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Language Acquisition with English Language Learners Who Have Developmental Delays

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ABSTRACT

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Who Have Developmental Delays

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The current study examined the effects of language instruction with two preschool age students who are English language learners who have developmental delays using the incidental teaching method. Language targets were randomly chosen according to the language level of each student and the targets were either in Spanish (L1) or English (L2). The students were in a special education classroom and researchers worked with them one-on-one, using the natural learning environment to teach and to better implement learning objectives. Targets were withheld during play and students had to mand, tact, or use intraverbal skills to receive the item. Their reward was the object they desired after they manded, tacted, or used intraverbal language. The experimental effects were measured using a single case, repeated acquisition design. The intervention was maintained for five months. The results indicated that acquisition of English (L2) is acquired faster after Spanish (L1) has been appropriately taught. Implications for further research are discussed.

Keywords: single case, language acquisition, vocabulary, English language learners, developmental delays

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Chapter 1: Introduction

English language learners (ELLs) often have difficulties adapting to the English language, often making it difficult to achieve academic success to the same degree as a native English speaker. Developmental delays (DD) are identified in students who demonstrate lower achievement than their average peers, and there are quite a few ELLs who who also have developmental delays that lead to further impairments in their academic growth. Verbal behavior instruction is useful in teaching children to use verbal operants—primarily mands, tacts, and intraverbals, which are the building blocks for early communication development. Since incidental teaching is student-initiated, learning is at the student's pace and is more meaningful for the student, making it an effective method for vocabulary instruction. These topics will be discussed in depth throughout this literature review.

The primary purpose of the review is to evaluate language instruction and incidental teaching with English language learners who have developmental delays. Initially, we will be focusing on English language learners and developmental delays, and then explaining language instruction and incidental teaching in the context of English language learners who have developmental delays. Finally, vocabulary and its relationship to language instruction will be explained.

Chapter 2: Literature Review

Communication deficits are a main area of concern in children with developmental delays and difficulties; therefore, supporting the communication needs of children with these challenges is an essential component of any intervention (Virués-Ortega, 2010). There are several evidence-based methods that can be used when implementing communication interventions. Discrete trial teaching is an extremely structured type of instruction focused on prompting, shaping, and reinforcing expressive and receptive communication (Lovaas, 1987; Smith, Eikeseth, Klevstrand, & Lovaas, 1997). Functional communication training is an intervention method that uses communication alternatives to change problem behaviors (Carr & Durand, 1985; Mancil, 2006). Incidental teaching and pivotal response teaching are student-initiated approaches that utilize the child's natural environment during an intervention. Incidental teaching and pivotal intervention opportunities do not require much structure, instead relying on the natural setting (Charlop-Christy & Carpenter, 2000; McGee, Krantz, Mason, & McClannahan, 1983; McGee, Krantz, McClannahan, 1985). It is suggested that behavioral programs should consist of both discrete trial and naturalistic methods (Barbera, 2007; Thompson, 2011).

In seminal research, B.F. Skinner's analysis of language, *Verbal Behavior* (1957), has been effectively used in language intervention programs (Barbera, 2007; Greer & Ross, 2008; Sundberg & Partington, 1998). Skinner's verbal behavior approach focuses on language operants consisting of requests, imitation, responding to others' verbal behavior, labeling, and others (Sundberg & Michael, 2001). Skinner described multiple types of verbal operants that are currently used with the verbal behavior approach. They are applied using motivation and reinforcement that accompany communication responses. Skinner labeled these verbal operants using terms such as mand, tact, and intraverbal. Mands are verbal operants that are used to

"obtain objects or bring about conditions that are not present" (Sweeney-Kerwin, 2012, p. 73). Tacts are verbal operants used to label, while intraverbal responses are those that are stimulated by other speakers and require a verbal response in return.

Verbal behavior interventions differ from other types of interventions in distinct ways. In verbal behavior interventions, the environment elicits a response. For example, if a child is playing with blocks but then notices that the blocks he needs to continue building are out of his reach, he will ask his sibling for more blocks, and then he will receive them. In this case, the receipt of the blocks, which was facilitated by the sibling, reinforced the child's verbal request. This request is considered a mand. The language used in verbal behavioral approaches also sets it apart from other approaches. Terms such as motivating operations, mand, tact, and intraverbal are key to describing processes in the verbal behavior approach. These terms and processes will be explained in depth in successive paragraphs.

These verbal language interventions can be applied to any person. In the current study, a verbal behavior intervention is applied to students who are ELLs who also have developmental delays. ELLs have the ability to learn just as well as native English speakers when given the opportunity.

English Language Learners

It is important to help students who have difficulty with the language because it is the role of teachers to provide a quality education to all students regardless of their linguistic or other background. According to Utah State Board of Education, the core mission for educators is "ensuring students are well prepared for the future by providing high quality instruction in every classroom, college and career ready student performance standards, and accompanying assessments to enable parents, students and teachers to provide adequate support" (State of Utah

Department of Education, 2010). These students may require more help to succeed academically, but it is the responsibility of schools and teachers to provide whatever help is needed.

Definition. The Utah Department of Administrative Services defines an ELL in the following way:

> [An individual] who has sufficient difficulty speaking, reading and writing or understanding the English language and whose difficulties may deny such individual the opportunity to learn successfully in the classrooms where the language of instruction is English or which may deny the individual the opportunity to participate fully in society. (Utah Department of Administrative Services Division of Administrative Rules, 2014)

Prevalence. The number of ELLs has risen and continues to rise in the United States. From 1991–2002 the number of ELL students increased 95 percent and in 2001–2002, 4.7 million students were identified as limited English proficiency students (Genesee, 2006). These students represent a range of more than 400 native languages, but about 80 percent of them are native to Spanish. Other languages that are common for ELL students in the United States are Vietnamese, Cantonese, and Korean (Genesee, 2006).

According to The Pew Research Center (2015), there has been an increase of 13.6 million in the Hispanic population in the United States. The population has changed from 3.5 million in 1960 to 17.1 million in 2013. In 2013, there were 89.1% U.S.-born Hispanics who were proficient in English, 34.2% foreign-born Hispanics who were English proficient, and an overall total of 67.8% Hispanics in the U.S. who were English proficient. There is still an expectation for education systems to meet the language needs of the 33% percent of Hispanics who are not English proficient.

There is immense variability of ELL students in the United States: some students who are immigrants may have a strong academic background in their native language, while others might not have been able to receive an adequate education because of economic situations in their homeland. There are many ELL students who are not literate in their native language and have never taken a norm-referenced test. These students also have spotty educational backgrounds, which means that they are enrolled in school and drop out of school multiple times over the course of their education. Students in this situation require time to adapt to American schools (Genesee, 2006).

Students who are born in the U.S. but still qualify as an ELL may not be literate in their native language, either. Some may have strong oral English skills and others may not. However, most ELLs born in the United States learn English skills early on. Many parents enroll their students in pre-school where students will learn pre-literacy skills that will help them in the future (Genesee, 2006).

Educating ELLs

Taking into account certain factors when working with ELL students can make a profound difference in the students' educational success.

> Among the many factors associated with [Hispanic] students' educational outcomes, two stand out: culture and bilingualism. The first manifests itself in multiple national origins, traditions, and histories. These interact with American culture, producing unique sociocultural and socioeconomic outcomes. More than anything, however, what impacts [Hispanic] populations in the United States is the failure of the American educational system to meet the needs of students who manage two languages. (Figueroa, 2005, p. 163)

Artiles, Rueda, Salazar, and Higareda (2005) describe educating bilingual students and the lack of assistance these students are provided given their circumstances. They also explain how ELL students are overrepresented in special education and how schools do not assess students for language proficiency and other factors, including culture, before placing them in a special education classroom. Artiles et al. provide two vital questions to ask when working with an ELL student. The first is whether biological and social factors in early development are different according to race, which coincides with school matters, and the second is whether the school experience is racially and behaviorally discriminative. Although research demonstrates that the answer to these questions is no, ELL students may still require assistance and there are suggestions to help educate them.

Obiakor and Rotatori (2014) offer some suggestions for educating Hispanic students in special education, including to "provide optimal language supports, use culturally and linguistically responsive curriculum and instruction, routinely collect data and monitor student progress, convene a multidisciplinary academic support team, administer culturally and linguistically responsive assessments, attend workshops or trainings regularly" (p. 55). Along with these suggestions, Obiakor also provides an instruction process that many teachers can use in their classrooms. The teacher should use responsive instruction, which means that teachers should use scaffolding strategies to help their students succeed. The teachers can provide this instruction by supporting culture and language, and by showing a genuine interest in their students' relationships and families in order to better understand each student individually, as a vital part of educating these students is to understand and accept their culture. As the steps in this cycle are reached, educating ELLs becomes much easier.

Difficulty or Disability

Ford, Cabell, Konol, Invernizzi, and Gartland (2013) have said there is a considerable gap between Hispanic students who are ELLs and native English speakers. Hispanic students also have the highest school dropout rate of any other ethnicity in the US. There is a gap between ELLs and native English speakers and ELLs have "been regarded as a homogeneous at-risk group, characterized simply by limited English proficiency" (p. 890). However, ELL students may have the same "variance in content area skills, including early literacy skills, as native English-Speaking students" (p. 890). It is evident that ELL students are overrepresented in special education and perform poorly in academics when compared to native English speakers. Determining if ELL students have a disability or are having difficulties learning English, however, is no easy task. (English, Leafstedt, Gerber, & Villaruz, 2001).

Obiakor (2014) provides some identifiers for those students who may require more help to succeed academically. First, students may have a language delay in both languages. This can be determined by assessing Basic Interpersonal Communication skills and Cognitive Academic Language Proficiency. One of the few main assessments used for ELL students is the *Batería III*, which assesses cognitive and achievement levels of Hispanic individuals from the ages of 2 to 90 (Woodcock, Munoz-Sandoval, McGrew, & Mather, 2011). Second, students may have significant difficulty learning regardless of the instructional method. Third, students may not respond to instruction despite a variety of instructional methods that have been implemented. These three identifiers can help educators identify ELL students with a disability.

Social and emotional implications may also be a concern in addition to determining a difficulty or disability. According to research conducted by the Center for Early Care and Education Research- Dual Language Learners (2011), they were able to find three conclusions regarding

the social and emotional development of dual language learners or English language learners. First, preschool and elementary age children who are English language learners have a better ability to cope with school settings. They better cope with skills such as "frustration tolerance, task orientation, and self-control" (p. 3). This may be due to the school environment. Learning in their L2 may be difficult for these students to understand so therefore they are paying closer attention to instruction in order to succeed. Second, when teachers use the students home language it promotes positive outcomes on the student's behavior and attitudes toward English. When students feel more comfortable in their educational environment, they may be more willing to learn. Third, being a bilingual speaker has social-emotional benefits versus being monolingual. This may be due to the fact that ELL students are better able to task orient, manage frustration, and control themselves therefore better developing social-emotional skills. These conclusions suggest that being an ELL may be difficult for some students but it can also be an advantage.

Developmental Delays

A developmental delay exists when "a child has not attained developmental milestones expected for a child's age adjusted for prematurity, as measured by qualified personnel using informed clinical opinion, appropriate diagnostic procedures, and/or instruments" (Landsman, 2003, p. 1952). Parents, teachers, and physicians should pay close attention to these milestones in order to recognize any deficits early on. According to Guastaferro, Lutzker, Jabaley, Shanley, and Crimmins (2013), there are four main categories of developmental delays. First, "language and communication milestones deal with the child's understanding and response to language stimulation in addition to progress toward independent communication" (p. 10). Second, "motor skills, or physical movement, include gross motor and fine motor control" (p. 10). Third,

"cognitive processing milestones deal with problem-solving abilities," an example of which would be a child looking for a hidden toy in a game (p. 10). Fourth, "social-emotional category concerns the socialization of children, including temperament development" (p. 10). Developmental delays can be detected at a variety of childhood ages; some children can be identified at the age of two while others are not identified until they start school and they remain under this classification until age seven to nine depending on the state guidelines.

According to Gerenser, Forman, and Thursday (2007), developmental delays can be understood through either the traditional approach or the descriptive developmental approach. The traditional approach has five biological elements: first, "language and communication disorders associated with sensory disorders such as hearing and vision impairments" (p. 563); second, "language and communication disorders associated with motor disorders such as cerebral palsy or spina bifida" (p. 563); third, "language communication disorders associated with central nervous system damage such as learning disabilities" (p. 563); fourth, "language and communication disorders associated with severe emotional dysfunction such as schizophrenia or autism" (p. 532); and fifth, "language and communication disorders associated with cognitive delays such as [intellectual disability]" (p. 532). The biological approach is not, however, foolproof; there is a large degree of overlap between each biological approach. The descriptive developmental approach "describes rather than classifies language" by comparing a typical child to the child with the disability (Geresner et al., 2007, p. 564).

Teaching Children with Developmental Delays

Lerman, Parten, Addison, Vorndran, Volkert, and Kodak (2005) conducted research on Skinner's *Verbal Behavior* and determined that "based on the [language] learning theory verbal behavior has been shown to be highly effective in teaching communication skills to children with

developmental [delays]" (p. 303). Lerman et al. (2005) say that Skinner's theory does not conclude that children learn the definitions of words outside of the context, and then use it appropriately. It is assumed that it is the context that helps the child understand the functions of words. Lerman et al. (2005) conclude "the focus is not on the topography of the response (e.g.,, a child says "book") but on its functional unit" (p. 303). A functional unit can be a verbal operant that control antecedents and consequence; for instance, a child says "book" with the assumption that the listener will give him the book (Lerman et al., 2005).

Geresner et al. (2007) says "the most effective treatment program for a child with a developmental disability must include both a clear description of the child's existing skills and a thorough understanding of the impact of the specific [disability] on these skills and deficits (p. 564). There is a wide spectrum of children who have speech and language deficits in conjunction with developmental delays. Different factors that can contribute to this spectrum are "etiology of the disability, the level of [intellectual disability], the environment, as well as the presence of comorbid problems" (Geresner et al., 2007, p. 573).

When determining if a child has developmental delay , it is important to first assess their communication skills and then to evaluate their social skills and the strategies that they use when they interact with others. Last, a preference assessment should be conducted so the student's likes and dislikes are identified (Geresner et al., 2007).

For a student with developmental delays, Geresner et al. (2007) suggest a few common elements to help ensure the best possible outcome. First, "begin as early as possible" (p. 573). Second, "provide intervention in the natural environment and include parents and family members in the interventions" (p. 573). Third, "highlight relevant information and make it more salient" (p. 573). Fourth, "use overlearning and repetition as much as possible" (p. 573). Fifth,

"reorganize information" in order to know what to teach (p. 573). These recommendations will make it easier to teach a student with developmental delays.

It is easier for educators to address language skills when a child with a developmental delay is provided with appropriate and related services. Teachers can observe and note what motivates the student and how to best elicit a response while assuring the student is learning and enjoying their experience. Being aware of language operations can make a meaningful difference when teaching a child who has a developmental delay.

Language Operations

Motivating operations. There are two effects that define a motivational operation (MO): reinforcer motivating effect and an evocative effect (Laraway, Syncerski, Michael, & Poling, 2003). A reinforcer motivating effect can be defined as "the effect of time-based presentation of attention on the subsequent reinforcing effectiveness of attention" (Laraway et al., 2003). An example of this would be to conduct a learning session with edibles (e.g., crackers, candies, water, or juice) as a reinforcer before the student has had lunch. This way, the reinforcement is effective because the student is hungry, making hunger the MO. The evocative effect can be defined as part of the learning process that requires an increase or decrease in a specific behavior (Laraway et al., 2003). If a behavior has been evoked in the past, the instructor will to try to evoke this behavior again. Using the example from above, if the instructor knows that the student has requested a piece of candy in the past, they will evoke that behavior in the future. Along with evoking effect, MOs also "modify the evocative effects of discriminative stimuli" (Laraway et al., 2003, p. 411). Changing the reinforcement either to be desired or to cause punishment modifies the evocative effects. Another way to modify the evocative effect is to change how the

discriminative stimulus controls the behavior. In the current study, MOs are used to increase the students' language repertoire in Spanish and English.

Unconditioned and conditioned motivating operations. Motivating operations fall into two categories: unconditioned motivating operations (UMO) and conditioned motivating operations (CMO; see Appendix A for classification chart). According to Shafer (1994), UMOs are "effects that are unlearned," while CMOs are "effects [that are] a result of the individual's history" (p. 55). UMOs have been used for many years in classrooms. Examples of UMOs are food or water that the teacher can use to manipulate the learning session.

There are three different types of CMOs, however. The first is a transitive CMO, and it is utilized when one stimulus increases the reinforcing value of the second stimulus (Shafer, 1994). For example, a child who wants to engage in play with a truck that is outside has to open the door first, and in order for the teacher to open the door for him, he must say "open" or "out" (Shafer, 1994). The first stimulus is the fire truck and the second stimulus is the open door, so the teacher can prompt the student to say the necessary words to go outside, which is a desired stimulus because it provides access to the fire truck. A reflexive CMO is defined as "any stimulus condition whose presence or absence has been positively correlated with the presence or absence of any form of worsening, and will function as a CMO in motivating its own termination" (Shafer, 1994, p. 55). For example, a teacher can give directions to a student that may lead to a worsening reaction where the student tries to avoid or escape the situation (Shafer, 1994).

The third type of CMO is a surrogate CMO, which "is developed when a stimulus is correlated with a UMO and becomes capable of the same reinforcer motivating and evocative effects as the UMO" (Shafter, 1994, p. 55). An example of this is when a child goes to the

doctor's office and sees white coats, which may result in painful stimuli because the child has had a negative experience at a doctor's office in the past (Shafer, 1994). In these situations, it is important for children to be able to request in order to receive what they want and communicate clearly with other individuals in order to expand their language repertoires.

Discriminative stimuli. When manipulating opportunities (as will be done in the current study), it is vital to distinguish between the discriminative stimulus (S^D) and the MO. Shafer (1994) says, "It is important to clarify [between the S^D and the MO] in order to plan effective interventions" (p. 56). An S^D can be defined as "a stimulus condition that has a history of correlation with the differential availability of and effective form of reinforcement" (Shafer, 1994, p. 56). For example, a student in the cafeteria sees a variety of different foods (S^D), is hungry because it is lunchtime (UMO), and will therefore request a specific food (Shafer, 1994). Another example is when a woman goes to the bathroom in a public restaurant and sees a picture of a woman on one door and a man on the other. The picture of the woman on the door is the S^D and the reinforcement is walking into the correct bathroom. Everyday opportunities such as these provide plenty of opportunities for students to perform requests. It is important to understand that the S^D helps individuals understand the consequences of an action. When the woman looked at the door, she decided to go into the bathroom with the woman on the door because she knew the consequences would be positive. If she had chosen to go into the bathroom with the man on the door, a negative consequence would have followed. On the other hand, the MO makes a reinforcer more or less desirable depending on the situation (e.g., when the child saw the white lab coat the desire to be at the doctor's office decreased significantly).

Spontaneity. According to Shafer (1994), spontaneity is the ultimate goal of requesting. Spontaneity is when the student requests something without any manipulation of the MO. Not all

students will reach this goal, especially those with specific severe disabilities. There is a vast contrast between a manipulated session and spontaneous requesting. At the start, a student will be asked specifically "what do you want?" after a sandwich is placed in front of them. The student will then imitate the adult saying "sandwich." Ultimately, that student should learn to say that he or she is hungry without any type of food being present. Reaching this goal will help students acquire other language skills to increase their language abilities (Shafer, 1994).

According to Shafer (1994), "request making should be the starting point of training for learners with limited verbal repertoires" (p. 58). For the current study, it is important to remember the participating students have learned to make some of the requests in L1 (Spanish) and are now required to learn how to make requests in L2 (English). That undoubtedly affects their verbal repertoire because they have to apply the language skills they have learned for their first language a second time. This study focuses on helping students to integrate both languages and increase their verbal abilities by teaching them new words. Now that the role of antecedent and reinforcing stimuli in language instruction for children with developmental delays has been defined in detail, it is important to determine how to implement mand instruction.

Mand

In Skinner's Book, *Verbal Behavior*, he defines a mand as "a verbal operant in which the response is reinforced by a characteristic consequence and is therefore under the functional control of relevant conditions of deprivation or aversive stimulation" **(**Skinner, 1957, p. 35-36). Let us break down this definition into simpler terms. A verbal operant can be defined as different types of responses (mand, echoic, tact, intraverbal) that functionally relate to a variable (Chomsky, 1959). A "characteristic consequence" is a reinforcement that a child desires at that moment in time. "Under the functional control of relevant conditions of deprivation or aversive

stimulation" is when instructor has control of the reinforcing situation in some way to influence the student's decision. So in layman terms, a mand is a type of response given when someone desires something and the conditions of reinforcement are dependent upon the child's response and the adult in the setting.

According to Albert, Carbone, Murray, Hagerty, and Sweeney-Kerwin (2012), people use mands because "'[t]he ultimate value of the mand to the speaker is to obtain objects or to bring about conditions that are not present. This means that to be optimally useful a mand should occur in the absence of the object or condition that is the reinforcement for the mand'" (p. 73). A common example of manding is at a restaurant, where a person asks for food, drinks, utensils, sauces, and napkins. These are all types of mand instruction in that the customer identifies objects that were not originally present, mands for those objects, and then receives them.

There are different levels of mand instruction dependent on the speaker's level of ability. An adult is capable of creating complete sentences to mand for something, while a child is more likely to mand for things with just one word. For example, if a child says simply "bear," that may be a mand for a teddy bear, whereas an adult will mand for a picture of a bear by saying "Can I have the picture of the bear?" These different levels of manding should be considered when teaching mand instruction.

Tact

Mand instruction alone is insufficient in building an individual's verbal repertoire. The second verbal operant discussed here is tact. According to B.F. Skinner's *Verbal Behavior* (2014), the word tact suggests "making contact with" (54). He defines a tact as "a verbal response in which the form is determined by a particular object or event which stimulates the speaker prior to the emission of the response" (54). A tact "represent[s] aspects of an individual's

environment across all five senses" (Delgado & Oblak, 2007, p. 392)**.** Usually, a child will learn tact instruction through direct instruction, naming, or observation (Delgado, 2007). An example of a tact is when a child says "cup" (which is the motivating operant) when her mother is putting out dishes for dinner. Her mother then responds by saying, "yes, those are glass cups." Her mother's attention and response is the reinforcer in this situation and will increase the possibility that the child will tact in the future.

For both tact and mand instruction, if a stimulus is present then there will be more occasions to provide a response. Skinner (1957) states, "The presence of a given stimulus raises the probability of occurrence of a given form of response" (p. 82). Skinner (1957) goes on to discuss how events in an environment often dictate verbal responses. Therefore, in the current study researchers will be in the classroom and will provide the toys and other objects that the students mand for in order to increase the opportunities for manding. The toys and objects will serve as MOs. The same applies for tacting: the researchers will be in the classroom and will ensure that the objects to tact for are visible and in close vicinity in order to increase the probability of verbal responses.

Intraverbal

Skinner (2014) states that an intraverbal response is "accounted for only by appealing to causal relation to prior verbal stimulation, arising from behavior of either the speaker himself or other speakers" (46). An example of this would be someone asking, "How has your day been?" which is the MO. That sentence is the stimulus for a response such as "it has been great, thanks for asking." A school setting example would be a teacher asking a student "what is 2 times 5?" The student responds by saying "10."

Similar to the tact, there are multiple types of intraverbal operants. The first is an intraverbal mand. An intraverbal mand is when the speaker asks a question that not only prompts a response, but prompts a response that is dependent on the listener. An example of this would be asking a student "what do you want?" (MO) when there is nothing that they desire in sight. The mand portion of this interaction is the answer that is provided because it is the reinforcement of some object, person, or event. The intraverbal portion of this interaction is the teacher's question to the student (Bondy, Tincanim, & Frost, 2004).

There is also an intraverbal tact operant. With this operant, the teacher may prompt with a question, which is the intraverbal portion of the interaction. The question (MO) may be, "what is this?" The tact portion of the interaction would be the student's response. His response may be "a notebook." The student's response would be followed by verbal reinforcement by the teacher. The verbal reinforcement would be a response of "correct" (MO) from the teacher. The intraverbal mand and intraverbal tact combine two important individual operants to widen a verbal repertoire (Bondy, Tincanim, & Frost, 2004).

Verbal Behavior Program

Verbal behavior has been applied in schools in multiple states and countries. One model known as, the Comprehensive Application of Behavior Analysis to Schooling (CABAS®) has been implemented in schools in Northeast America and the United Kingdom. The CABAS® mission statement is to "Seek to develop and expand a learner driven science of teaching for all children, a science of practice that provides superior education based exclusively on scientific procedures (CABAS®, 2012-2014). According to Greer and Ross (2004), The CABAS® schools have educated hundreds of students and have researched verbal behavior for sixteen years, seeing much success in the use of verbal behavior teaching strategies. According to CABAS®,

"Skinner's theory has allowed us to serve our students more effectively and to reorganize instruction and curricula into repertoires of function (Greer & Ross, 2004, p. 158). They have combined functional and behavioral approaches to teach language.

According to Greer and Ross (2004), the CABAS® schools organize instruction according to verbal behavior levels instead of basic developmental levels. This type of organizational instruction helps them better meet the individual needs of their students. CABAS® created a hierarchy for their instruction that includes 9 stages: pre-listener, listener, speaker, speaker-listener exchange, speaker as own listener, reader, writer, writer as own reader, and verbally governed behavior for problem solving. Since CABAS® uses a verbal behavior approach, they can "meet both structural and functional requirements," leading to authentic instruction (Greer & Ross, 2004, p. 148). It is evident that verbal behavior is successful in schools according to the CABAS® and can be more effective than the current language instruction curriculum in schools nationwide.

Implementing Language Instruction

There are many different types of methods to implement or teach a mand. Professionals can use any method that will generate the best outcome for the students they are working with. Each method will ultimately bring about the same outcome, but follow different paths to attain the goal.

Choice making. Choice making is used when someone provides items for the student to observe and then asks the student what they want. Then, the student responds by manding the desired item. The main goal of choice making is to increase the number of opportunities to respond. Not only can students choose a tangible item, but they can choose activities to participate in or when they want to stop or continue playing a game, to name a few of the many

options available to them during choice making. Unfortunately, there are some inconsistencies when it comes to choice making. The first is that there may be some confusion between the S^D and the MO. Since the items are placed in front of the student before the choice is made, the present S^Ds may influence the decision. The second is that students can change their minds often. A professional may be assessing preference and the student might change his or her mind about which option he or she really wants to choose. Students may also choose the opposite item of their original choice. For example, a student may be presented with a piece of candy or a sip of juice among other options. At first, the student will choose the candy but then they are also thirsty so they also want the juice. Though choice making may be an effective way to teach manding, these inconsistencies significantly limit its abilities (Shafer, 1994).

Interrupted behavior chain. Interrupted chain behavior is when "the student is presented with the opportunity to complete a chain of behavior" (Shafer, 1994, p. 62). In this process, a piece vital to the completion of the behavior that is withheld from the student, which is the transitive conditioned motivating operant, and access to the withheld item is the reinforcer. For example, there was a study done where the researchers conducted several interrupted chain procedures (Lechago, Carr, Grow, Love, & Almason, 2010). One of the procedures was an ice cream interrupted chain behavior procedure. They presented the students with a bowl, a napkin, a plastic spoon, and ice cream. The researcher would demonstrate what the student should do and then the students were to complete the task. However, the students had to complete the task with one item missing. In the ice cream example, the spoon was withheld from the student. The student then had to mand for the spoon in some way. The student could say multiple responses as long as the target, "spoon," was used. Interrupted chain procedure was shown to have a positive effect with students. (Lechago et al., 2010).

Incidental teaching. Incidental teaching was first developed from teaching language in preschools using incidental language teaching skills. Its use has now evolved to be an intervention for students with autism and developmental delays. Incidental teaching is "characterized by conducting training trials throughout the day instead of in structured sessions" (Shafer, 1994, p. 59). One of the important factors of incidental teaching is that it is student-initiated rather than teacher-initiated. The teacher can manipulate the environment to provide opportunities for the student to mand. Incidental teaching focuses on the MOs in the teaching environment, which can help to prompt and shape new responses in different situations, but teaching incidental teaching is no easy task (Shafer, 1994; McGee, Morrier, & Daly, 1999).

Three main aspects. It is important to understand that mand instruction has three important steps when implementing learning strategies: "student's initiation, its consequences, and the teacher's request for elaboration" (Hart & Risley, 1978, p. 413). When it comes to student initiation, a teacher can prepare the situation but cannot initiate because otherwise it would not be student-initiated. If a student wants something, he or she will usually use language to obtain the desired item. Hart and Risley (1978) also say that "To get and keep students initiating, the teacher must identify and take advantage of those occasions when oral language can and will function to gain for the student something he wants (a reinforcer)" (p. 414). The consequences of the initiation will determine how often the student will initiate so it is important to remember that initiation and consequence play off each other (Hart & Risley, 1978). For example, if a student desires a blue ball that is on the counter, which is too high for him to reach, then he will mand for the ball. If the teacher gives him the ball and he enjoys playing with it, he will mand for it in the future. If the teacher gives it to him and he does not enjoy playing with it, then he will not mand for it in the future. Lastly, Hart and Risley (1978) state that elaboration by

the student is the third important factor to language instruction. The type of elaboration can vary between students because incidental teaching is a one-on-one teaching strategy. For example, the initiation is a hand raise, the consequence is the teacher calling on the student with their hand raised, and the elaboration is manding for something that is desired. It is important to understand these three steps must be achieved so a true learning moment can occur.

Incidental teaching outline. Along with the three main aspects of incidental teaching, Hart and Risley (1978) have provided readers with an outline of the incidental teaching process. First, the teacher must focus on his or her full attention on the student initiating. Initiation can be eye contact, smiles, or saying the student's name for example. Second, the teacher may have to model the elaboration she wants the student to say. For example, a student may look at the teacher and point to something and the teacher looks at the student (initiation). Then, teacher may have to say what the student is pointing to and wait for student response and then provide the object. Third, the teacher will have to ask for elaboration to elicit a verbal response from the student. Fourth, the teacher may have to prompt the student depending on differentiating circumstances; prompts can widely vary between situation and student. Fifth, the teacher may have to instruct the student on what to say and then have him or her repeat it. Lastly, the teacher must confirm the student's performance. The teacher should end each incidental teaching session by confirming the student's performance to be right, and it is the teacher's responsibility to guide the student in the session in order to elicit the correct response. This step-by-step outline can be very beneficial to the student when implemented appropriately.

Incidental teaching occasions. Now that an outline has been reviewed, it is important to be able to identify the two main occasions for incidental teaching provided by Hart and Risley (1978). First, there is student inquiry. Student inquiry can look like a student playing with a

specific toy or item. For example, there could be a student who is presented with a variety of activities. He or she will begin to play with the toys until he or she finds one in particular that he or she is interested in. Second, there is student assistance. This could look like a student handing you a toy because something is missing or broken so they want you to help. For example, a student could be playing with a fire truck and then notices that the ladder came off. He might hand the teacher the truck and the ladder so she can fix it.

Training. Teaching incidental teaching requires training in specific areas. In a study conducted by Houghton, Bronicki, and Guess (1987), researchers entered classrooms and observed teachers implementing incidental teaching. They concluded that teachers would not notice incidental teaching opportunities in an unstructured moment, and were more willing to teach language instruction incidental teaching in a more structured teaching opportunity. The reason for this conclusion might be that incidental teaching is a very different type of teaching technique in comparison to typical teaching techniques and it is difficult to attend to student requests throughout the day. As Houghton, Bronicki, and Guess (1987) trained the staff, they made several suggestions for more effectively implementing incidental teaching. One suggestion is that "staff must have the ability to recognize mand instruction that include a wide range of response forms, and to be observant for these throughout the day" (Shafer, 1994, p. 60). Another suggestion is to capture MOs so teachers would be able to improve the amount of mand instruction. For example, a teacher can take advantage of opportunities when students are naturally deprived of UMOs such as food or drink. Then, ensure that those food and drink items are available and that the student's mand for the item they desire. Last, a productive suggestion is to have the student elaborate on their mands and provide the student with more reinforcement for

an elaboration (Shafer, 1994). These approaches can augment learning of language instruction for all students.

Vocabulary

According to Ramos and Dario (2015), vocabulary is the building block of language learning. According to Nagy, Herman, McKeown and Curtis (2014), many researchers have tried to pinpoint the best way to teach children vocabulary, but there are so many options available that a conclusive result has been impossible to attain. Ramos and Dario (2015) have also said that the first thousand words of vocabulary are learned during the initial stages of classroom instruction, mainly from guessing the meanings of words. Each year in school, children learn 3000 new vocabulary words. It can be suggested that the "frequency of vocabulary exposure seems to have a great impact on incidental vocabulary learning" (Ramos & Dario, 2015, p. 158). The process of acquiring lexicon and then using it requires both vocabulary and language operations.

Similarities between language functions and vocabulary. Like language operants, "vocabulary knowledge is a fundamental aspect of language learning and language use" (Alharbi, 2015, p. 501). For example, a child must first learn that an action elicits a response. For example, a baby learns very young that if he is hungry and cries (mand), a parent will come to soothe him. The MO was unconditioned, and the baby was hungry. The baby's behavior was crying, which led to an elicited response from his parents coming to feed him. In this case, the baby is not using vocabulary but instead is performing early verbal operants. However, as the baby grows and learns language as a toddler, he is expected to begin to use language and vocabulary to elicit responses. A 4-year-old learns that if he asks for something when he is hungry, a parent will make him food. The MO, hunger, remains the same, and the behavior is

still unconditioned. He may say “peanut butter and jelly sandwich please,” which is a mand. Then, the response will be his parent making him a sandwich. The process remains the same as in the example with the baby, but in this case, vocabulary is added to the process, which makes it easier to communicate appropriately.

Differences between language operants and vocabulary. From the example above, the clear difference between vocabulary and verbal operations can be determined. Verbal operants are a process that guides the vocabulary. They are separate processes, but each is dependent upon the other. If a child has an apple, orange, and banana in front of him or her and says “I want the apple,” it is clear that the child manded for the fruit. This process used verbal operants in that an MO was present, and a vocabulary-based mand was used as well. Although these processes are learned independently of each other, a child instinctively learns to put them together.

Verbal operants can be used to build vocabulary. As children learn more vocabulary, their verbal operants become more advanced. Using the example from above, the child will first learn to mand for food when hungry by crying. Once the child learns appropriate vocabulary words, he can tact the word apple. And when the child learns to create and use entire sentences, he can have conversations about apples using intraverbal skills.

Problem Statement

ELLs have learned verbal behavior such as mand, tacts, and intraverbals when they learned to speak their first language. Verbal behavior can be taught in different ways but in the current study we will use incidental teaching with the participants. When ELLs learn another language, they are applying verbal behavior skills to a new language. Some ELL students are classified with a developmental delay, which can be the result of learning new concepts in a different language. In the current study, we want to know if teaching verbal behavior to ELLs

with developmental delays using incidental teaching will be effective. There is not much research in this area; therefore, more research must be conducted with ELL students with developmental delays in schools in order to obtain more reliable conclusions.

Purpose of the Study

The primary purpose of this study is to teach verbal behavior instruction using incidental teaching with students who are ELLs and also have developmental delays. We will determine the effects of incidental teaching on dual language acquisition in children with developmental delays. We will also determine if there is a differences in English acquisition when target words are first taught in a student's native language compared to being taught first in English.

Research Question

These specific research questions will be addressed in this research study:

1. What are the effects of incidental teaching on dual language acquisition in children with developmental delays?
2. Is there a difference in English acquisition when target words are first taught in a student's native language compared to being taught first in English?

Chapter 3: Methods

In the following section, the setting will be introduced. Then, selection criteria will be explained and the participants will be introduced. Last, the data collection procedures, thesis design, and reliability measures will be addressed.

Setting

The study was conducted at a preschool in a small urban area in the Western US. The school had 608 students, approximately 40% of whom were Hispanic and 61% of whom received free and reduced lunch (Western State School District, 2014).

The participants in this study were students who attended an English-speaking classroom in a preschool. There were nine students in the class, six of whom were boys and three of whom were girls. All of the students in the class were categorized as having a developmental delay. Of the nine students, six were Hispanic and three were Caucasian. These students were enrolled in an afternoon special education kindergarten class in the preschool. The class was from 12:30–3:30 Monday through Thursday. Their teacher was an intern and there were two paraeducators who assisted the teacher.

A typical day in this classroom was very organized. To begin, the students had about 10-15 minutes when they got to school to work on sensory activities. These activities consisted of playing with play dough, puzzles, links, and blocks. Next, the students participated in morning exercises: going over the date, learning a new word, sometimes reading a new book, and listening to a wiggle song or two. Following these activities, the students went to academic rotations. There were about three students in each group and each station was related to the word or letter they were learning at the time. Then, the students had recess. Following recess, the students had snack time. After snack time, the students had an activity or academic time.

Participant Selection Measures

This elementary school in the western part of the United States was selected because of its willingness to work with university students. The director of the preschool chose the specific classroom from which participants were selected. The two participants used for the current study were selected according to the following criteria: (a) the students had to be Hispanic, (b) the students' first language had to be Spanish, (c) the students had to have a delay, (d) and the students' verbal communication skills had to be understandable to another person.

Pre-assessment. Prior to taking data, direct observations were conducted. Researchers observed the students during different activities in order to determine what activities the students liked and what activities they did not like. This made it easier to implement incidental teaching because the researchers were aware of the students' preferences when they were playing.

Participants

After obtaining institutional review board approval and parental consent was given, there were two participants enrolled in the study. Participants were given pseudonyms.

Laura. Laura was a six-year-old Hispanic girl with a developmental delay. The main language spoken at her home is Spanish. Laura's mom is most concerned with Laura's speech and learning skills. Her mother stated that she works very hard with her but Laura does not seem to remember concepts after she has been taught. Laura was given the *Preschool Language Scale* and received a standard score of 70, which is in the second percentile for her age range. On her cognitive assessment, the *Battelle Developmental Inventory*, 2nd ed., she received a standard score of 55, which is in the 0.1 percentile for her age range. She was quick to help her peers and performed well in class. Her disability category was developmental delay.

Laura's reading performance in English was as follows: Laura could match the letters in the alphabet but could not name all 26 letters, and identified the letter L when asked what her name started with. In order to access the general education curriculum, Laura must name all the upper and lower case letters of the alphabet and blend CVC words. Laura combined three or more words in English and three or more words in Spanish when speaking. For example, she would say something like, "I like to swim *y* play in the sandbox." Her code switching is seen as a strength because she uses her L1 as a resource when learning L2 English. In L2, Laura was not at the same reading level as typical peers, which limited her ability in general education. She used gestures to help her explain when speaking. Her goals consisted of the following: naming the alphabet, blending words, and using at least four or five words when talking to adults and peers and when answering who/what/where questions.

Aaron. Aaron was a five-year-old Hispanic boy with a developmental delay. The main language spoken at his home is Spanish. His mother first referred him for special education when he was 2 years old, and he has been receiving special education services since then. His mother was concerned with cognitive skills, motor skills, language skills, self-help, and peer relationships. Aaron was recently given a Preschool Language Scale and his total language score was a standard score of 50, which is in the .1 percentile for his age range. On his recent cognitive assessment, the *Stanford Binet*, he received a standard score of 44, which is in the .1 percentile for his age range. Aaron was able to recognize his name, but was unable to identify the letters in his name. Aaron's reading skills in comparison to his peers were very low, which affected his participation in literacy activities. Aaron used gestures and single words to communicate with adults in English and Spanish, and he sometimes spontaneously produced words. He produced many sounds and was working on blending those sounds. He would put some words together and

repeated them until the adult he was communicating with understood them. Aaron's speech and language skills were also very low compared to his peers, which affected his ability to obtain and share information. Aaron had goals that targeted blending sounds, identifying vocabulary words, and articulating words.

Aaron was a very friendly student who got along well with the other classmates. The teachers and paraeducators in the classroom often spoke to Aaron in Spanish when he did not listen in English. They would say Spanish words such as *sientate* (sit) and *libro* (book), and he often responded better when they spoke to him in Spanish. His verbal ability when communicating was low, and interaction with him required familiarity with his singular form of speech. Oftentimes, Aaron's speech was not very clear, but still understandable. Two of his most frequently understood words were *a* and *me*.

Materials

Researchers used standard paper and pencil to record data when in the classroom (See Appendix B). Audio of specific sessions in the schools was recorded using the Voice Memos© app on a locked iPhone for interobserver agreement. From the paper and pencil data sheet, the data were transferred to an Excel© document on a computer (See Appendix B). The Excel© document was a replica of the paper and pencil data sheet. Then, the data were transferred to another Excel© document that focused on completed targets (See Appendix B). Last, the data were transferred to another Excel© document with graphs for visual observation of completed targets (See Appendix C).

In the classroom with the participants, the researchers used supplies that the teacher provided each day for all the students. The teacher put out a variety of supplies such as puzzles, kitchen supplies, playdough, and magnets.

Experimental Procedures

Researchers went into the classroom to teach the two participants to expand their verbal repertoire, having a 15 to 20 minute window to engage in incidental teaching with the students. Researchers worked one-on-one with each student. Researchers only spoke one language at a time during the sessions. First, researchers chose mand targets. A mand is "a verbal operant in which the response is reinforced by a characteristic consequence and is therefore under the functional control of relevant conditions of deprivation or aversive stimulation" (Shafer, 1994, p. 54). In other words, a mand is a verbal operant that elicits a response that is rewarded by the desire that was elicited. The following was an example of a mand target in this study. Aaron would point to the bumblebee stuffed animal but before it was handed to him, a researcher would make him say "bee" by modeling the word and having him repeat it.

Then, the researcher gave him the bee to play with for his reinforcement. Researchers taught the participants a number of tacts as well. According to B.F. Skinner's *Verbal Behavior* (2014), the word tact suggests "making contact with" (p. 54). He defines a tact as "a verbal response in which the form is determined by a particular object or event which stimulates the speaker prior to the emission of the response" (p. 54). A tact "represent[s] aspects of an individual's environment across all five senses" (Delgado & Oblak, 2007, p. 392). A tact can also be defined as a label. The following is an example of a tact target in this study. Laura and a researcher played in the kitchen. At times when Laura pointed and picked up the orange and said "orange," the researcher responded by saying "That's right, oranges are so very yummy." The researcher's verbal response was her reinforcement.

Finally, researchers also taught the participants a variety of intraverbals. Intraverbals, as defined by Skinner (1958), are "accounted for only by appealing to causal relation to prior verbal

stimulation, arising from behavior of either the speaker himself or other speakers" (p. 46). The following was an example of an intraverbal target in this study. Laura and a researcher would play in the kitchen and the researcher asked her "Where do we put the milk to make sure it stays cold?" She responded by saying "In the refrigerator." The researcher said "That's right," and they continued to play.

First, researchers went into the classroom to see what the students were already playing with. Mand, tact, and intraverbal targets were then assigned (See Appendix A for definitions with examples). Researchers observed what their targets were and how they could work with those targets in that specific play setting. Researchers wanted to teach the students in a play setting because they used incidental teaching. Incidental teaching is "characterized by conducting training trials throughout the day instead of in structured sessions" (Shafer, 1994, p. 59). In this case, researchers conducted sessions during the students' playtime. Next, researchers started with either English or Spanish targets. Researchers slipped in the targets as they played with the students.

Data Collection

Data was collected during the 2014–2015 school year at the preschool. In this study, direct data collection was conducted and responses to incidental teaching and mand, tact, and intraverbals were directly recorded. Researchers worked with participants on targets and researchers only spoke one language at a time during the session. Targets were chosen according to observations of their verbal repertoire. For example, at one point Laura had five targets, three of which were in English and two of which were in Spanish. Researchers assessed her English targets first, then told her to speak Spanish and continued with her Spanish targets. The data that was taken in the school was recorded with an F, P, +, or -, depending on the level of prompting

and the response of the student. The F signified a full verbal prompt, where the answer had to be given to the student. The P signified a partial verbal prompt where the student was given a hint to the answer in some way. The + signified an independent response where the student responded without any assistance. A - signified no response at all. This was done consistently with all targets, and each participant had two to five targets at a time. Criterion for completion was at least 80% accuracy over three consecutive trials.

Variables. The dependent variable was student acquisition of mand, tact, and intraverbal targets. These targets were Spanish only, English-only, Spanish first then English, or English first then Spanish. The independent variable was the incidental teaching instruction of mand, tact, and intraverbals through incidental teaching. A mand was coded when the child emitted a vocal response related to the object being withheld. For example, if a bee toy was being withheld, the child would have to say bee in order for the response to be coded as a mand. A tact was coded when the child emitted a vocal response that labeled the item when teaching. For example, the child had to label specific foods while playing with kitchen items in order for the vocal response to be coded as a tact. An intraverbal target was coded when the child emitted a verbal response that completed a phrase or sentence that the researcher stated. For example, if the researcher said, "A, B, C…" the child would respond by stating the rest of the alphabet. Refer to the Terminology and Processes table in appendix A for further explanation.

Interobserver Agreement

Reliability with responses was extremely relevant. In order to guarantee reliability, audio of the incidental teaching sessions was recorded. Then, an interobserver coded the videos. Agreement was marked only if the interobserver and researcher recorded exactly the same response. For Laura, there were 17 out of 42 sessions coded with 85.4% interobserver agreement.

For Aaron, there were 23 out of 44 sessions coded with 80% interobserver agreement. Finally, the interobserver data was compared with the live sessions for reliability.

Experimental Design

The study used a single-case, repeated acquisition design (Kennedy, 2005). This design was chosen because it is a small study with each participant starting at a different level. The design also measured acquisition, and researchers provided evidence of replication by ensuring sufficient demonstrations of the effect. Researchers evaluated the data and determined if L1 affects L2 (L1 is independent of L2) when teaching mand, tact, and intraverbal instruction using incidental teaching in a special education classroom.

Baseline. The researcher trained another research assistant to help collect data. The training was performed in the classroom with the participants while the researcher collected data. During the baseline phase, the researchers observed the participants to learn what words each participant was capable of saying. Then, random words in English and in Spanish were selected and the participants were assessed for a starting point in vocabulary development. In the baseline session, the researcher played with the participant, utilized an opportunity to implement a target, and waited for a response without providing a prompt of any kind. Baseline data was taken from October through November of 2014. See Appendix C for reordered data.

Audio recording. Teaching sessions were recorded using an iPhone© app called Voice Memos©, standard on the iPhone©. The user initiates audio recording by simply tapping the red record button on the screen. The recording stops when the same red record button is tapped again. Then, the recording is saved to the app on the phone with a date and name. The phone was placed on the table or floor during sessions. The participants were aware of the audio recorder and it was not intrusive to their performance. Each session lasted about ten minutes per student.

Intervention. The intervention was implemented during free time in the beginning of the day. As soon as the researcher began interacting with the participant, the session began. With incidental teaching, it is important to ensure that the participant has fun and is engaged in the learning at the same time. When the researcher saw an opportunity to implement a target, the researcher prompted the participant either by withholding a desired object or asking a question. This process was completed multiple times to reach the appropriate amount of targets.

Maintenance. Each participant had a number of targets and the criteria for success was to get a least 80% on each target for three sessions in a row (usually at least 24 hours apart). When the participant received 80% or higher on a target, a new target was added until they achieved success on each target.

Data Analysis

Visual analysis was used for each skill. Researchers addressed level, trend, and variability. Then, a statistical *t* test was used to compare targets learned in Spanish. Then, English to English-only targets were compared regarding session to acquisition. The *t* test measured if the mean of Spanish-English target acquisition differed from English-only target acquisition.

A repeated acquisition design was used to analyze the results. Repeated acquisition designs are used when a task needs to be measured under multiple experimental conditions. There are a few defining characteristics of repeated acquisition design: "(a) the use of multiple equivalent learning tasks (b) in which acquisition can be studied repeatedly from one task to another (c) under at least two different experimental conditions" (Kennedy, 2005, p. 163). In this study, the different language operations (mand, tact, and intraverbal) served as the different experimental conditions.

Chapter 4: Results

In this section, data is provided for each participant. Laura was higher functioning and therefore was able to master more targets than Aaron. Under each graph is a short description of the content. For all graphs, see Appendix C.

Laura

Laura mastered 26 targets over a span of five months. In sessions, there were a mixture of mand, tacts, and intraverbal targets. The graph below shows one Spanish-English mand. It took her eight trials to master the word in Spanish and only four trials to master the word in English. Her ability to master the word in Spanish first resulted in her mastering the word in English faster. It took Laura an average of 6.8 sessions to master her Spanish targets in her Spanish then English targets, an average of 5.4 sessions to master her English targets in her Spanish then English targets, and an average of 6.8 sessions to master English-only targets.

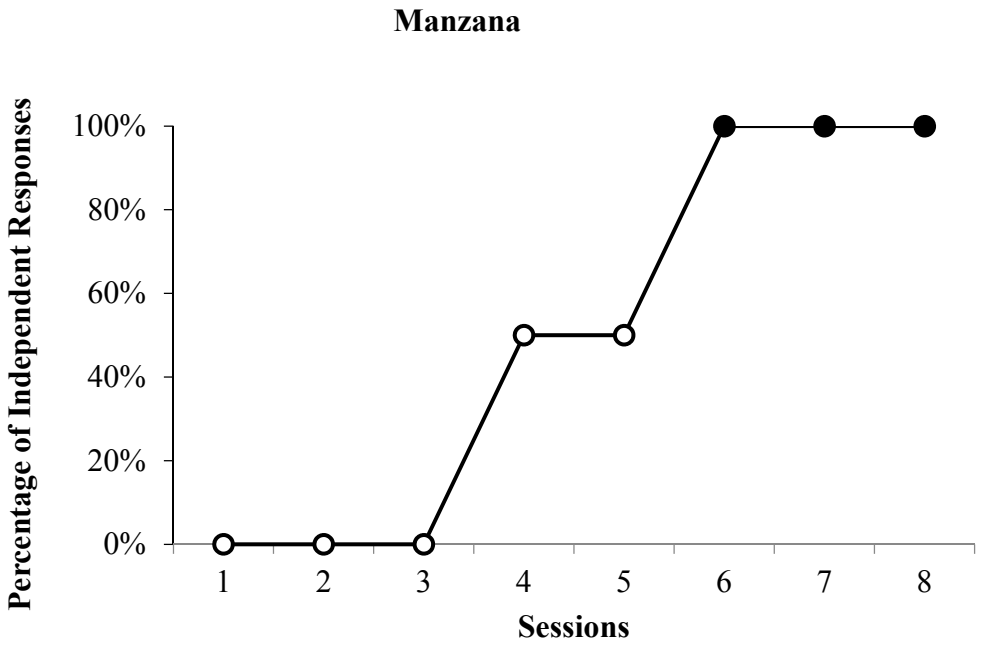

Figure 1. Laura: Spanish then English target one. According to this graph, it took Laura eight sessions to master "manzana." The white symbols accuracy below mastery. The black symbols represent mastery.

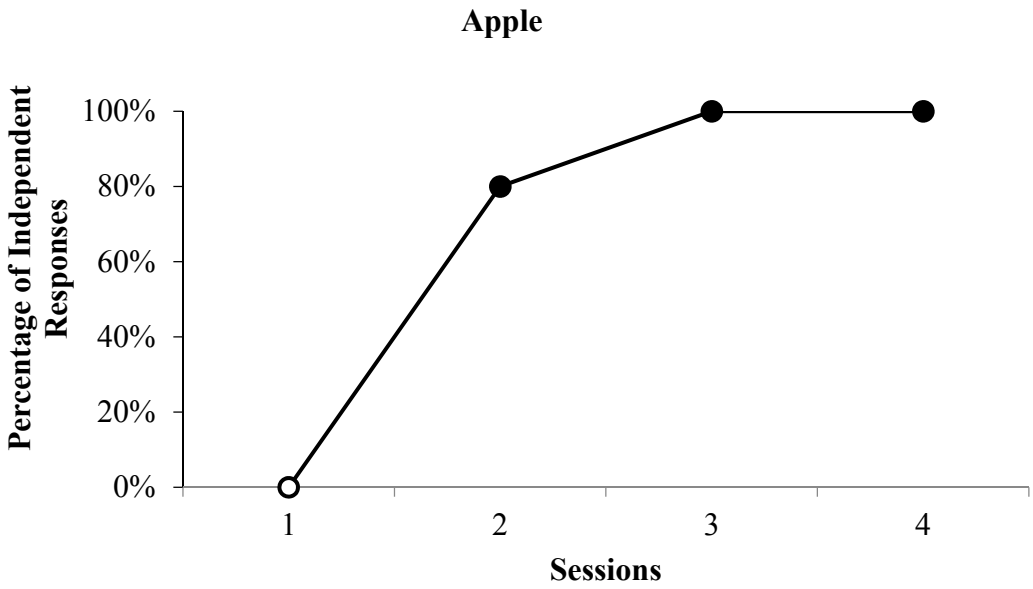

Figure 2. Laura: Spanish then English target two. According to this graph, It took Laura only 4 sessions to master "apple." The white symbols accuracy below mastery. The black symbols represent mastery.

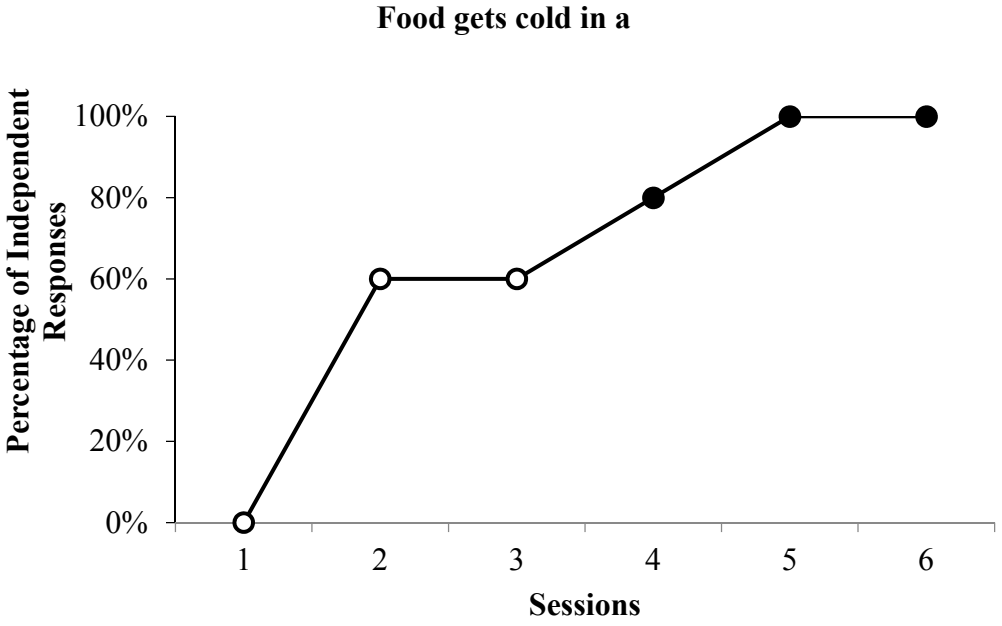

Figure 3. Laura: English-only target. According to this graph it took Laura six sessions before she mastered the word "refrigerator" in the prompt "Food gets cold in a." The white symbols accuracy below mastery. The black symbols represent mastery.

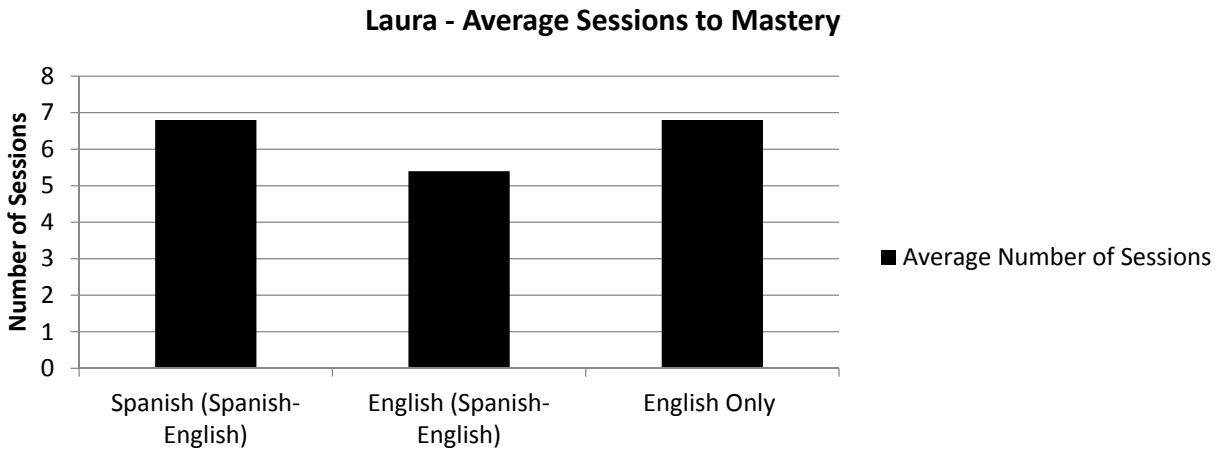

Figure 4. Laura: Average sessions to mastery. According to this graph, it took Laura 6.8 sessions to master Spanish targets in her Spanish then English targets. It took her 5.4 sessions to master her English targets in her Spanish then English targets. It took her 6.8 sessions to maser her English-only targets.

Aaron

Aaron was able to master five targets over five months and some targets were not mastered. In graph 5 below, it shows that it took Aaron nine trials to master a Spanish word, "bloque," and then it took him 23 trials to master the same word, "block," in English. Aaron had three English-only targets and only mastered one. It took him seven trials to master the word "bee". Aaron had three Spanish only targets and he mastered two of them. In graph six it shows that it took him twelve trials to master the word "libro" (book).

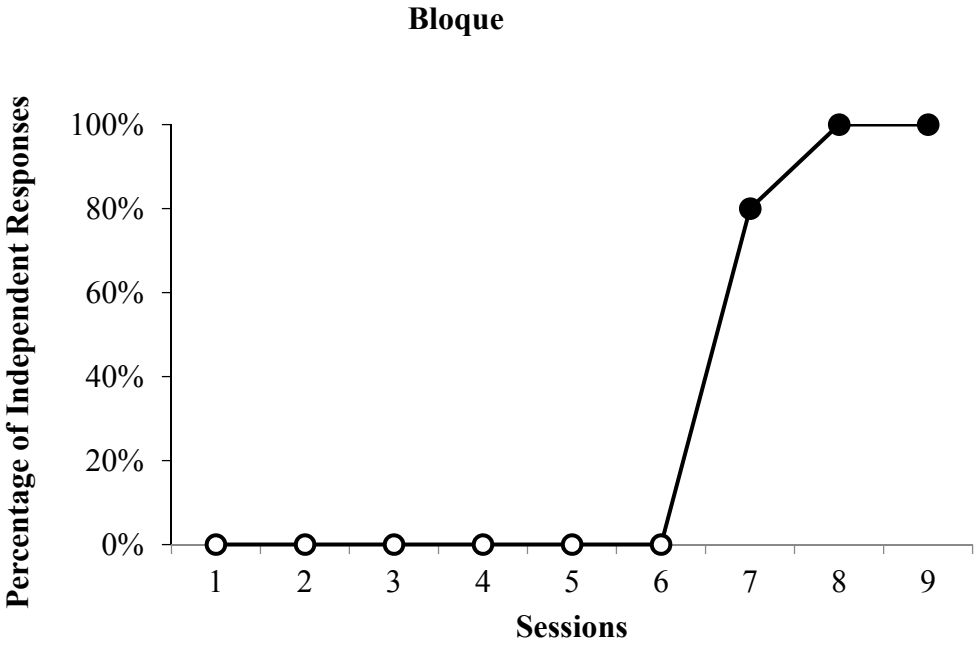

Figure 5. Aaron: Spanish then English target one. It took Aaron nine sessions to master his Spanish target word "bloque" in his Spanish-English target. The white symbols represent accuracy below mastery. The black symbols represent mastery.

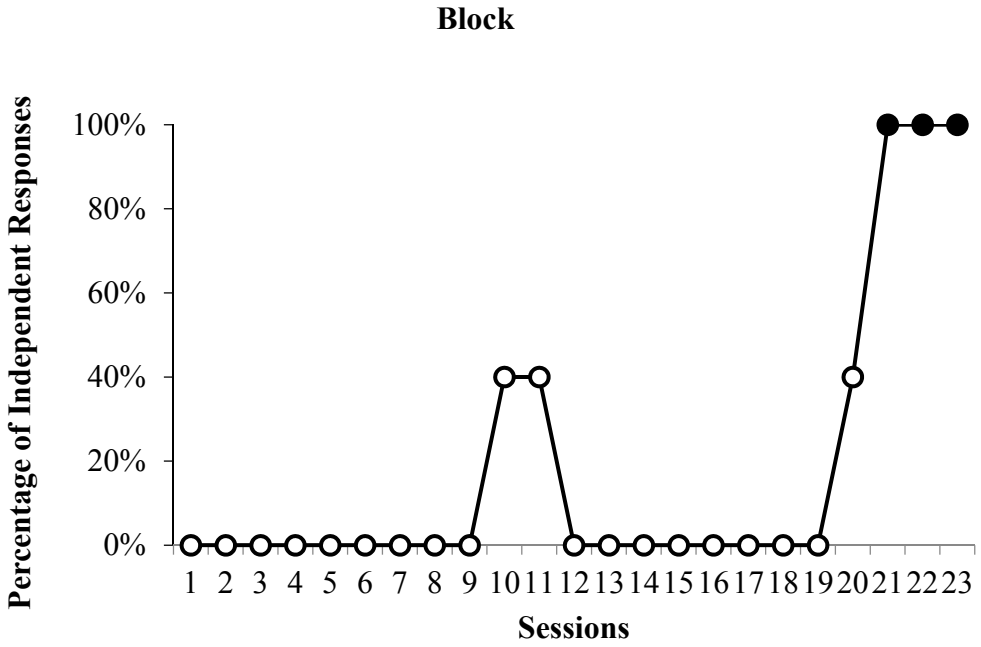

Figure 6. Aaron: Spanish then English target two. It took Aaron 23 sessions to master his English target word "block" in his Spanish then English target. The white symbols represent accuracy below mastery. The black symbols represent mastery.

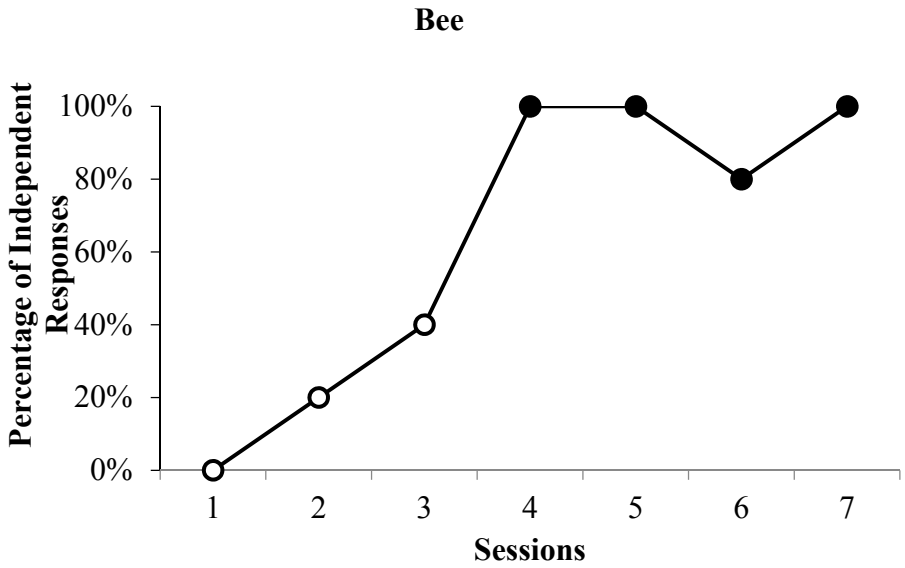

Figure 7. Aaron: English-only target. It took Aaron seven sessions to maser his English-only word, "bee". The white represent symbols accuracy below mastery. The black symbols represent mastery.

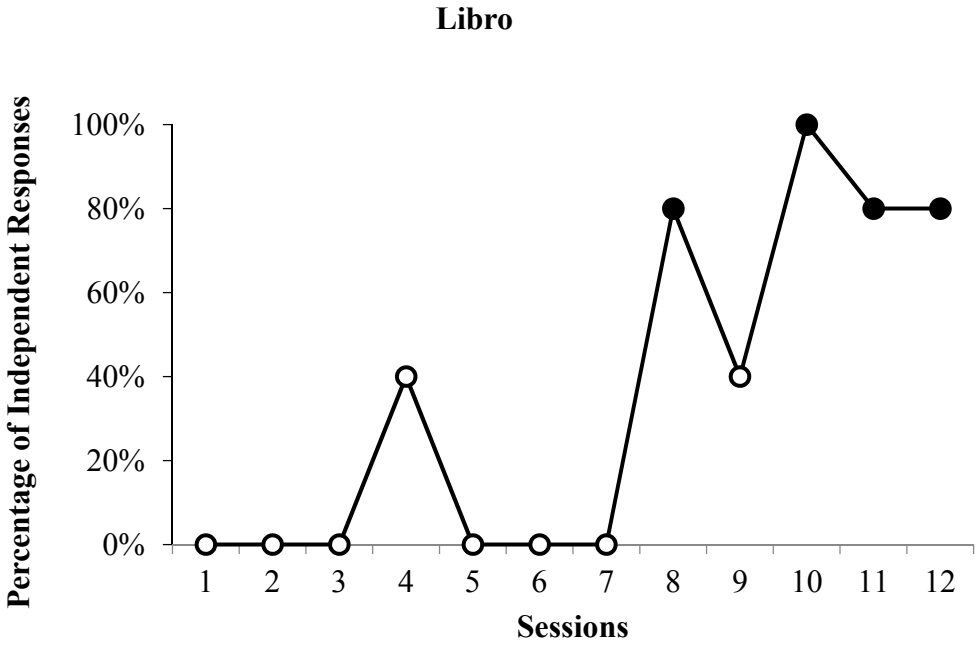

Figure 8. Aaron: Spanish only target. It took Aaron 12 sessions to master his Spanish only target, "libro" (book). The white symbols accuracy below mastery. The black symbols represent mastery.

Chapter 5: Discussion

The purpose of the study was to teach verbal behavior using incidental teaching with two students who are English language learners and also have developmental delays. The purpose was achieved and children in an elementary school who had developmental delays and were English language learners received the intervention stated above. Below, the research questions will be addressed.

The study suggests how language instruction, including vocabulary, was useful when using verbal behavior. The research from the current study is concurrent with previous research such as Barbera (2007), Greer & Ross (2008), and Sundberg & Partington (1998). They all determined that verbal behavior has shown to be effective when implementing language intervention. The incidental teaching or student led sessions were much more productive than instructor led teaching. Since the learning was practical, students were able to play with the targets and learn all in one session and it was student oriented allowing researchers to take plenty of data during each session. Research from Shafer (1994) and McGee, Morrier, & Daley (1999) determined that since incidental teacher is student initiated, it focuses on the MOs, which can help to shape new responses in different situations. Findings in the current study coincided with Shafer and McGee, Morrier, & Daley's findings.

The study also suggests if acquisition of functional communication of L1 (Spanish) affected manding instruction of L2 (English), although results indicated that one participant benefited more from the intervention than the other participant: we have preliminary evidence demonstrating that the intervention was effective for students with average vocabulary skills in English and Spanish such as Laura. Laura was able to communicate using full sentences in English and Spanish. Her code switching is viewed as a strength because she is using her L1

Spanish as a resource when learning her L2 English. Aaron did not benefit as much from the intervention because of his low verbal skills in English and in Spanish. Aaron was able to communicate using one or two words and his words were at times unintelligible. The findings in the current study coincide with Genesee (2006), when it determined that education background is integral in a student's educational future whether they have a base in English or Spanish.

These results indicate that vocabulary instruction including mands, tacts, and intraverbals was useful when implementing incidental teaching to students. This information coincides with research conducted by Sweeney-Kerwin (2012), when they stated that verbal operants such as mands, tacts, and intraverbals help individuals "obtain objects or bring about conditions that are not present (p. 73). And the findings also conidcide with Hart and Risley (1978) when they determined the main aspects of incidental teaching that make it a successful teaching strategy. Laura benefited from using verbal behavior targets and she was able to learn more words and use them in typical conversations. It was useful to use incidental teaching because it was a student led learning where the students enjoyed learning targets. It was also suggested that L2 was affected by L1 in Laura's data. It was evident that when Laura learned a target in Spanish, she was able to master the same word in English quicker than in Spanish. On the other hand, results for Aaron were quite the opposite. We were not able to collect much data from Aaron. It was inconclusive if vocabulary instruction such as mands, tacts, and intraverbals was useful when implementing incidental teaching when working with Aaron. It was also inconclusive if L1 affected L2 because of the lack of mastered targets and lack of Aaron's verbal skills. This preliminary data can be beneficial to literature.

Due to the variety of components in this research, its results are applicable to many different topics. This data adds to the verbal behavior evidence. In this research we used verbal

behavior—mands tacts, and intraverbals—in two languages and we were able to record data on dual language verbal behavior and its effectiveness. This study also adds to vocabulary research in that it monitors the acquisition of vocabulary for ELLs. Additionally, this study is relevant to the research for ELLs, monitoring the progress of students learning vocabulary in Spanish and in English. We incorporated both languages to determine how they affect each other, as well. This study also contributes to research done regarding incidental teaching. Incidental teaching was the type of instruction we used in each session with the participants, and it was simple and effective to use with the participants. Lastly, this study adds to research about students with developmental delays, as the participants had developmental delays and we monitored their progress in a vocabulary acquisition study.

Limitations

There were a few limitations in this study. First, there were only two participants available to be a part of the study. Second, these two participants had very different profiles. One student was able to communicate well, while the other student struggled to communicate. Third, the school year ended and the participants were not in school for the summer, which limited the amount of data researchers could collect. Fourth, the following year, one of the participants transferred to an unknown school, preventing follow-up.

Implications for Practice

The information in the current study is important for practitioners in the field of education today, as it provides information regarding ELLs, which represent one of the ever-growing populations in U.S. schools. Effective strategies teachers can put into place to teach ELL students include language instruction, cultural understanding, incidental teaching, and ensuring that a student has firm foundation in language one before learning concepts in language

2. If a classroom teacher understands the student's language and culture, that understanding can make a difference in effective student learning. If the teacher uses incidental teaching, the teaching can be student-initiated and more purposeful for the student. If the teacher can effectively teach language 2 by building on language one, then the student could be more successful. In all of these ways, the information found in the current study is beneficial for classroom teachers.

The data in the current study is also useful for other related service providers such as school psychologists and speech language pathologists. School psychologists often administer assessments and counsel. In order to effectively do both of those tasks, they should understand the student's language and culture. School psychologists must provide appropriate assessments to measure cognitive functioning, and it is the job of the school psychologist during counseling to understand the student, who is heavily influenced and informed by his or her own culture. Speech language pathologists also benefit from the information in the current study because it is language-based. Speech language pathologists make efforts to understand the student's first language in order to help them learn English. The data in the current study suggests that having an understanding of language concepts in L1 is useful when learning L2, and that is important information for the speech language pathologist to be aware of when working with ELL students. Multiple practitioners in the education field today may benefit from the findings in the current study.

Conclusion

In the current study, the researchers met the goal of understanding how vocabulary that included manding, tacting, and using intraverbals (requests/ functional communication) was useful instruction when implementing incidental teaching to children with developmental delays.

Researchers found that the study suggests that incidental was an effective teaching method and made it simple to work with the participants. The study also suggests that it was a teaching method that could be applied with ELLs when using functional communication. It was also suggested that L2 (English) was affected by L1 (Spanish) because learning the target in Spanish made it so that the participant learned the target more quickly in English. In the future, it would be useful to have more participants to get more generalized data. It would also be useful to have more time to implement the study. This study was most beneficial in suggesting how vocabulary instruction was useful when implementing incidental teaching to children with developmental delays and better understanding how L1 (Spanish) affects L2 (English).

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APPENDIX A:
Terminology and Processes

Table 1

Definitions and Measurements for all Coded Behaviors.

Definitions

Variables	Definitions	Simplified Term	Examples
Mands	When the child emitted a corresponding response to the item or therapist behavior that was either available, out of reach, or desired.	Requests	"More please," "I want water," "look at this."
Tacts	When the child emitted a corresponding response to the prompt "what is it" or "what color is it." Tacts occurred only the presence of the item being tacted.	Labels	"Red," "Fast," "Car."
Echoics	When the child emitted a response that corresponded directly to the therapist's vocal behavior.	Imitation	If the therapist said: "dog," the child said "dog."
Intraverbals	When the child emitted a verbal response in response to an adult verbal response. To be coded as an intraverbal, the verbal behavior did not have exact correspondence to the adult's behavior. Intraverbals included answering questions, with the exception of "what do you want" when mands were prompted.	Answers / Conversation	If the therapist asked: "what did you eat for breakfast today" and the child responded: "cereal." If the therapist asked: "will you throw this away?" and the child responded: "yes."
Motor Imitations	When the child emitted a motor response that corresponded to the therapist's motor response.	N/A	If the therapist waved at the child, the child waved back.
Problem behaviors	When the child emitted a response that disrupted the teaching process.	N/A	Problem behaviors included stereotypy, self-injury, disruptive vocalizations, and aggression.

APPENDIX B:
Data Sheets

Data Sheet 1. Blank data sheet used during intervention with students

Data Sheet:

- = No response

F = Full Verbal Prompt

P+ = Partial Verbal Prompt

+ = Independent

English						Spanish					
Target	1	2	3	4	5	Target	1	2	3	4	5

English						Spanish					
Target	1	2	3	4	5	Target	1	2	3	4	5

Data Sheet 2. Baseline— Laura

A	B	C	D	E	F	G	H
BASELINE							
English				Spanish			
Black				Amarillo			
Orange				Azul			
Red				Rojo			
Blue							
Heart				Corazon			
Onion				reloj			
Corn							

Data Sheet 3. Intervention Data— Laura

SD	Target Word	Type (mand, tact, intraverbal)	1/7/2015	1/8/2015	1/12/2015	1/14/2015	1/15/2015	1/16/2015	1/21/2015
manzana (apple)		mand	0/5	0/3	2/4	2/4	5/5	5/5	5/5
uvas (grapes)		mand		1/5	3/4	5/5	5/5	5/5	

Data Sheet 4. Intervention Data continued— Laura

	Type	StC	1	2	3	4	5	6	7	8
Manzana	Mand	8	0%	0%	0%	50%	50%	100%	100%	100%
Apple	Mand	4	0%	80%	100%	100%				

Data Sheet 5. Baseline— Aaron

A	B	C	D	E	F	G	H
BASELINE							
English				Spanish			
Pencil				Lapiz			
Ball				Bola			
Paper				Papel			
Phone				Telefono			
Clock				Reloj			
Lego				Bola			
Ball				Lapiz			
Pencil				Javes			
Keys							
Chair							

Data Sheet 6. Intervention Data— Aaron

A	B	C	D	E	F	G	H	I	J	K
Target Word	Type (mand, tac	1/7/2015	1/8/2015	1/9/2015	1/12/2015	1/14/2015	1/15/2015	1/16/2015	1/21/2015	1/22/2015
bloque	mand	0	0/5	0/5	0/4	0/5	0.4	4/5	5/5	4/4
lapiz	mand	0/5	0/5	0/5	0/5	0/5	0/5	0/5	0/5	1/4

Data Sheet 7. Intervention Data Continued— Aaron

	Type	StC	1	2	3	4	5	6	7	8	9	10	11	12	13	14	15	16	17	18	19	20	21	22	23
bloque	mand	9	0%	0%	0%	0%	0%	0%	80%	100%	100%														
block	mand	23	0%	0%	0%	0%	0%	0%	0%	0%	0%	40%	40%	0%	0%	0%	0%	0%	0%	0%	0%	40%	100%	100%	100%

APPENDIX C:
Data

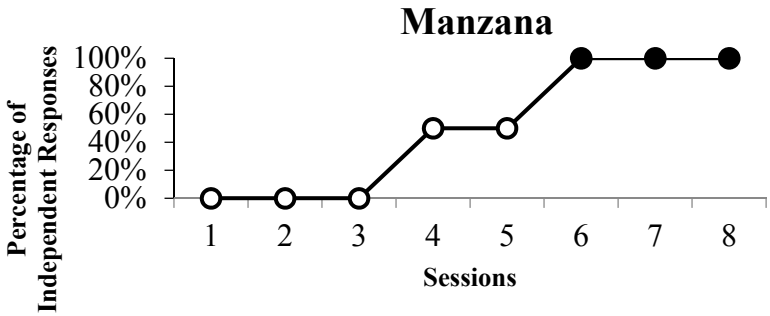
Spreadsheet 1. Laura Baseline

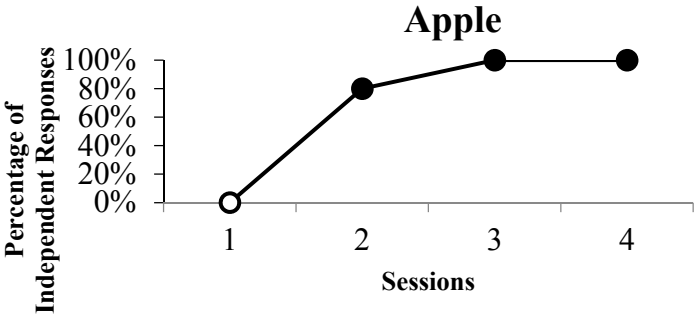
BASELINE							
English 10/10/14				**Spanish**			
Pencil	F+	F+		Lapiz	F+		
Ball	F+	F+		Bola	F+		
Paper	F+	F+		Papel	F+		
Phone	F+	F+		Telefono	F+		
Clock	F+	F+		Reloj	F+		
10/13/2014							
Lego	F+			Bola	F+	F+	
Ball	F+			Lapiz	F+	F+	
Pencil	F+			Javes	F+	F+	
Keys	F+						
Chair	F+						
10/27/2014 (Audio)							
A	(+)	(+)	(+)	a	F+	(+)	(+)
M	F+	(+)	(+)	m	F+	(+)	(+)
Sun	F+	F+	F+	sol	F+	F+	F+
11/17/2014							
Blue	F+	F+	F+	azul	F+	F+	F+
Red	F+	F+	F+	rojo	F+	F+	F+
Orange	F+	F+	F+				

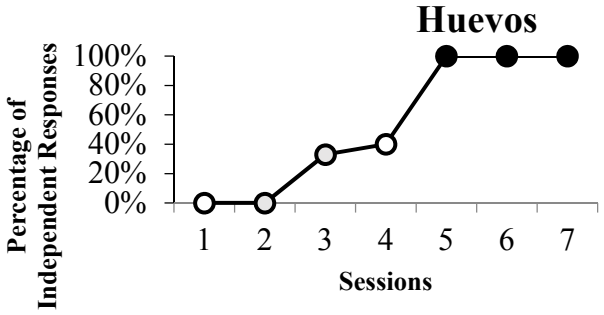
Spreadsheet 2. Aaron Baseline

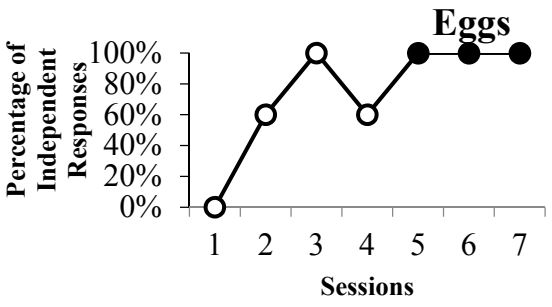
BASELINE							
English 10/10/14				**Spanish**			
Pencil	F+	F+		Lapiz	F+		
Ball	F+	F+		Bola	F+		
Paper	F+	F+		Papel	F+		
Phone	F+	F+		Telefono	F+		
Clock	F+	F+		Reloj	F+		
10/13/2014							
Lego	F+			Bola	F+	F+	
Ball	F+			Lapiz	F+	F+	
Pencil	F+			Javes	F+	F+	
Keys	F+						
Chair	F+						
10/27/2014 (Audio)							
A	(+)	(+)	(+)	a	F+	(+)	(+)
M	F+	(+)	(+)	m	F+	(+)	(+)
Sun	F+	F+	F+	sol	F+	F+	F+
11/17/2014							
Blue	F+	F+	F+	azul	F+	F+	F+
Red	F+	F+	F+	rojo	F+	F+	F+
Orange	F+	F+	F+				

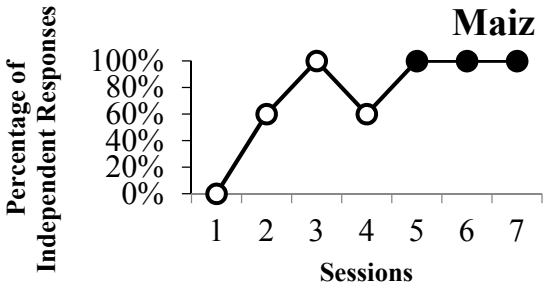
Set of Graphs 1. Laura- Spanish-English Pairs

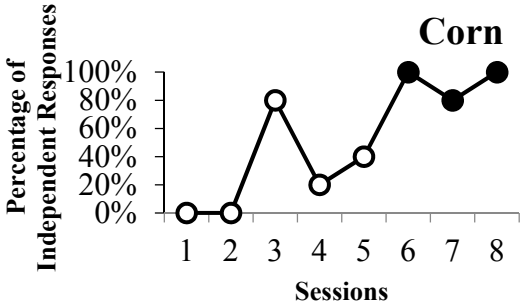


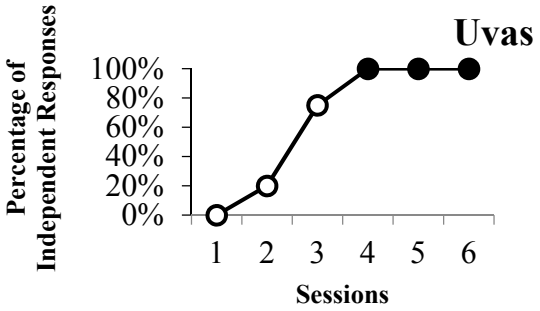


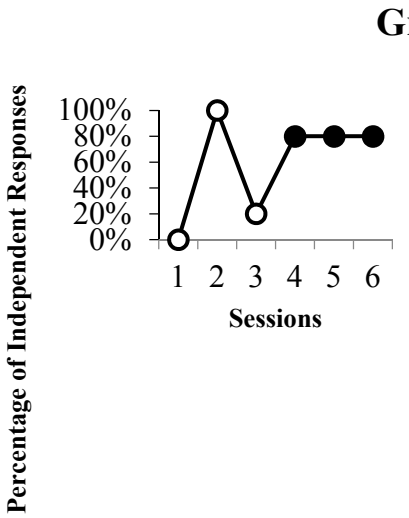


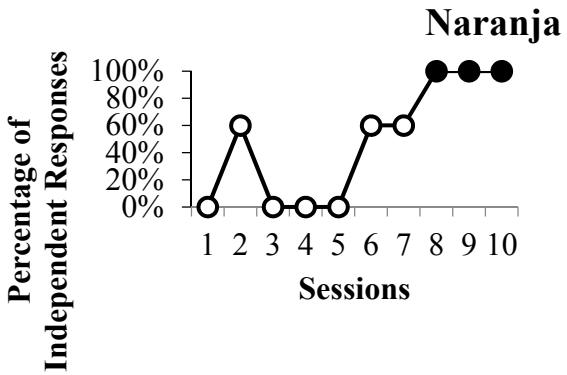


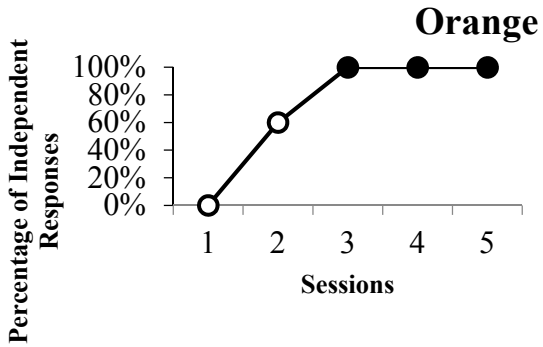

Maiz
Percentage of Independent Responses
100%
80%
60%
40%
20%
0%
1 2 3 4 5 6 7
Sessions

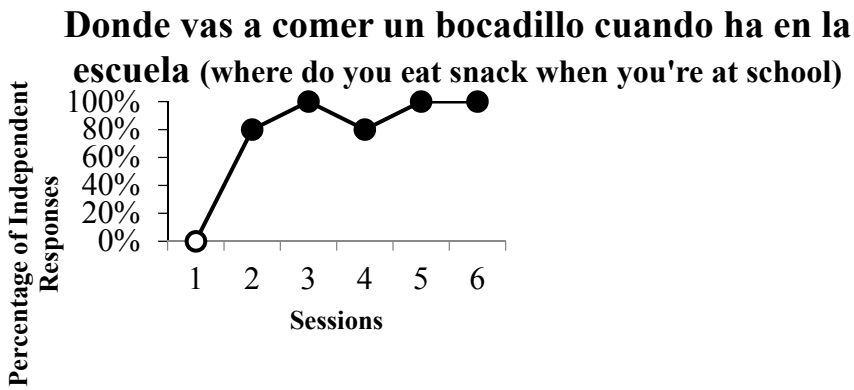

Corn
Percentage of Independent Responses
100%
80%
60%
40%
20%
0%
1 2 3 4 5 6 7 8
Sessions

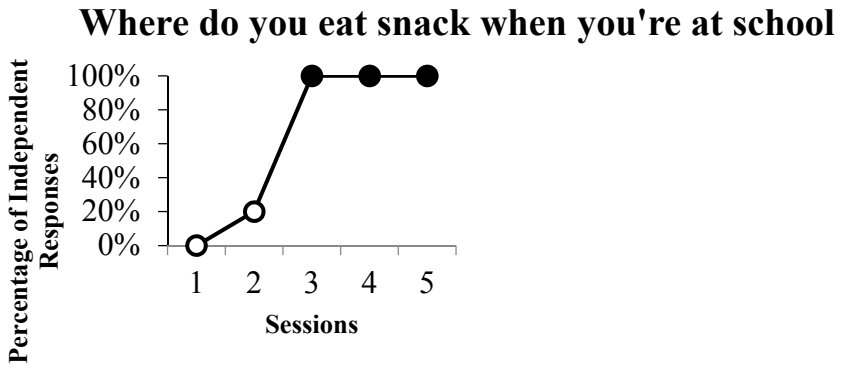

Uvas
Percentage of Independent Responses
100%
80%
60%
40%
20%
0%
1 2 3 4 5 6
Sessions

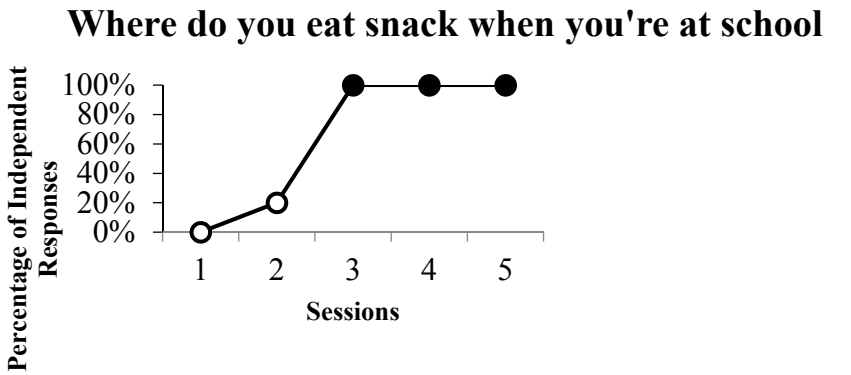

Grapes
Percentage of Independent Responses
100%
80%
60%
40%
20%
0%
1 2 3 4 5 6
Sessions

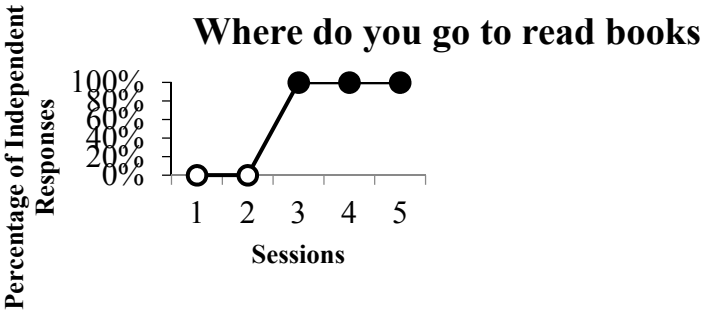

Naranja
Percentage of Independent Responses
100%
80%
60%
40%
20%
0%
1 2 3 4 5 6 7 8 9 10
Sessions

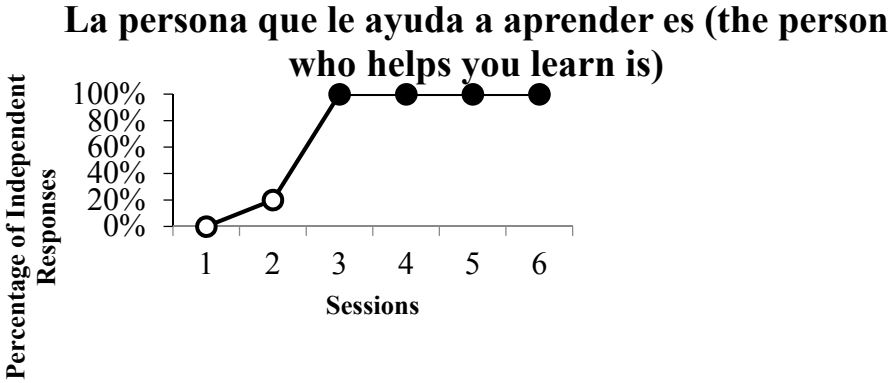

Orange
Percentage of Independent Responses
100%
80%
60%
40%
20%
0%
1 2 3 4 5
Sessions

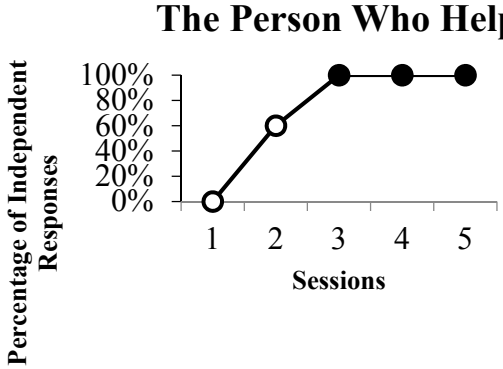

Donde vas a comer un bocadillo cuando ha en la escuela (where do you eat snack when you're at school)
Percentage of Independent Responses
100%
80%
60%
40%
20%
0%
1 2 3 4 5 6
Sessions

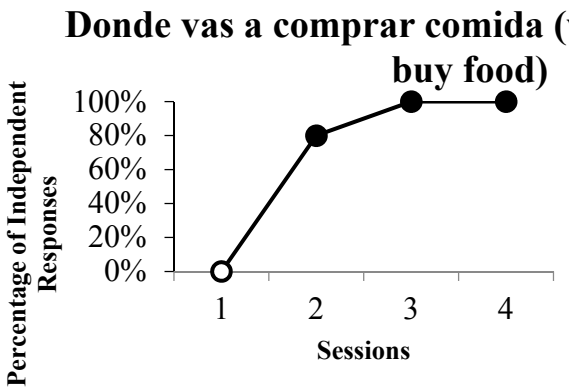

Where do you eat snack when you're at school
Percentage of Independent Responses
100%
80%
60%
40%
20%
0%
1 2 3 4 5
Sessions

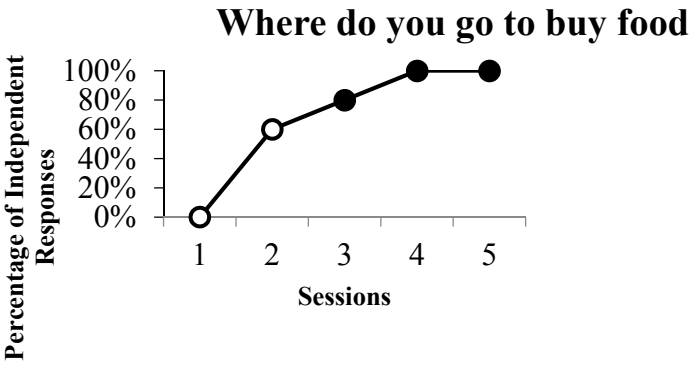

Where do you eat snack when you're at school
Percentage of Independent Responses
100%
80%
60%
40%
20%
0%
1 2 3 4 5
Sessions

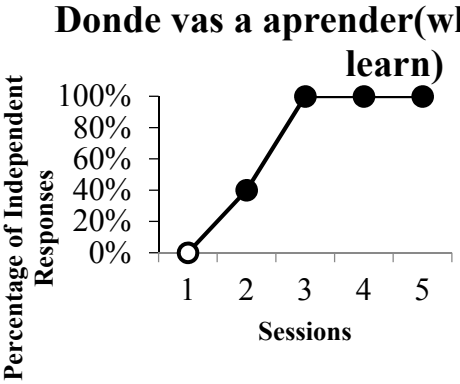

Where do you go to read books
Percentage of Independent Responses
100%
80%
60%
40%
20%
0%
1
2
3
4
5
Sessions

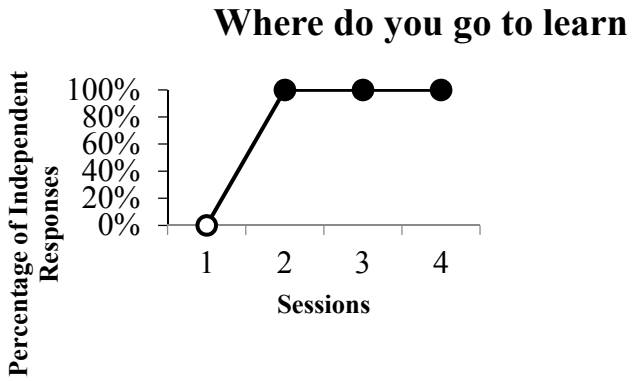

La persona que le ayuda a aprender es (the person who helps you learn is)
Percentage of Independent Responses
100%
80%
60%
40%
20%
0%
1
2
3
4
5
6
Sessions


The Person Who Helps You Learn
Percentage of Independent Responses
100%
80%
60%
40%
20%
0%
1
2
3
4
5
Sessions

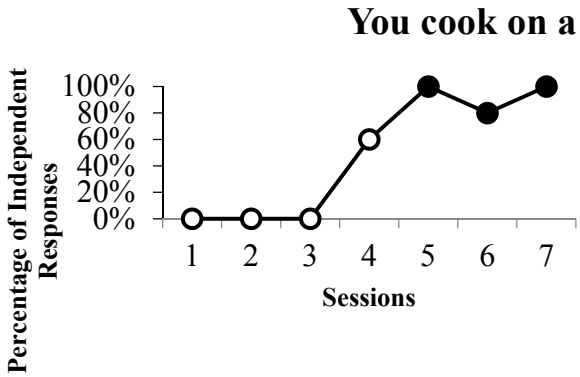

Donde vas a comprar comida (where do you go to buy food)
Percentage of Independent Responses
100%
80%
60%
40%
20%
0%
1
2
3
4
Sessions

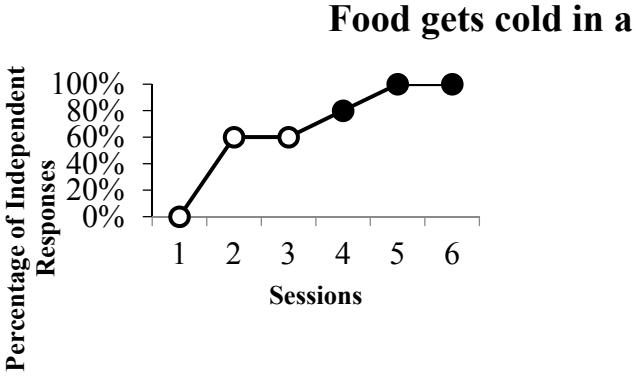

Where do you go to buy food
Percentage of Independent Responses
100%
80%
60%
40%
20%
0%
1
2
3
4
5
Sessions

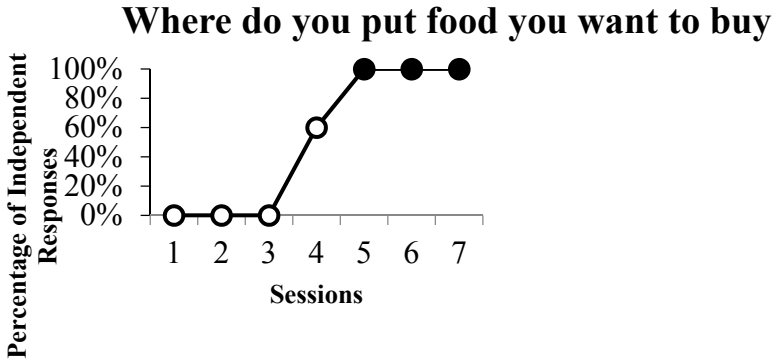

Donde vas a aprender(where do you go to learn)
Percentage of Independent Responses
100%
80%
60%
40%
20%
0%
1
2
3
4
5
Sessions

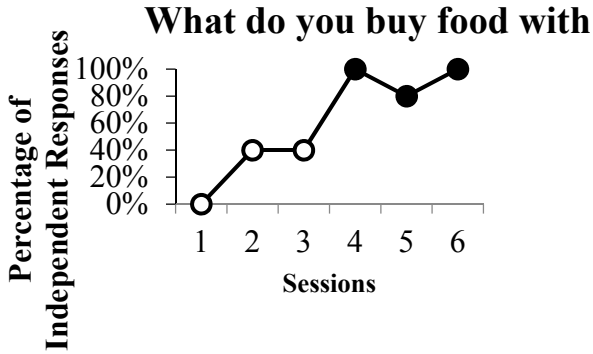


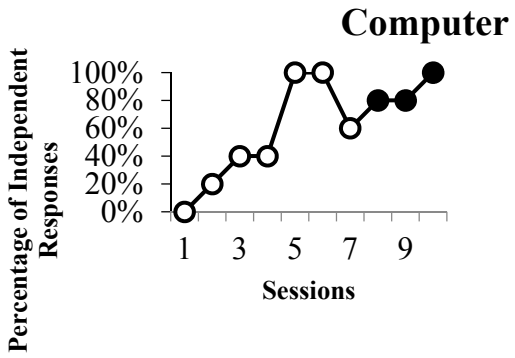
Set of Graphs 2. Laura- English-only Targets

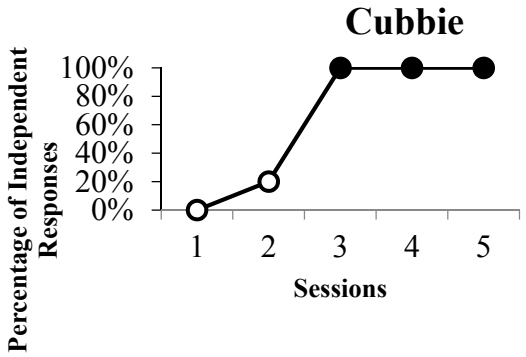




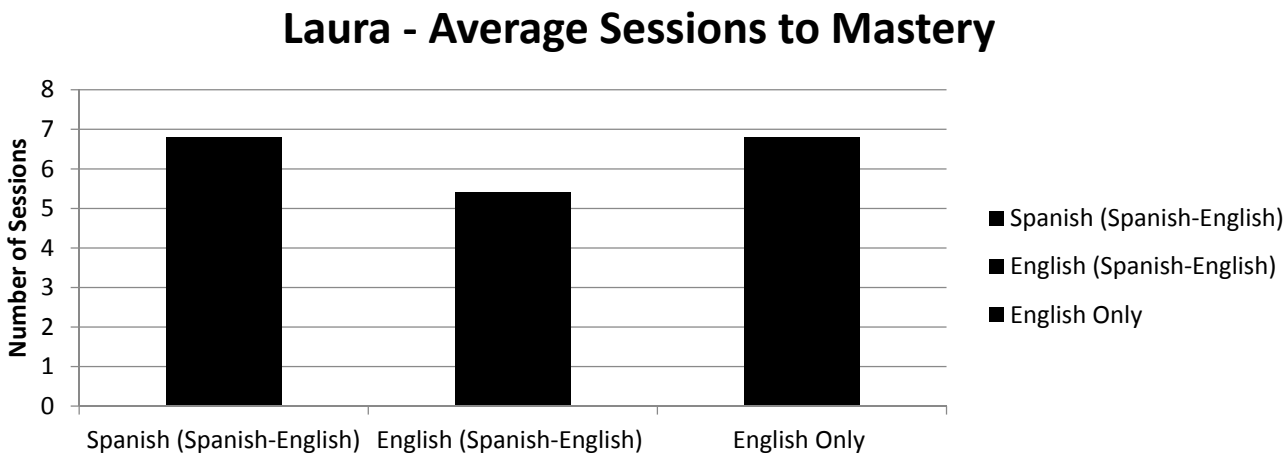

Where do you put food you want to buy
Percentage of Independent Responses
100%
80%
60%
40%
20%
0%
1 2 3 4 5 6 7
Sessions


What do you buy food with
Percentage of Independent Responses
100%
80%
60%
40%
20%
0%
1 2 3 4 5 6
Sessions

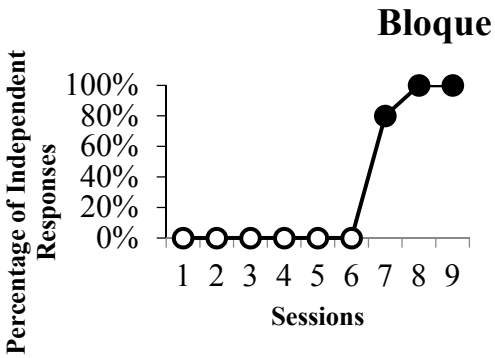

Computer
Percentage of Independent Responses
100%
80%
60%
40%
20%
0%
1 3 5 7 9
Sessions

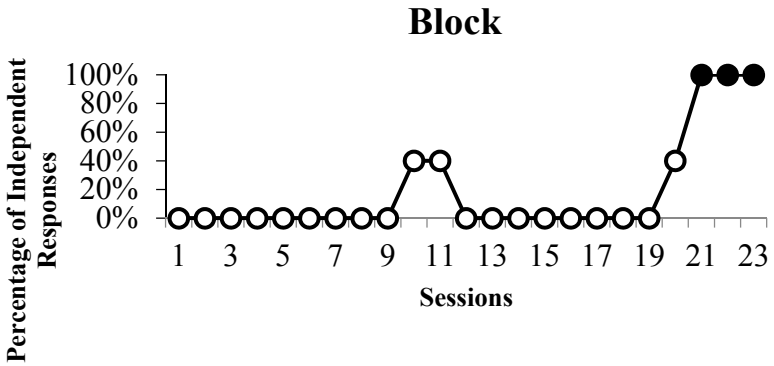


Graph 3. Laura- Average Sessions to Mastery

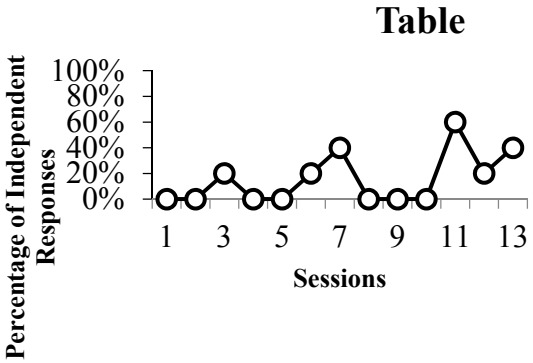


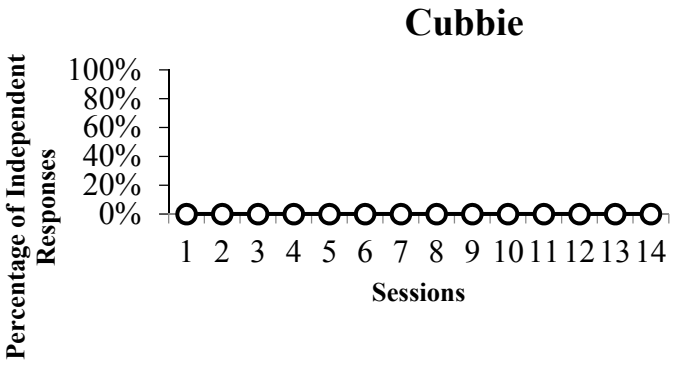
Set of Graphs 4. Aaron- Spanish- English Pairs



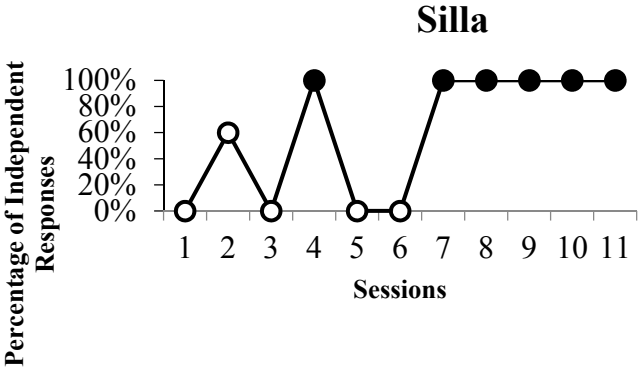


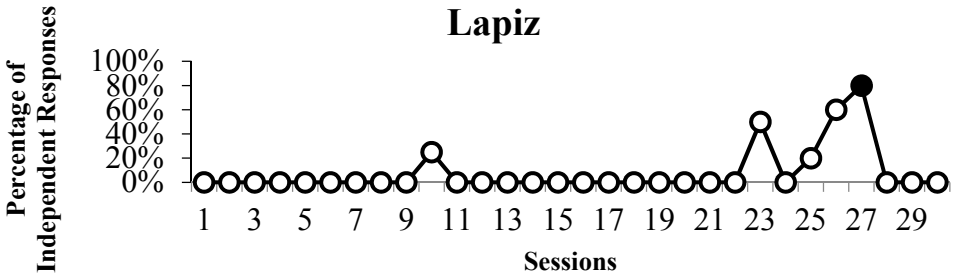
Set of Graphs 5. Aaron- English-only Targets

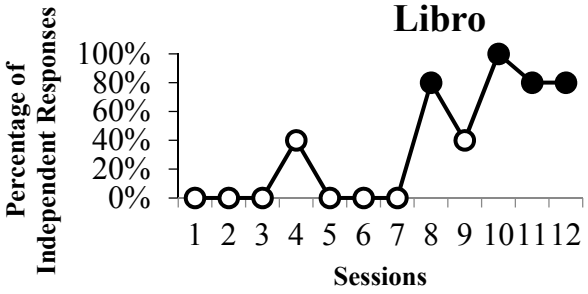




Set of Graphs 6. Aaron- Spanish Only Targets







APPENDIX D:
Consent Form

Parental Permission

Introduction

My name is Blake Hansen. I am a special education professor from Brigham Young University (BYU). I am conducting a research study about innovative ways to teach communication skills to children with disabilities. I am conducting a study on an approach to teaching called "Incidental Teaching" where situations to teach communication skills are found in a child's classroom environment.

I am in inviting your child to take part in the research because we are partnering Provo Peaks Elementary School and Sunrise Preschool where your child attends special education classes.

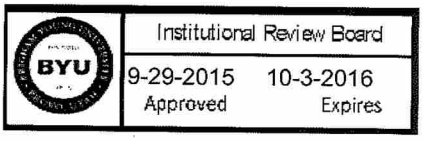
Procedures

If you agree to let your child participate the following will occur:

- We will set up a meeting to discuss the teaching style that we and ask you some questions about your child's communication skills.
- Your child's nonverbal and verbal communication skills will be tested in a public location of the school (such as the library or in the hallway) by a BYU student who is under my supervision. This test should take less than an hour and will be conducted during the school day. This test will be repeated up to 4 times during the school year to check for progress. The test is not diagnostic. It is used to identify skills that your child will work on in a teaching session.
- After your child's communication skills are tested, a BYU student who is trained to teach language skills will spend up to three hours per week teaching your child in his/her classroom. The student will teach your child the skills identified in the test. A second BYU student will also be present to record your child's progress. In addition, your child's vocalizations will be recorded using a digital audio recorder. This recording will be deleted within one week of the recording being made. All BYU students who interact with your child have received background checks. At no time will a BYU student be alone with your child. The teaching will take place during normal classroom hours.
- We will also request to see your child's Individualized Education Program (IEP) and previous assessments.

Risks and Confidentiality

There are minor risks for participating with this study. There is a minor risk of loss of privacy. To limit this risk, any data we keep will be stored on password protected computers or locked filing cabinets. Any data presented in public will be completely confidential and your child's real name will not be used.



Your child may feel uncomfortable working with a new person. To limit your child's discomfort we will stop teaching immediately and return him/ her to ordinary classroom if he/she becomes upset. In addition, we will be as consistent as possible with assigning the same BYU student to work with your child.

Benefits

There are no guaranteed benefits to participating in this research study. Research has shown improvements in communication skills using these teaching methods, but we can't be certain that they will work for your child.

Compensation

No financial compensation will be provided for your child's participation in the present study. We will provide you and your child's teacher with progress reports each month.

Questions about the Research

Please direct any questions about the study to Blake Hansen, 801-422-4691 or blake_hansen@byu.edu.

Questions about your child's rights as a study participant or to submit comment or complaints about the study should be directed to the IRB Administrator, Brigham Young University, A-285 ASB, Provo, UT 84602. Call (801) 422-1461 or send emails to irb@byu.edu.

Participation

Participation in this research is voluntary. You are free to decline to have your child participate in this research study. You may withdraw your child's participation at any point without affecting your child's relationship with the school or your child's teacher.

[ ] I want my child to participate in the study.

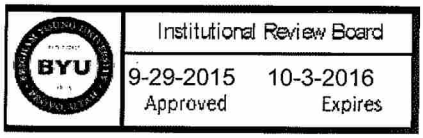
Your name: _____

Your child's name: _____

Your email address or phone number: _____

Your signature: _____

Date: _____



Permiso de los Padres

Introducción

Mi nombres es Blake Hansen. Soy un profesor de educación especial de la Universidad Brigham Young (BYU). Estoy realizando un estudio de investigación sobre las formas innovadoras de ensenar habilidades de comunicación a los niños con discapacidades. Estoy realizando un estudio sobre un enfoque de la enseñanza llamada enseñanza incidental donde las situaciones pare ensenar habilidades de comunicación se encuentran en el ambiente de la clase de un niño.

Estoy en invitar a su hijo a participar en la investigación porque nos estamos asociando con la escuela primaria de Provo Peaks y Sunrise Preescolar donde su hijo asiste a clase de educación especial.

Procedimientos

Si está de acuerdo con que su hijo participe ocurrirá lo siguiente:

- Vamos a establecer una reunión para discutir el estilo de enseñanza que nosotros y hacerle algunas preguntas acera de las habilidades de comunicación de su hijo.
- Habilidades de comunicación verbales y no verbales de su hijo se pondrá a prueba en un lugar publico de la escuela (como la biblioteca o en el pasillo) por un estudiante de BYU, que está bajo mi supervisión. Esta prueba debe tomar menos de una hora, y será realizado durante la escuela día. Esta prueba se repetirá hasta 4 veces durante el ano escolar para revisar el progreso. La prueba no es diagnostica. Se utiliza para identifica las habilidades que su hijo va a trabajar en una sesión de enseñanza.
- Después de las habilidades de comunicación de su hijo se ponen a prueba, un estudiante de BYU que está capacitado para enseñar habilidades lingüísticas gastará hasta tres horas a la semana a enseñar a su niño en su / su salón de clases. El estudiante va a enseñar a su hijo las habilidades identificadas en la prueba. Un segundo estudiante de BYU también estará presente para registrar el progreso de su hijo. Además, las vocalizaciones de su hijo serán grabadas utilizando una grabadora de audio digital. Se eliminará Esta grabación dentro se hizo una semana después de la grabación. Todos los estudiantes de BYU que interactúan con su hijo han recibido la verificación de antecedentes. En ningún momento un estudiante de BYU estar a solas con su hijo. La enseñanza se llevará a cabo durante el horario normal de clase.
- También vamos a solicitar ver el Programa educativo individualizado (PEI) de su niño y las evaluaciones anteriores.

Riesgos y Confidencialidad

- Hay riesgos menores para participar en este estudio. Existe un riesgo menor de pérdida de privacidad. Para limitar este riesgo, los datos que guardamos será almacenada en las computadoras protegidas con contraseña o archivadores cerrados con llave. Cualquier dato que se presentan en público serán

completamente confidenciales y el nombre real de su hijo no se utilizarlo. Su niño puede sentirse incómodo trabajar con una nueva persona. Para limitar el malestar de su hijo vamos a dejar de enseñar de inmediato y regresar a él / ella para el aula ordinaria si él / ella se convierte en trastornado. Además, vamos a ser lo más consistente posible con la asignación de la misma estudiante de BYU para trabajar con su hijo.

Benéficos

- No hay beneficios garantizados a participar en este estudio de investigación. La investigación ha demostrado mejoras en las habilidades de comunicación que utilizan estos métodos de enseñanza, pero no podemos estar seguros de que van a trabajar para su hijo.

Compensación

- No hay compensación financiera se proporcionará para la participación de su hijo en el presente estudio. Usted y el maestro de su hijo proporcionaremos informes de progreso cada mes.

Preguntas Sobre la Investigación

- Si usted tiene preguntas con respecto a este estudio, puede comunicarse con Blake Hansen al 801-422-4691 para obtener más información.
- Si usted tiene preguntas sobre sus derechos como participante en una investigación, en contacto con el Administrador IRB al (801) 422-1461; A-285 ASB, Universidad de Brigham Young, Provo UT 84602; irg@byu.edu

Participación

- La participación en este estudio de investigación es voluntaria. Usted tiene el derecho de retirar en cualquier momento o negarse a participar en su totalidad sin peligro a usted o a su reputación con la Universidad de Brigham Young.

[ ] Quiero que mi hijo participe en el estudio

Su Nombre: _____

El nombre de su hijo: _____

Su dirección de correo electrónico o número de teléfono:

_____

Su firma: _____

Fecha: _____