see how language impacts challenging behavior during an FA and whether language is relevant in function-based treatment. This study expands on the previous research by using multiple participants as the previous study only used one participant. I will also implement a function-based treatment identified through the completion of the FA, which was not completed in the previous study. The previous study's participant came from a home in which the participant's family spoke Spanish whereas her school was bilingual. The current study includes participants who came from families who speak Spanish at home a majority of the time; however, their school is English only. This study also includes a wide range of ages whereas the previous study included a young child. The research questions addressed in this study are as follows:

1. How will challenging behavior differ between FA conditions conducted in English compared to Spanish in individuals who come from bilingual homes in which Spanish is the primary language spoken?

2. Based on the differential results of the FAs, if a function-based treatment is implemented in the language which produces more challenging behavior within the FA, will this result in lower rates of challenging behavior, which will maintain throughout treatment?

CHAPTER 2

METHODS

Participants

The participants in this study were three individuals with intellectual disabilities whose language used in the home was primarily Spanish, but whose parents also spoke English. Students ranged in ages from 7- to 19-years-old. The students exhibited challenging behavior that warranted an FA. The parents of the students were considered bilingual; however, to be included in the study, the parents were surveyed, in Appendix C, to ensure they spoke to their child in Spanish for the majority of time within the natural environment. The survey asked the parents questions such as, “When you ask your child to do something which language do you use?”, “When providing attention, which language do you use?”, and “What language do you primarily use throughout your day?” All participants currently lived in a residential setting and were students at a residential school where English is the primary language used for instruction. Students were not included in the study if it was found that their parents did not speak to them in Spanish at all, they did not come from bilingual homes, and they did not have significant challenging behavior deeming a FA necessary.

The first participant, Carson, was a 19-year-old male of Hispanic descent who had lived in the residential treatment facility for 6 years. Carson’s diagnoses include autism spectrum disorder; severe intellectual disability; stereotypic movement disorder associated with autism spectrum disorder; intellectual disability with self-injurious behavior, moderate; GERD; episodes of intermittent vomiting, history of gastritis, seasonal allergies, and a differential diagnosis of migraine headaches. Carson has had a history of aggression in the home, primarily towards his mother. Previous FAs had used

Carson's mother as therapist to see if responding differed based on therapist history; however, those results were inconclusive. When surveying Carson's mother, she stated that she spoke both Spanish and English in the home. She stated that Spanish was her first language. The previous FAs were in English even when Carson's mother was the therapist. Carson was verbal; however, novel staff had difficulty understanding him sometimes, so he used an augmentative and automated communication (AAC) device to make requests in situations in which he is hard to comprehend.

The second participant, Sandra, was an 11-year-old female of Puerto Rican descent who lived in the residential treatment facility for three years. Sandra's diagnosis included autism spectrum disorder, severe intellectual disability, PICA, attention deficit hyperactivity disorder, encopresis, and enuresis. Sandra has had a history of exhibiting aggression; however, this was primarily seen with her mother. In her survey, Sandra's mother stated that she primarily speaks Spanish in the home. She stated that Spanish is her primary language, and she has difficulty speaking in English. Aggression for Sandra was previously assessed; however, she often had high rates of aggression with her parents who only speak Spanish to her. Sandra had a limited verbal repertoire. In the natural environment she uses a picture point book and verbal requests to communicate.

The third participant, Michael was a 7-year-old male, of Puerto Rican descent, who had lived in the residential treatment facility for three months. Michael was diagnosed with autism spectrum disorder and intellectual disability. Michael's mother stated that she primarily speaks Spanish and that she tries to speak English to Michael as well as Spanish which is her primary language for communication. Michael was

nonverbal and was just beginning phase 1 of the Picture Exchange Communication System (PECS).

Materials and Settings

FAs were conducted in the residential treatment facility within a padded assessment room. All sessions were conducted by the same therapists. Therapists were able to comprehend and speak to the client in Spanish as well as English. The therapist conducting the sessions completed an FA training curriculum (Chok & Harper, 2016). This training including the history of FAs, the different types of FAs within the literature, as well as common conditions used within an FA. This curriculum required extensive oversight from a clinician and required participants to not only know how to conduct a FA, but also how to think critically when deciding which design to use. Assessments included preferred items that were identified via a paired stimulus preference assessment (Fisher et. al. 1992) prior to sessions.

During treatment for Michael, sessions were conducted in the residential treatment facility within a padded assessment room and then generalized to the natural environment. All treatment sessions were conducted by the same therapist used within the FA and then generalized to other staff members. Therapists were able to comprehend and speak to the client in Spanish as well as English. The therapist conducting the treatment sessions were the same as those used within the FA. The break card used for Michael had a picture of a character lounging in a chair, stated “break” in Spanish as well as stated “break” in English on the icon.

Dependent Measure

The dependent variable was the rate of the individual's challenging behavior. The challenging behavior for all of the participants was aggression. Aggression for Carson was defined as any instance or attempt of biting others, hitting others with an open or closed hand, head butting, scratching, pushing, pinching, kicking or throwing objects or furniture at people. This was previously assessed (within an FA) for Carson; however, language was never assessed in rates of challenging behavior for Carson. Sandra's aggression was defined as any instance or attempt of biting, hitting others with an open or closed hand from more than 6 inches, head butting, scratching, pinching, kicking, pulling a person to the ground and hair pulling. Aggression for Michael was defined as any instance or attempt of hitting with an open or closed fist from a distance greater than 6 inches, kicking, biting, scratching, pinching, grabbing and pulling on staff's appendages (with a force great enough to pull staff off balance), pulling hair, heading butting, and/or throwing objects within 2 feet of another individual. Michael has had no prior FAs completed since his admission to the residential treatment facility. During treatment for Michael aggression data were collected using the same definition as used in the FA.

Data Collection

Data were collected on a mini computer with the program DataPal (Bullock, 2017) for both FA and treatment sessions. Data were collected by the clinical team within the residential treatment facility. Frequency data were conducted for aggression for all the participants. Each instance that the behavior occurred the key corresponding to the behavior was entered by the data collectors on the mini computers.

Inter-observer Agreement

Inter-observer agreement (IOA) data were calculated using exact interval agreement (EIA) recording across all sessions for all conditions. Sessions were divided into 10 sec intervals and an agreement was scored if both observers recorded the same number of responses for each interval. Total agreements and disagreements were calculated by number of intervals with agreements divided by number of agreements plus the number of disagreements multiplied by 100. IOA data were collected for each participant and each condition. For Carson in English sessions, IOA was collected 66.7% of attention sessions with a mean EIA for aggression 100% (range, 100%), 57.1% of demand sessions with a mean EIA for aggression 98.9% (range, 96.7%-100%), 66.7% of play-verbal sessions with a mean EIA for aggression 96.7% (range, 93.3%-100%), and 33.3% of play- nonverbal sessions with a mean EIA for aggression 100% (range, 100%). For Carson in Spanish sessions, IOA was collected 66.7% of attention sessions with a mean EIA for aggression 100% (range, 100%), 42.9% of demand sessions with a mean EIA for aggression 100% (range, 100%), 50% of play-verbal sessions with a mean EIA for aggression 100% (range, 100%), and 33.3% of play- nonverbal sessions with a mean EIA for aggression 100% (range, 100%). For Sandra in English sessions, IOA was collected 100% of attention sessions with a mean EIA for aggression 100% (range, 100%), 100% of demand sessions with a mean EIA for aggression 100% (range, 100%), 100% of play-verbal sessions with a mean EIA for aggression 100% (range, 100%), and 100% of play- nonverbal sessions with a mean EIA for aggression 100% (range, 100%). For Sandra in Spanish sessions, IOA was collected 100% of attention sessions with a mean EIA for aggression 100% (range, 100%), 100% of demand sessions with a mean EIA for aggression 100% (range, 100%), there was no IOA for play-verbal sessions

because they did not occur, and 0% of play- nonverbal sessions (there was only one play- nonverbal session conducted). For Michael in English sessions, IOA was collected 18.2% of attention sessions with a mean EIA for aggression 100% (range, 100%), 40% of demand sessions with a mean EIA for aggression 100% (range, 100%), 45.5% of play- verbal sessions with a mean EIA for aggression 100% (range, 100%), and 50% of play- nonverbal sessions with a mean EIA for aggression 100% (range, 100%). For Michael in Spanish sessions, IOA was collected 47.1% of attention sessions with a mean EIA for aggression 100% (range, 100%), 55.6% of demand sessions with a mean EIA for aggression 96.0% (range, 93.3%-100%), 57.1% of play-verbal sessions with a mean EIA for aggression 100% (range, 100%), and 71.4% of play- nonverbal sessions with a mean EIA for aggression 100% (range, 100%). For treatment for Michael, IOA was collected for 41.2% of all baseline sessions with a mean EIA for aggression 98.0% (range, 93.3% - 100%), 28.6% of all treatment sessions with a mean EIA for aggression 97.1% (range, 93.5% - 100%), and 100% of all fading sessions with a mean EIA for aggression 100% (range, 100%).

Procedural Fidelity

Procedural fidelity measures were collected to ensure all FA sessions were conducted accurately and can be found in Appendix A. The procedural fidelity checklists consisted of an outline of what was to be occurring within each session. The sessions were outlined to describe the contingency that was provided within each session. It also noted the language in which the session was being conducted. The checklist highlighted demands to be present in demand conditions, tangibles present in play and attention conditions, and the prescribed amount of attention to be delivered by the therapist when

the targeted challenging behavior was evoked. The checklist data were summarized by calculating percentage of steps implemented correctly. During all FA sessions for Carson, procedural fidelity scores were 100% of steps implemented correctly across all conditions and were conducted for 100% of sessions. During all FA sessions for Sandra, procedural fidelity scores were 100% of steps implemented correctly across all conditions and were conducted across 100% of all FA sessions. During all FA sessions for Michael, procedural fidelity scores were 100% of steps implemented correctly across all conditions and were conducted across 100% of all FA sessions. During treatment for Michael, procedural fidelity checks were conducted as well and can be found in Appendix B. During all treatment sessions (baseline, treatment, and fading), procedural fidelity scores were 100% of steps implemented correctly across all conditions and were conducted across 100% of all FA sessions,

Experimental Design

The FA conditions were conducted in a multi-element design with language assessed within an ABAB design with A and B representing Spanish or English conditions. The order of language condition was counterbalanced with Carson starting with the Spanish conditions and Sandra and Michael starting with the English conditions. There were a total of four conditions conducted per each FA condition within each language. The number of sessions in each language varied based on the participant and responding. Carson had a total of 25 sessions conducted in Spanish and 25 sessions conducted in English. Sandra had a total of 12 sessions conducted in English and only 3 in Spanish. This was due to the fact that Sandra did not engage in the target behavior throughout any of the sessions conducted. Michael had a total of 42 sessions conducted

in English and 30 sessions conducted in Spanish. The four conditions were attention, play–verbal, play–nonverbal, and demand. The order of FA conditions were randomized within the languages to prevent sequencing effects; however, another session of the same condition was not conducted until all conditions were conducted (e.g., play-verbal is ran and cannot be conducted until attention, demand, and play-nonverbal are completed).

Evaluation of the effectiveness of Michael’s intervention procedure (based on the FA results) was conducted in a reversal (i.e., baseline, treatment, baseline, etc.) with an alternating treatment design (i.e., alternating English vs. Spanish). This design was used to teach a break response in both Spanish and English. Once treatment sessions were conducted in both Spanish and English throughout two environments (i.e., padded treatment room and the classroom), fading sessions were continued within English only.

Procedures

All sessions FA sessions were 5 min in length. Within the Spanish sessions only Spanish was spoken to the individual throughout all sessions. In the English sessions only English was spoken.

Attention

During the attention condition, the individual was in the padded treatment room and had access to moderately preferred items. The therapist stated that they had “work” to do and turned away from the individual with a magazine or paperwork to work on. Upon an occurrence of the targeted challenging behavior, the therapist turned back toward the individual, provided 10 sec of attention in the form of a brief verbal statement and brief physical contact. The brief verbal statement included stating things such as “Hey, you don’t have to do that,” “Did you need something?” or “Hey I can give you

attention.” The physical contact included side hugs, high-fives, arm squeezes or head rubs. All other challenging behavior was ignored.

Demand

During the demand conditions, demands were presented according to the individual’s skill level. Demands were selected based on interviewing the individual’s special education teacher. The teacher provided things they may be working on in the classroom or mastered tasks they still required maintenance on. Demands were in the form of table top, fine motor, and gross motor activities. Least-to-most prompting was provided if the individual was non-compliant or did not respond. Prompting was provided to the individual with the therapist stating the demand in the target language, then modeling the response while restating the demand, and finally providing hand over hand prompting while restating the demand. Demands were presented in the target language. Contingent on the targeted challenging behavior 10 sec of escape was provided from the task demands. All other challenging behavior was ignored.

Play-Verbal

During the play-verbal conditions, the individual had no task demands and had non-contingent access to preferred items. Preferred items were identified via a paired stimulus preference assessment (Fisher et. al. 1992). Verbal praise and physical contact were provided at least once every 30 secs. Verbal praise was in the form of positive statements towards the individual commenting on their clothes or toys, while physical interactions involved high-fives, side hugs, and head squeezes. Verbal interactions were in the specified language within the condition. All challenging behavior was ignored as well as the target behavior.

Play-Nonverbal

The play- nonverbal condition was conducted identical to the play-verbal condition with the exception of verbal interactions. No verbal interactions were provided throughout this condition, regardless of language. Although no verbal interactions were provided the therapist still provided the individual with physical contact (ide hugs, head rubs, high-fives, etc.) This served as the control across all conditions in both English and Spanish.

Function-Based Treatment

Given that his rates of challenging behavior maintained across languages a function based-treatment (i.e., FCT) was conducted for Michael. An alternating treatment design was implemented to demonstrate whether there was a difference in the acquisition of the break response in English versus Spanish. Due to his responding within the demand condition I implemented the teaching of a break request through FCT. Baseline data prior to the treatment was taken from the previously conducted demand conditions from the FA. During the treatment phase, demands were delivered in one respective language for one session and the opposite in the next sessions. All treatment sessions were conducted in the padded treatment room where the FA was conducted and then generalized to the natural environment. Generalization occurred by conducting sessions in the client's classroom, and implementing the FCT across multiple staff members.

The break response was taught in the form of an icon exchange since Michael was non-verbal. The break icon had a picture of a character relaxing on a chair and stated the word "break" in English and in Spanish. The break was a 30 sec sterile break, meaning

that no other items or activities were provided during the break: only escape from demands were provided. This was increased from the 10 sec of escape during baseline to make the FCR more valuable than aggression. During the treatment phase, contingent on demands, an icon exchange was prompted using a progressive time delay with most-to-least prompting. Once he performed three exchanges with a hand over hand prompt he was then provided a partial physical prompt at the elbow, which was then faded to a gesture prompt and then no prompt. The latency of the prompt also extended as the prompts were faded. This was continued until 3 consecutive sessions of 80% independence of icon exchanges was identified with low rates of aggression. The therapist was the same throughout the treatment implemented as well. Once Michael had reached the previous stated criteria (3 consecutive sessions at 80% independent icon exchanges or better) of independent responding, sessions were faded to the natural environment, which was his classroom. Treatment sessions in the natural environment were identical to those in the treatment room. Once Michael had reached 100% independence across three sessions per language, the therapist reversed to baseline. Baseline sessions were conducted in both languages and were identical to baseline sessions in the treatment room; however, they were conducted in the natural environment (i.e., the classroom). Treatment probes in both English and Spanish were then implemented following baseline probes to show experimental control through the use of FCT. Following treatment probes, fading was implemented. Prior to fading, it was assessed which language showed differentiated responding in the FCR, as well as low rates of challenging behavior. During treatment sessions Michael was able to ask for 10 breaks throughout sessions. During fading sessions, Michael was to complete 5 min of

work; however, could only ask for 5 breaks at 30 secs each. Once he requested for the maximum number of break requests for sessions, the break icon was covered with a red square and Michael was told break was no longer available until his work time was complete. Michael was prompted to complete his work until the timer went off for the five minutes of work and icon exchanges were placed on extinction until the work timer went off. Following the work timer sounding for the end of work Michael was informed that his work block was complete and he could ask for items or activities for his break. Michael was provided with a 5 minute break between sessions.

CHAPTER 4

RESULTS

Functional Analysis Results

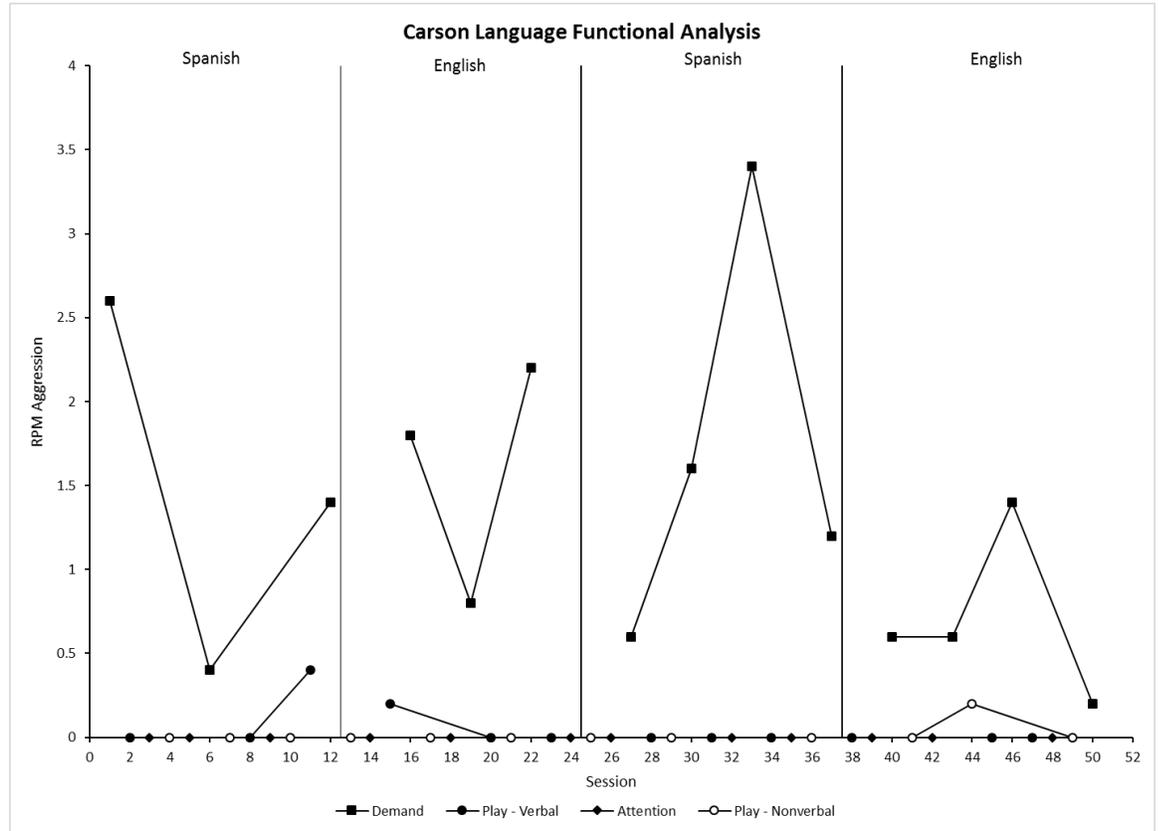


Figure 1. This graph demonstrates rates of aggression for Carson in a multi-element FA with language assessed in a reversal design. The y-axis displays rate, while the x-axis displays sessions.

Figure 1 displays the rate of aggression for Carson's FA. The y-axis displays the responses per minute of aggression and the x-axis displays the sessions. The closed squares represent demand conditions, the closed circles represent the play-verbal conditions, the closed diamonds represent the attention conditions, and the open circles represent the play-nonverbal conditions.

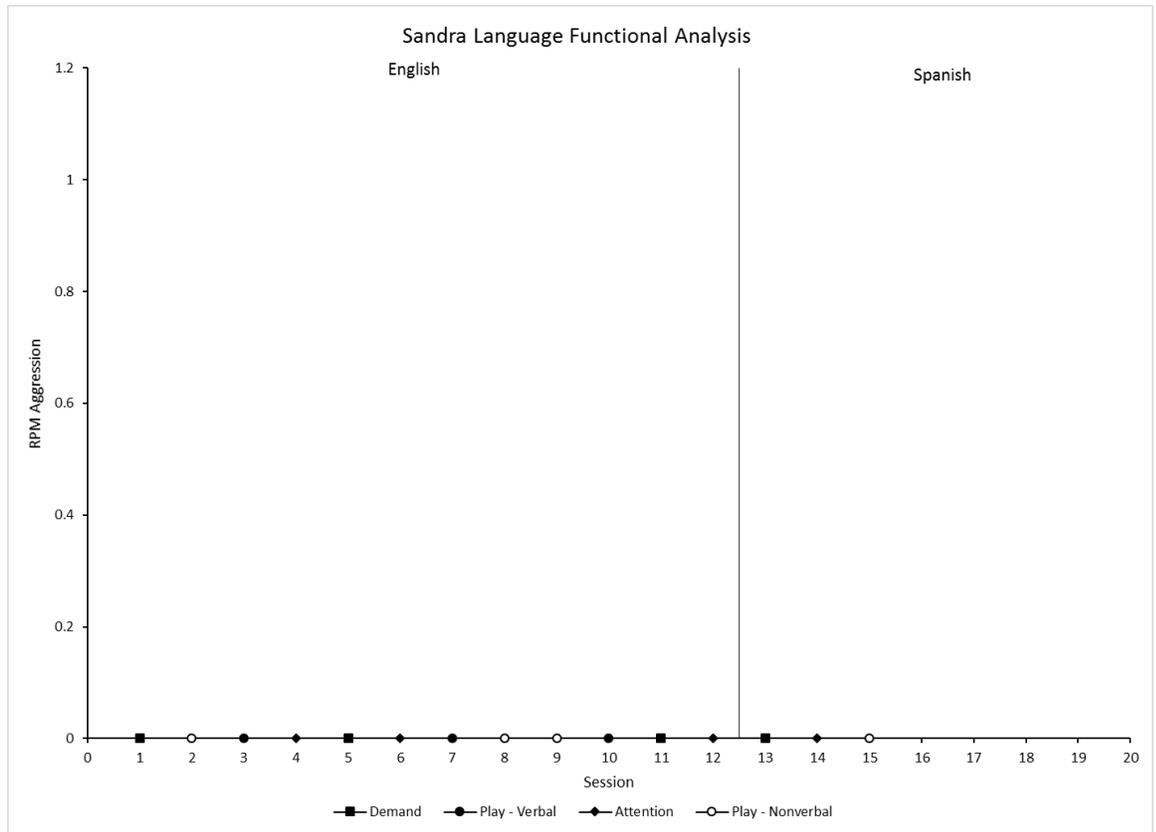


Figure 2. This graph demonstrates rates of aggression for Sandra in a multi-element FA with language assessed in a reversal design. The y-axis displays rate, while the x-axis displays sessions.

Figure 2 displays the rate of aggression for Sandra’s language FA. The y-axis displays the responses per minute of aggression and the x-axis displays the sessions. The closed squares represent demand conditions, the closed circles represent the play-verbal conditions, the closed diamonds represent the attention conditions, and the open circles represent the play-nonverbal conditions.

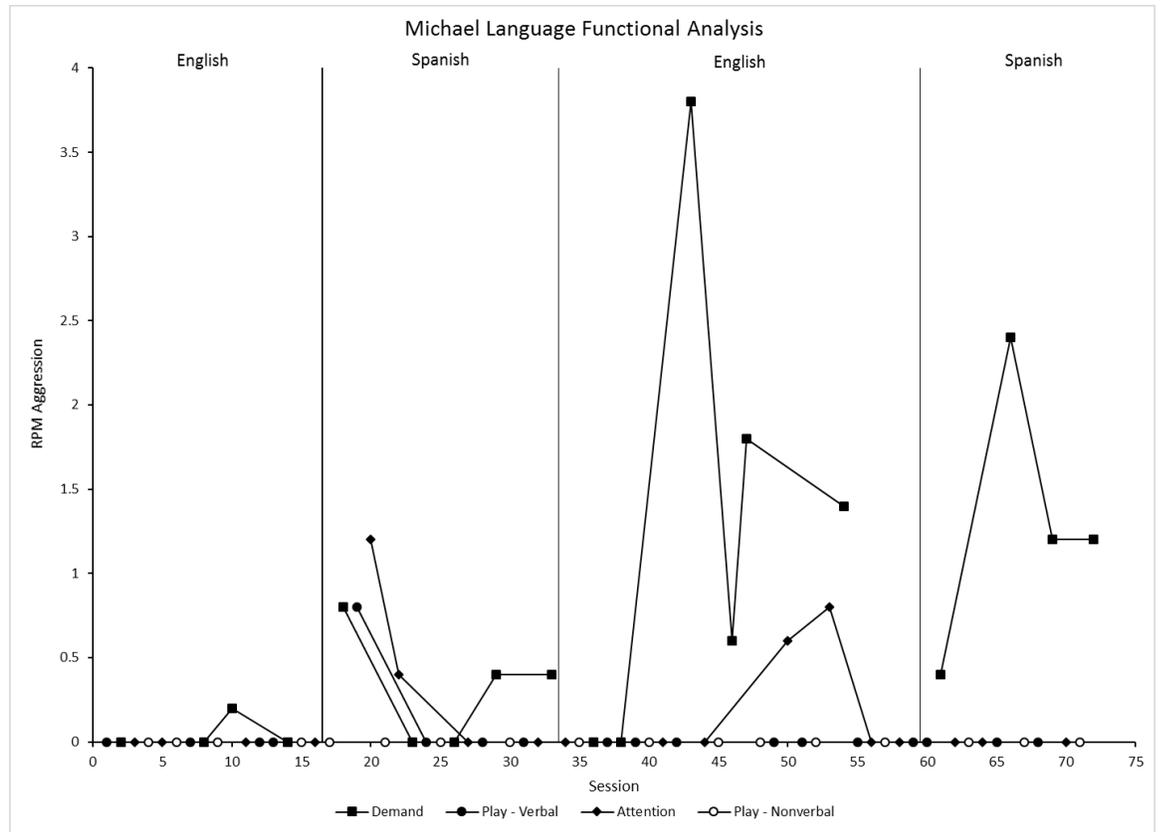


Figure 3. This graph demonstrates rates of aggression for Michael in a multi-element FA with language assessed in a reversal design. The y-axis displays rate, while the x-axis displays sessions

Figure 3 displays the rate of aggression for Michael’s language FA. The y-axis displays the responses per minute of aggression and the x-axis displays the sessions. The closed squares represent demand conditions, the closed circles represent the play-verbal conditions, the closed diamonds represent the attention conditions, and the open circles represent the play-nonverbal conditions.

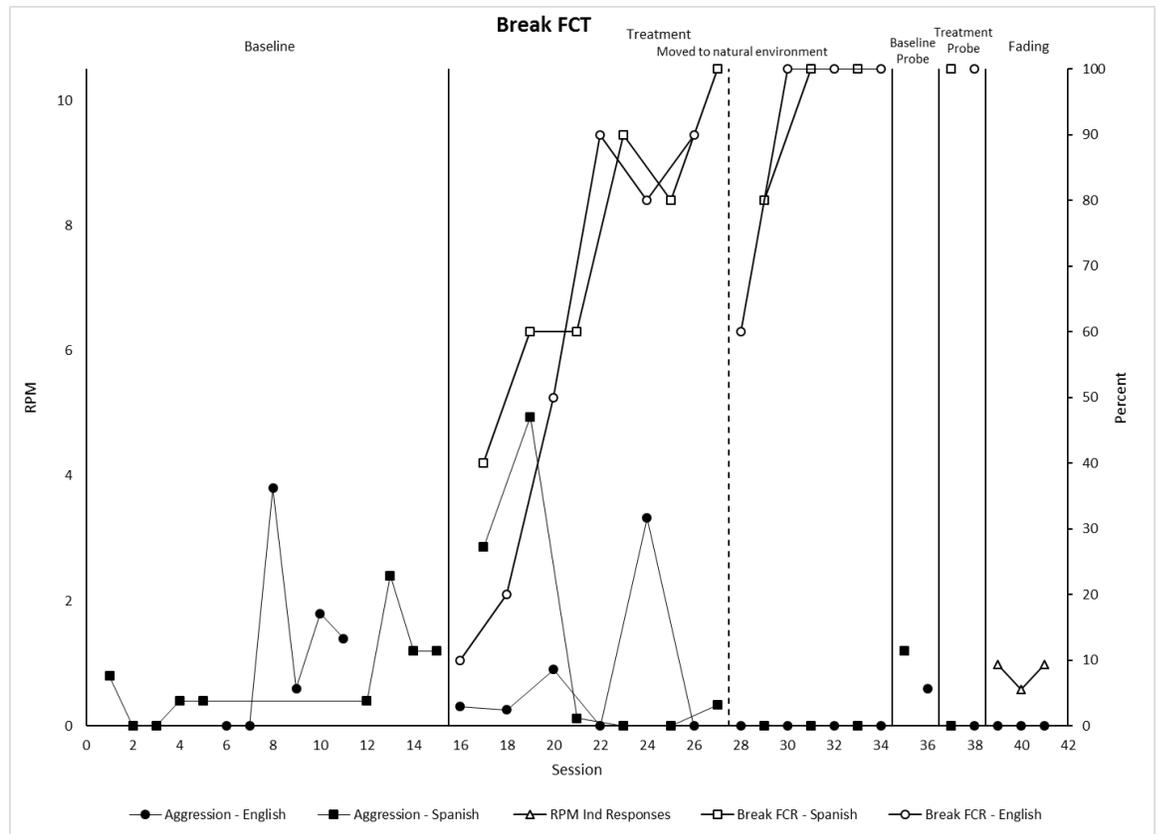


Figure 4. This graph demonstrates independence during FCT for Michael and rate of aggression. The primary y-axis displays rate of aggression, the secondary y-axis displays percent of independence with the break response, and the x-axis displays sessions.

Figure 4 displays Michael's break FCT. The primary y-axis displays responses per minute of aggression, the secondary y-axis displays percent of independent responses, and the x-axis display the sessions. The closed circles represent the rate of aggression within the English conditions, the closed squares represent the rate of aggression within the Spanish conditions, the open triangles represent the rate of independent responses, the open squares represent the percent of independent responses within Spanish conditions, and the open circles represent the percent of independent responses within English conditions.

Carson's FA, displayed in Figure 1, demonstrated that he engaged in aggression to escape demands regardless of what language the demands were given. Carson's mean rate of aggression was 0.45 (range, 0-3.4) in Spanish conditions and 0.3 (range, 0-2.2) in English conditions reflecting little difference in responding when evaluating the differences in rate of aggression among languages. The data show that rates of aggression remain high and stable with a clear level change when compared to control conditions (play-nonverbal). Carson's rates of aggression were within the same range across both languages and remained stable throughout. All other conditions remained low and stable when compared to control conditions. There were two sessions (one within Spanish and one within English) in which rates of aggression within the play-verbal were differentiated when compared to control conditions. When observing these conditions, it was clear that the physical and verbal attention provided by the therapist every 30 sec appeared to be aversive to Carson. He stated "all done" and "bye-bye." The researcher hypothesizes that he could potentially find excessive attention aversive and engage in aggression to avoid social attention however this was not clearly identified or tested through this study. Anecdotally, staff reported that sometimes before the therapist began verbally stating the demands he engaged in aggression. One possible interpretation is that Carson could have been responding to the therapist's body language and orientation towards him as the discriminative stimulus for demands prior to the verbal directive.

Sandra's results are displayed in Figure 2. She did not show any challenging behavior regardless of the language in which the FA was conducted. There were zero

rates of challenging behavior in all 15 sessions conducted; therefore, the FA procedures were terminated for her.

Michael's results, shown in Figure 3, overall demonstrated differentiated responding in demand sessions when compared to control sessions (play non-verbal). Michael's mean rate of aggression in the FA was 0.3 (range, 0-2.4) in Spanish conditions and 0.2 (range, 0-3.8) in English conditions reflecting little difference in responding when evaluating the differences in rate of aggression among languages. Within the first English condition, Michael only engaged in aggression during one demand condition; however, that decreased to zero by the last session. Once Spanish conditions were conducted Michael engaged in aggression within the demand, play verbal, and the attention conditions. However, both the attention and the play verbal conditions decreased to zero over the course of the first Spanish FA condition while the demand conditions remained elevated. Once we reversed back to the English conditions demand conditions continued to remain elevated when compared to the control conditions. There was some responding during the English attention conditions however that decreased to zero. Finally, when we reversed back to the Spanish conditions demand conditions remained elevated while all other sessions were at zero rates of challenging behavior. Michael could have contacted the contingency within Spanish which then resulted in elevated rates of aggression regardless of language.

Treatment Results

As shown in Figure 4, during treatment sessions, Michael showed a decrease in challenging behavior as independence in the FCR continued to increase in both languages. Michael's mean rate of aggression in baseline for treatment was the same as

the FA listed above (mean, 0.3; range, 0-2.4) in Spanish conditions and 0.2 (range, 0-3.8) in English conditions). Michael's mean rate of aggression in treatment sessions was 0.5 (range, 0-3.8) in English sessions and 0.9 (range, 0-4.9) in Spanish conditions displaying minimal difference in rate of aggression across language during treatment sessions. There were zero rates of aggression during fading sessions. Sessions conducted in the treatment room still showed elevated rates of challenging behavior; however, Michael met the 80% or better criteria to fade sessions to the natural environment. Once we moved to the natural environment, Michael's classroom, we saw an immediate increase in independence of the FCR in both languages as well as zero rates of aggression. We then reversed to baseline, and conducted a baseline probe in both languages during which we saw differentiated rates of challenging behavior than treatment sessions as well as similar to baseline rates. We reversed back to treatment to show experimental control and Michael demonstrated elevated rates of independence in utilizing the FCR in both languages as well as zero rates of challenging behavior. We then moved to fading in which Michael was limited to five break responses per 5 min of work. During this time, Michael demonstrated zero rates of challenging behavior even when limited to half the amount of breaks he was afforded previously.

CHAPTER 5

DISCUSSION

The purpose of this study was to replicate the procedures of the Rispoli et al. (2011) study using multiple participants, and to incorporate function-based treatment. This study predicted that challenging behavior would differ between FA conditions conducted in English compared to Spanish in individuals who come from bi-lingual homes in which Spanish is the primary language spoken. Also, based on the differential results of the FAs, a function-based treatment implemented in the language that produced more challenging behavior would result in lower rates of challenging behavior during treatment, which would maintain throughout treatment. This results of this study did not replicate the findings of past research (Rispoli et al.). Specifically, these findings did not demonstrate that rates of challenging behavior differed based on the language that was used in the FA in that no differentiation based on language was observed for any of the three participants. When there was an identified function for a participant they responded in the same manner regardless of language. Carson and Michael both responded at higher rates during the escape condition regardless of language, while Sandra had no responding regardless of language. Carson and Michael's lack of differential responding by language may be due to the nature of the demands, in which the aversive stimuli (i.e., the work task) were the same regardless of language. In Rispoli et. al., their work demands consisted of colored blocks and the individual was instructed to point to a specific block. Although the demands delivered for both Carson and Michael involved instructions in both English and Spanish, there was no differentiation in their responding during either condition. Further evaluation would need to be completed to determine their

level of comprehension in written and spoken Spanish versus their comprehension in English to assess why language did not make a difference for them.

Furthermore, for Carson, a function-based treatment was implemented in both languages following baseline. Language was not a factor in this participant's rates of challenging behavior or the rate in which he acquired the alternative replacement response during FCT. When FCT was implemented rates of challenging behavior remained low and stable throughout treatment conducted in both languages. In the last treatment phase of the study, English was selected as the language of intervention since services were delivered in English in the school the participant attended. Once English was selected as the primary language to complete treatment, challenging behavior continued to remain low and stable even when the intervention was faded.

Limitations

There were several limitations to this study to consider. The first limitation is that although the outcomes of language on FA results were assessed we did not address comprehension or the participant's linguistic ability. These variables could have an effect on rates of challenging behavior given the nature of demands, particularly if the demands require more advanced language comprehension.

Second, in some sessions Carson would respond with challenging behavior prior to the therapist stating the demand verbally. In some cases, the body positioning and the orientation of the therapist with the presence of the demands would occasion challenging behavior. This could be a factor because it is possible that the presence of demands occasioned challenging behavior apart from the language used in the demands. For example, if an individual had difficulty with a specific language in regard to reading you

would expect to see challenging behavior due to the presence of the demands that required reading.

Third, Sandra did not engage in any challenging behavior throughout any of her FAs. Thus, after the 15th session the study procedures were terminated for Sandra. Further research could examine moving sessions in the natural environment to enable the participant to contact naturally occurring contingencies that may be maintaining the challenging behavior while examining language. Her lack of responding could also be due to a tangible reinforcement function that was not assessed, as well as extraneous variables in the natural environment that evoked challenging behavior that were not present in the sterile treatment rooms. Sessions could have been moved to the natural environment which could have possibly had different outcomes not only for Sandra but for all of our participants.

Fourth, the use of an analog FA did not necessarily isolate extraneous variables which could affect rates of challenging behavior, specifically in the case of Sandra. While language was assessed to see if a typical FA in English would differ from a typical FA in Spanish sessions were conducted within an environment different from the one in which challenging behavior occurred. If a trial-based FA was conducted in the natural environment, for example, it could potentially show different results than the analog FA conducted within this study.

Last, while language was assessed all of the participants either had limited or no verbal repertoire. Michael was non-verbal, while Carson and Sandra had limited verbal skills. We did not identify prior to this study whether they could read or even speak

Spanish. This could have had a significant impact on how language affects their challenging behavior as well as acquisition of the replacement behavior.

Overall, challenging behavior and FA outcomes can be affected by a myriad of extraneous and environmental variables not typically assessed (McAdam et. al. 2004, Lang et. al. 2011, & Rispoli et. al. 2011). These continue to make impacts and more research is needed on the effects idiosyncratic stimuli have on FA outcomes.

Future Research and Practice

Given that participants did not show any response differentiation between conditions, future research should look to expand this study with individuals with more verbal skills to assess whether more advanced language affects challenging behavior. While two of the participants in this study had some verbal skills, they were limited in their verbal repertoires. Future researchers should conduct assessments in the participant's native language to determine if native language level may be a factor in challenging behavior when presented with verbal stimuli. Future research should also examine isolating if there is a difference in language effects on work demands (e.g., demands presented with verbal instructions versus no instructions). While this study showed for two participants that language did not play a part on the averseness of demands, this could differ based on the complexity of the demands (e.g., two-step instructions). Therefore, while the results of this study did not show that language made a difference for these individuals, this does not necessarily mean that language is not a concern for all English language learners. Practitioners should still consider language before they conduct an FA if individuals have a background with English as their second language.

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APPENDICES

APPENDIX A

FUNCTIONAL ANALYSIS PROCEDURAL FIDELITY CHECKLIST

Reviewer: _____ Therapist: _____ Date: _____ Client: _____ Session: _____

Directions: Mark a “y” for yes it occurred, a “n” for no it did not occur, or “n/a” for not applicable.

Attention Conditions:

- Therapist stated they had work to do and turned away: _____
- Contingent on challenging behavior therapist provide 10 secs of attention: _____
- Attention was provided in the targeted language: _____
- All other non-targeted challenging behavior was ignored: _____

Demand Conditions:

- Demand materials present throughout sessions: _____
- Contingent on challenging behavior therapist removes demands for 10 secsecs: _____
- Demands were presented in target language: _____
- All other non-targeted challenging behavior was ignored: _____

Play-Verbal Conditions:

- No task demands present: _____
- Participant has non contingent access to preferred item: _____
- Verbal praise and physical contact provided at least every 30 secs: _____
- Verbal interactions provided in targeted language: _____
- All targeted and non-targeted challenging behavior was ignored: _____

Play-Nonverbal Conditions:

- No task demands present: _____
- Participant has non contingent access to preferred item: _____
- No verbal interactions provided throughout: _____
- All targeted and non-targeted challenging behavior was ignored: _____

Percentage Correct: _____

APPENDIX B

TREATMENT ANALYSIS PROCEDURAL FIDELITY CHECKLIST

Reviewer: _____ Therapist: _____ Date: _____ Client: _____ Session: _____

Directions: Mark a “y” for yes it occurred, a “n” for no it did not occur, or “n/a” for not applicable.

Baseline Conditions:

- Demand materials present throughout sessions: _____
- Contingent on challenging behavior therapist removes demands for 10 secs: _____
- Demands were presented in target language: _____
- All other non-targeted challenging behavior was ignored: _____

Treatment Conditions:

- Task demands present: _____
- Break card present on front of PECS book: _____
- Contingent on exchange of icon 30 sec sterile break provided: _____
- Demands provided in targeted language: _____
- Prompts faded in a progressive time delay with most to least prompting: _____
- All targeted and non-targeted challenging behavior was ignored: _____

Fading Conditions:

- Task demands present: _____
- Break card present on front of PECS book: _____
- Contingent on exchange of icon 30 sec sterile break provided: _____
- Demands provided in targeted language: _____
- No prompts provided: _____
- Only 5 breaks provided: _____
- Following 5th break prompted to complete remainder of work time: _____
- All targeted and non-targeted challenging behavior was ignored: _____

Percentage Correct: _____

APPENDIX C
PARENT SURVEY

Client #:

Target Behavior:

What language do you primarily use throughout your day?

Spanish English

What language did you first learn and still understand today?

Spanish English Both Spanish and English equally Other:

What is your level of English?

Basic Intermediate Advanced Native tongue

What is your level of Spanish?

Basic Intermediate Advanced Native tongue

How often do you speak to your child in Spanish?

Always Sometimes Never

How often do you speak to your child in English?

Always Sometimes Never

When you ask your child to do something in which language do you use?

Spanish English

When providing attention to your child which language do you use?

Spanish English