

Dynamic Assessment of Narratives among Navajo Head Start Children

by

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ABSTRACT

Purpose: Over-identification of Navajo Head Start children into special education on the Navajo Reservation has come to the attention of Tribal leaders, Educational leaders, and parents due to the use of invalid assessment measures. Dynamic assessment (DA) of narratives may be a tool for distinguishing language differences from language disorders. The purpose of this study is to determine whether the Predictive Early Assessment of Reading and Language (PEARL), a dynamic assessment of narratives, accurately classifies Navajo Head Start students with typically developing (TD) language or with language impairment (LI), and to examine which measures best predict children's overall performances on the PEARL.

Method: Ninety, 4- and 5-year-old Navajo preschoolers with LI and with TD language were selected. Children completed the PEARL, which measured both language comprehension and production using pretest and posttest scores, and a modifiability scale. In addition, children completed the *Clinical Evaluation of Language Fundamental, Preschool, Second Edition* (CELF – Preschool 2) and language samples. A Navajo Speech Language Pathologist confirmed the diagnosis of the participants. Research assistants pretested, briefly taught the principles of narrative structure (story grammar, language complexity and episode) and evaluated response to learning using an index of modifiability.

Results: Results of discriminant analysis indicated that PEARL pretest differentiated both ability groups with 89% accuracy. In addition, posttest scores discriminated with 89% accuracy and modifiability scores with 100% accuracy. Further,

the subtest story grammar was the best predictor at pretest and posttest, although modifiability scores were better predictors of both ability groups.

Conclusion: Findings indicate that the PEARL is a promising assessment for accurately differentiating Navajo preschool children with LI from Navajo preschool children with TD language. The PEARL's recommended pretest cut score over-identified Navajo children with TD language; therefore, a new recommended cut score was determined.

DEDICATION

This dissertation is dedicated to my family for their continued love and support. First and foremost, to my parents, David and Erlene Henderson, for all their years of love and encouragement. It is because of their guidance I am the person I am today. I am extremely grateful and thankful for all they have provided me in the past.

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CHAPTER I

INTRODUCTION (LONG)

In 1996, the Navajo Head Start Program reported that 64% of Navajo students enrolled were identified with language impairment (LI). In 2000, 66% of Navajo students enrolled in Head Start were identified with LI, and in 2013, 71% of Navajo students were identified with LI. This trend indicates that a disproportionate number of children with typically developing (TD) language are qualifying for language services (Begay-Vining, 1997), which may be attributed to their unique cultural and linguistic characteristics that impact performances on assessments (Research Agenda Working Group et al., 2001), rather than true language disorders.

The Navajo Government, school administrators, teachers, and Navajo communities have been concerned with the over-identification of Navajo children in speech-language services and special education (Beaulieu, 2000; Deyhle & Swisher, 1997; Hillabrant et al., 1992). Standardized, norm-referenced assessments have traditionally been used to identify Navajo children with LI, which over-identifies children with TD language from linguistically and culturally diverse backgrounds, even though it is not considered the best practice for Navajo students (Allison & Vining, 1999; Failing, Stice, & Inglebret, 1993). There are several alternative approaches, such as language sample analyses and dynamic assessment (DA) that may better identify Navajo children as having LI or children with TD language, allowing for better diagnosis and treatment planning than standardized, norm-referenced assessments.

The Navajo Nation (2011) and the United States Department of Education (2007) require the Navajo Head Start Program to use child assessments that are developmentally, linguistically, and culturally appropriate. This requirement is a challenge for the program because there are no tools that are valid for the assessment of Navajo children's language; there is no known assessment available that specifically addresses the linguistic and cultural needs of Navajo children in order to identify whether they present with language or learning disabilities (Spiker, Hebbeler, & Barton, 2011). Therefore, there is a need for a valid assessment to prevent the inaccurate diagnosis of Navajo children and to correctly identify their strengths and weakness to ensure better educational interventions and outcomes (U. S. Department of Health and Human Services, 2005; Begay-Vining, 1997). In particular, Head Start staff and tribal leaders are interested in 1) accurately identifying children as having speech and language disorders and reducing the over-representation of children with TD language in special education; 2) determining the unique characteristics and learning styles among Navajo children with special needs; and 3) developing effective methods for identifying Navajo children with special needs (U. S. Department of Health and Human Services, 2005).

Possible causes of over-identification

Academic achievement. Navajo students display the poorest school performance in the US when compared to other language majority and minority students (Deyhle & Swisher, 1997; Mackety & Linder-VanBerschot, 2008; Willetto, 1999). According to Mackety and Linder-VanBerschot (2008), low academic achievement among Navajo students is due to the use and focus of the mainstream curriculum and teaching practices that do not incorporate the Navajo culture, their language, and learning styles. For

example, Navajo children do not answer questions to which answers are already known; therefore, teachers may interpret the lack of response as not knowing or unwilling to participate, which, in turn, can be interpreted as a developmental delay (Walsh, 1998). Differences in language and learning styles between the mainstream and Navajo culture may account for some of this low achievement in Navajo children (Harry & Klinger, 2006).

Low academic performance in the classroom frequently results in referring Navajo students to special education (i.e., 73% to 90%), which typically requires a language assessment from a speech-language pathologist (SLP; Begay-Vining, 1997). Achievement patterns in national assessments of language arts indicate that Navajo children in second grade perform 1.2 grade levels below their mainstream peers, and by fifth grade, Navajo children perform on average 2.5 grade levels below mainstream peers (National Caucus of Native American State Legislators, 2013).

Navajo-influenced English. Many Navajo children entering the school setting are expected to speak Standard American English, although they are considered a language minority group due to their bicultural and/or bilingual experiences (Hibel, Faircloth, & Farkas, 2008; Willetto, 1999). This results in many Navajo students speaking nonstandard dialects of English, which differ from the mainstream American English in grammar, vocabulary, pragmatics, and pronunciation. Further, Navajo Influenced English can be their native or second language (Leap, 1993; Willetto, 1999). These differences stem from the influence of the Navajo language and culture that the children or their parents speak at home and in their communities. For example, verbalization is a form of “showcasing” knowledge that is not considered culturally

appropriate for Navajo children; therefore, labeling objects or events are not a form of teaching by Navajo parents (Cargo, 1992).

Characteristics of Navajo narratives. Navajo narratives reflect the language and cultural values of the Navajo people. Narratives are an important skill in preparing children to develop language skills that are necessary for success in elementary classrooms (Price, Roberts, & Jackson, 2006). Specifically, while children are producing narratives, they are simultaneously integrating multiple systems of language use and demands, such as the use of complex sentences and grammatical accuracy (Miller et al., 2006). Narratives also require the use of particular vocabulary and expanded use of specific grammatical forms (Squires et al., 2014); however, narratives differ among cultures and are used for different purposes across cultures. Therefore, Navajo narratives have the potential to impact the performance of Navajo children in the educational setting.

Navajo narratives differ from mainstream narratives in terms of how the narratives are told, why the narratives are told, and how their micro- and macrostructure are formulated (Berman & Slobin, 1994; Basso, 1990). These differences are related to the structure of the original language, and the cultural values and the purpose of storytelling (Westby, Moore, & Roman, 2002). Navajo narratives are used to entertain, to teach, to organize, to plan, and to warn. These represent different genres that differ in terms of who tells the narratives and how the information in the story is organized (Westby, Moore, & Roman, 2002). Cooley and Lujan (1982) found that the narrative lines of Navajo children told in the classrooms were not organized as their mainstream peers. Unlike students from mainstream backgrounds, Navajo students do not share

narratives that involve a specific sequence, causality, and succession of actions.

Consequently, the structure and organization of ideas in many Navajo narratives are markedly different from mainstream US narratives (Highwater, 1981; Zolbrod, 1999).

Navajo storytellers spend much of their time describing the characters, details of the landscape, and the places the character has passed; in contrast to mainstream narratives, the storyteller only talks briefly about the plot lines of the narrative. Eder (2007) indicated that Navajo storytelling does not use the structure of “beginning,” “middle,” and “ending,” which is typical in mainstream storytelling. Many Navajo narratives are repeated with recurring themes and are based on the Navajo culture of the “four directions:” a narrative should begin in the east, go south, then west, then north, where the problem is resolved and where the narrative returns to the east (Eder, 2007). The four directions are found explicitly in many narratives, with no clear ending or final lesson, such as in the Western understanding. Unlike mainstream narratives in which the lesson or moral is found in the conclusion, in Navajo narratives lessons occur throughout the narrative (Eder, 2007).

Brady (1978) provided an example of a narrative structure in Navajo. Brady observed 10- and 11-year-olds telling narratives about skinwalkers, also known as shapeshifters. The Navajo children devoted their attention to characters, background, and setting rather than to the initiating events and consequences, information that is a typical mainstream child presents. For example, one child was telling a narrative about skinwalkers containing information about the setting and background:

My friend at Window Rock one time she told me this story about when she went to her grandma's at Tohatchi. Um she said they were playing, her, her cousins and her brother. And then they saw something black go across there. Then they told their uncle and then their uncle went out to

*find it. Then they keep running and then they caught up with that thing.
It was a skinwalker...in a wolf, a black, wolfskin.*

The Navajo child provided specific background information about the setting, she did not provide detailed events to lead up to one specific time when her friend saw the dark image. In fact, the narrative concluded with information about the characters, setting, and background. Events and consequences were not provided in the narrative, which indicates that the narrative could be continued at a later time (Eder, 2006).

Scollon and Scollon (1981) described Navajo narratives as a social creation of reality based on personal and/or community experiences that differ from the dominant culture. Successful storytelling is based on the understanding between the narrator and audience, such that the audience can share in the telling of a narrative. With a listener who shares the same cultural values, experiences, and storytelling processes with the teller, there is a mutual understanding of the meaning, and the teller does not feel the need to elaborate in terms of motivations and internal responses. Specifically, storytelling is expressed as a mutually-negotiated meaning between the narrator and audience, wherein the teller provides only the background information, and the listener provides the foregrounded information in his or her own words (Scollon & Scollon, 1981).

Many educators incorrectly describe Navajo narratives as unorganized and rambling (Cooley & Lujan, 1982; Zolbrod, 1999), characteristics of an individual having LI in mainstream cultures. The concept of a non-linear narrative structure is typical in Navajo narratives, which contrasts with linear narrative structures among their mainstream peers and highlights the differences between mainstream children and Navajo children (Westby, Moore, & Roman, 2002; Zolbrod, 1999). Navajo narratives are

structured with no episodic organization; narratives do not conform to an arrangement that reflects causal relations and temporal sequence of events, but involve selecting, combining, and recombining “narrative chunks” to connect the narrative (Gough, 1990). “Narrative chunks” in Navajo narratives may be in one order in one situation, but in a different order or omitted in another situation (Westby, Moore, & Roman, 2002).

Traditional Navajo teaching. Traditional teaching in the Navajo culture is based primarily on observation and children listening to narratives rather than telling narratives (Eber 1995; Leavitt, 1995; Meyer & Bogdan, 2001). Narratives are the means by which many Navajos learn to construct the meaning of life, of human beings, and of the universe; narratives are the way in which elders and other adults pass on this knowledge (Farella, 1984). Navajo elders and parents play an important role in learning because they share their history, culture, and traditions with their children from a very young age through narratives. Through oral narratives, they guide the child’s interactions and way of life, and while the children listen, they are developing an understanding of their place in the world, their roles, and their culture. Elders and parents teach through observation, listening, and self-testing (Garrett, 1996). Therefore, Navajo children do not practice telling or rehearsing narratives like children from the mainstream US culture do in their homes, which can put them at a disadvantage in academic settings.

Storytelling holds the key philosophy to Navajo living grounded in the concept of *sa’a nághaí bik’e hózhó*, which refers to a life that is characterized by the balanced and harmonious interrelationships of male (Protection Way) and female (Blessing Way). This includes all things in nature and the elements: people, animals, plants, heavenly bodies, and daily phenomena that live in a balanced, interconnected, and ordered way

within *bik'e hózhó* (House, 2002). However, a mainstream narrative is an individual's production of a fictional or real story of an experience or event that is temporally sequenced (Engel, 1995). These narratives take many forms: telling a narrative from a book, sharing prior experiences with an audience, or retelling a movie (Stein, 1982). Because a narrative includes production or comprehension of several sentences or utterances that unfold over time, narratives are usually referred to as a type of discourse, along with conversations and expositions (Justice, Bowles, Pence, & Gosse, 2009).

Navajo elders, parents, teachers, community leaders, and spiritual guides are honored and highly respected because of their life's wisdom (Yazzie-Mintz, 2007). In the Navajo tradition, elders are known as the "Keepers of the Wisdom," and they play an integral role in ensuring the history and traditions of the Navajo culture are passed down generation to generation (Meyer & Bogdan, 2001). Using oral narratives, they guide one's interactions and way of life through a learning process of observation, listening, and self-testing (Garrett, 1996). In turn, children are expected to grasp the wisdom and knowledge when they are ready to understand the meaning or moral of the narrative. With each narrative told, the listener can learn of new morals and "life instructions" (Meyer & Bogdan, 2001). Storytelling serves two main purposes in the Navajo culture – teaching and expressing love, which fuse both wisdom and knowledge. Children are told that "thinking is sacred" and "listening is sacred" and that both are to be practiced by Navajo children during storytelling. In this way, children are assured that story telling is used to showcase the elders' and family's love and concern for their child (Meyer & Bogdan, 2001). Therefore, Navajo storytelling is an important method of teaching among families and communities.

Families and communities are regarded as the prime factors for language and cultural development necessary for Navajo children to become effective participants in their culture (Demmert, Grissmer, & Towner, 2006). Traditionally, within Navajo families, these developmental responsibilities have been carried out by a member of the family using both oral and visual demonstration. An example is a mother who passes on the skill of weaving or a father who passes on the skill of horsemanship, both parents serving as primary mentors and teachers to their young children (Yazzie-Mintz, 2007). Specifically, before the child is taught to weave, the parent shares narratives about how Changing Woman taught the Navajo people to weave rugs. Designs on the rugs have narratives that are told during weaving. While narratives are being told about the history of weaving and the designs, weaving is also taught through observation and storytelling, the two components of Navajo teaching (Yazzie-Mintz, 2007).

Parents and elders expose Navajo children to storytelling at a very young age, but the children lack experience producing or sharing narratives. Therefore, in the Navajo culture, young children are not expected to tell narratives. Storytelling is usually reserved for the elders (Zolbrod, 1999); young children hear narratives from elders who are considered wise and experienced (Westby, Moore, & Ramon, 2002). The role of a Navajo child is to always listen when an elder is speaking. This behavior shows respect and the willingness to learn from someone who has gained knowledge and wisdom over the years (Leap, 1986; Zolbrod, 1999). Navajo children are the listeners in contrast to mainstream culture where children are often encouraged to retell narratives.

Standardized assessments and norming samples. Evaluation of language skills in Navajo children poses a significant challenge among speech-language pathologists

(SLPs) because current standardized assessments are deemed inappropriate (Yazzie-Mintz, 2007), given that they tend to be normed with non-indigenous, mainstream, English-speaking children (Caesar & Kohler, 2009; Peña et al., 1992; Stockman, 2000). For example, the *Clinical Evaluation of Language Fundamental – Fourth Edition* (CELF – 4; Semel, Wiig, & Secord, 2003) included 11% of children under the category “other” ethnic minority students beyond African American and Hispanic children in their norming sample; however, it does not state how many of those were of Native American ethnicity, nor how many were Navajo students. Such a low percentage of “other” ethnic minority students could not provide adequate representation of Navajo students; therefore, Navajo students’ performance on the *CELF – 4* may be low because the items were not adequately normed with a sufficient sample of Navajo students, and thus, it may be biased against them. Moreover, current standardized language assessments are often poor indicators of Navajo children’s true language ability because they do not match Navajo culture, language patterns, learning styles, and strengths (Banks & Neisworth, 1995). For example, CELF-4 includes culturally inappropriate items, such as following directions with sequences that are not expressed in Navajo, or scoring irregular plurals such as “childrens” for children as incorrect.

Narratives

Oral narratives are “*oral discourse that relates real or fictional events that are temporally sequenced that convey meaning*” (Hughes, McGillivray, & Schmidek, 1997, p. 355) that is constructed by macrostructure and microstructure. Macrostructure is generally organized by story grammar and episodic complexity (Hughes, McGillivray, &

Schmidek, 1997). Microstructure entails more specific properties at the sentence level, such as cohesion and sentence complexity (Hughes, McGillivray, & Schmidek, 1997).

Production and comprehension of narratives are important skills during the early elementary years and are vital to succeed academically (Cazden, 2001; Gillam, McFadden, & Van Kleeck, 1995; McCabe & Bliss, 2003; Petersen, Gilliam, & Gilliam, 2008; Price, Roberts, & Jackson, 2006). Narrative skills are important precursors to literacy for monolinguals (Dickinson & Tabors, 2001) and bilinguals because narrative skills improve reading comprehension skills (Uchikoshi, 2005). For example, comprehension of narratives in English and Spanish are predictors of reading skills within and across languages for bilingual Spanish-English speaking children in K – 3rd grade (Lindsey, Manis, & Bailey, 2003; Proctor, Carlo, August, & Snow, 2005). Therefore, it is important that preschoolers are exposed to different types of texts, including narratives, to help develop their literacy and language skills (Fiestas, 2008). Specifically, while children are producing narratives, they are simultaneously integrating multiple systems of language, such as the use of complex sentences and grammatical, semantics, and cohesion skills (Miller et al. 2006; Squires et al., 2014).

Factors Influencing Narrative Development. As children in mainstream culture develop their narrative skills, adults not only play a role in modeling, but also in scaffolding their narratives (Fiestas, 2008). Children’s cognitive and communication skills develop through early interactions with adults, resulting in children who are able to communicate successfully with those around them (Bruner, 1985; Vygotsky, 1978). Parents begin to influence their children’s conversations about the past by providing both structure and content, by initiating topics, and by scaffolding their children’s productions

(Hudson, 1993). Scaffolding children's recounts of specific and special events from memory in sequence helps develop the underlying cognitive skills related to language use (Fiestas, 2008).

Adults create a framework for sequencing skills by allowing children to relate events while providing temporal markers (Melzi, 2002). Adults may begin to ask memory questions that require the child to provide content (Eisenber, 1985). When parents use prompts for children to include specific aspects and structures of narratives, the prompts become internalized and children begin to spontaneously include these features (Fivush, 1991; Peterson & McCabe, 1994). Parents or more competent peers who interact with children facilitate the change of cognitive processes, such as attention and perception through the interaction, leading to higher independent functioning (Vygotsky, 1986).

Although interactions with more competent adults or peers influence further development, culture influences the course and the expectations of narrative development (Rogoff, 1990). Since a child's culture reflects the development of the child's narrative style and structure (Melzi, 2002; Wang & Leichtman, 2000), an indigenous cultural style may not match the mainstream or nonindigenous narrative style and structure (Fiestas, 2008). In the Navajo culture and traditions, Navajo children are listeners while adults tell narratives of the past; Navajo children are never expected to retell narratives, but are expected to ponder the moral or teaching of narratives. It is not until years later that the child will be expected to retell narratives of their youth.

Narrative Development in Preschool Years. Children's narratives increase in both syntactic and temporal complexity, and they become linearly organized around a

central theme as they develop from preschool through primary grades (Benson, 1983; Hudson & Shapiro, 1991; Price, Roberts, & Jackson, 2006). Narratives increase in length throughout the preschool years, adding more prepositional phrases, increasing the utterances and utterance length, and using connective devices, such as relative clauses and causal relations (Berman, 1988; Hudson & Shapiro, 1991). Children's narratives also transition from additive chains, in which the children produce no temporal or causal relations, to temporal chains, in which children produce the narratives organized sequentially, to causal chains, in which children produce narratives with cause-effect relations (Lahey, 1988; Price, Roberts, & Jackson, 2006). As preschoolers continue to develop their communication skills, they increase their narrative elements beginning at ages 4 through primary grades (Berman, 1988; Hudson & Shapiro, 1991), allowing their narratives to become more cohesive and well sequenced (Hudson & Shapiro, 1991).

Preschool children's narratives are not well developed at age 4, and often depend on exposure to stories at home and school. Berman (1988) assessed preschoolers' narrative performances using Mayer's (1969) *Frog Where Are You?* and found that macro- and microstructure were not yet developed. Children used attempts to indicate the beginning development of episode; however, the presence of these basic narrative elements is dependent on exposure to and the practice of storytelling (Berman, 1988). Their narratives varied because they had not mastered complex grammatical forms, and they were still acquiring vocabulary and discourse organization skills necessary to tell complete and complex narratives. Most children focus on the specific details depicted in the pictures rather than the overarching narrative sequences or plot of the narrative. According to Berman (1988), children master the elements of macrostructure that

characterize a basic narrative before they include the complex microstructure elements related to literate language in their narratives.

At age 4, causality begins to emerge among preschoolers as a result of children's social cognitive abilities that underlie this change in narrative structures (Hudson & Shapiro, 1991; Trabasso et al., 1992). During the later preschool years, children's understanding of human intentionality begins to increase, which allows them to relate the character's internal states to the character's actions, enabling children's narratives to include the character's goals and plans (Curenton, 2004; Stein & Albro, 1997; Trabasso et al., 1992). Despite continued poor organization, preschoolers begin to include the character's physical and mental states and the actions and processes that demonstrate a character's thoughts and emotions (Stein & Albro, 1997).

By age 5, children begin to use causality in their narratives filled with more details, which becomes more purposeful. At this age, children begin to use complete episodes that are central in their narrative structures (Kemper & Edwards, 1986; Peterson & McCabe, 1983). Complete episodes begin to include a series of actions that are performed by a character, whose physical and mental states explain the backgrounds and consequences of his or her actions. Preschool children activate the use of initiating events, motivating states, attempts, and consequences to complete their episodes (Kemper & Edwards, 1986; Peterson & McCabe, 1983).

Narratives Abilities in Children with LI

Narrative abilities and development differs in children with LI from those developing typically. Children with LI have difficulty understanding and producing narratives (Bishop & Adams, 1992; Boudreau & Chapman, 2000; Fey, Catts, Proctor-

Williams, Tomblin, & Zhang, 2004; Gilliam & Johnston, 1992; Greenhalgh & Strong, 2001; Newman & McGregor, 2006; Scott & Windsor, 2000). Narrative tasks require the use of various skills such as organizing, sequencing, establishing the main idea, and perspective taking (Hutson-Nechkask, 2001). Causal relationships influence the understanding and use of narratives (Warner, 2014). Children with LI demonstrate deficits in using and/or understanding causal relationships that are central components of mental models for narratives; they may have difficulty building and/or recognizing relationships between causes due to comprehension deficits (Westby, Moore, & Roman, 2002). Moreover, children with LI exhibit deficits in semantics and syntax, influencing the comprehension of narratives, which also impact literal and inferential comprehension in narratives (Letts & Leinonen, 2001).

Children with LI produce shorter narratives that includes fewer episodes than those of age matched peers with TD language (Lu, Cheung, & Chaou, 2003). Chamberlain (2014) indicated that children with LI do not have the knowledge of producing narrative structures to tell, retell, or understand narratives. In general, children with LI produce shorter, less complete, and less organized narratives; they comprehend and remember less information from narratives; and they make fewer inferences about narratives (Chamberlain, 2014; Warner, 2014). Therefore, given the cultural differences in characteristics in narrative described above, Navajo children are often misdiagnosed, creating the need for alternative assessments to better diagnose of Navajo children as having LI.

Measuring narratives in preschool children

Narratives can be measured through a variety of methods, mostly involving narrative generation and narrative retelling. They can involve visual support or be dependent on past experiences. A narrative retell task may be used to measure children's language abilities in general, and narratives specifically. For preschool age children, a narrative retell task is a better choice for narrative assessment than using story generation, event casts, and scripts (Hughes, McGillivray, Schmideck, 1997). For example, Bishop and Edmundson (1987) asked preschool children to retell *The Bus Story* (Renfrew, 1969; 1991) with picture support. The preschoolers' production of narratives was found to be the best predictor for language ability. Paul and Smith (1993) used *The Bus Story* retelling with four-year olds and found a significant difference in the number of information units between children with normally developing language and those with expressive language delay. Children with expressive language delay produced fewer information units, fewer morphemes per unit, and their narratives were significantly less cohesive than those from children with TD language (Paul & Smith, 1993). However, there are very few recent studies that focus on the narrative development and structure of Navajo preschool children, and none that includes Navajo children with LI.

Standardized assessments assert that they are fair and impartial measures of diagnosing children with LI, which have become the most prevalent measures for SLPs. The US and Tribal government request that culturally and linguistically appropriate assessments be used for Native American children. In general, most assessments are normed using the scores of the majority group population and it is inappropriate to use the same assessment with Navajo children without norming the assessment to reflect the

Navajo language and culture. If the cultural and linguistic backgrounds of individuals being tested are not represented in the norming group, then an alternative assessment should be used to address the over-representation of Navajo children in special education and language services.

Dynamic Assessment

SLPs identify children with LI by equating their performance on standardized assessments with the performance of their same-age peers (Tomblin, Records, & Zhang, 1996). However, standardized assessments are of concern because they assess language skills that are compared to the mainstream population, which can be considered invalid or not sensitive to linguistically diverse populations (Demskey et al., 1998; Godekhr & Haynes, 2001; Scheffner-Hammer et al., 2002; Valencia & Rankin, 1985; Valencia & Suzuki, 2001). Instead, DA focuses on the child's learning process and language development abilities through mediation by using a pretest-intervention-posttest format. DA embeds the intervention as part of the assessment process in order to estimate the extent to which student learning can then be modified (Bolig & Day, 1993; Haywood, Tzuriel & Vaught, 1991; Lidz, 1991). DA is a general term for procedures that directly link assessment to intervention (Haywood, Tzuriel & Vaught, 1992; Lidz, 1987).

During the DA, the examiner is able to observe the child's strengths and weaknesses (Waters & Stringer, 1997), which become apparent in relation to the tasks. Then, the examiner rates the child's learning process, such as how the child defines, analyzes, and solves problems, offering a more accurate indication of the child's true learning skills (Haywood, Brown, & Wingenfeld, 1990). Thus, when examiners use DA, they focus on the child's ability to improve and change their learning processes and the

child's responses to remediation (Lidz, 1987; Lidz, Jepsen, & Miller, 1997), rather than current knowledge, which is influenced by culture and experience.

Theoretical Framework

DA comes from Vygotsky's (1978) learning theory and Feuerstein's (1981, 1979, 1977; Feuerstein & Rand, 1974) theory of mediated learning experiences and cognitive modifiability. Vygotsky (1986) believed that cognitive and linguistic development occurs as a function of symbolic mediation. Specifically, Vygotsky (1986) identified developmental mechanisms through which natural psychological processes, such as memory, perception, concept formation, and attention, are improved through contexts in which parents, teachers, or more competent peers attempt to teach children something new. Altered psychological processes drive the development of language, which becomes a symbolic tool that regulates learning (Kozulin, 2002). A Vygotskian (1979) approach to DA focuses on comparisons between pre-teaching and post-teaching performances. The premise of DA is built upon the competent learner performing a task better after instruction than before instruction as a result of an increase in learning a skill.

Vygotsky's (1986) design of cognitive development reflects how learning follows in the zone of proximal development. Vygotsky (1978) defines the zone of proximal development as the distance between the actual developmental level as determined by independent problem solving and the level of potential development as determined through problem solving under adult guidance or in collaboration with more capable peers. Vygotsky's (1978) conceptualization of a zone of proximal development proposes that learning can be significantly aided in interactions between students and a more knowledgeable and experienced person. These experiences are culturally facilitated and

slowly become adopted as advanced cognitive functions (Gutierrez-Clellen & Peña, 2001).

Feuerstein (1979, 1990) developed the concept of mediated learning experience (MLE), which is the examiner's ability to facilitate learning during the teaching period. According to Kozulin and Presseisen (1995), the mediator's purpose in this interaction is to help the learner interact more efficiently and productively with learning materials. The success of DA is based on the learner's independent achievement level and the continuation of learning beyond the learner's MLE level. The extent of the child's improvement after mediation is not measured against his or her own age peers. Rather, examiners observe how children ascertain and apply psychological tools in a learning situation. Therefore, the critical measure is the assessment of changes in cognitive strategies (Kozulin, 2002).

In DA, a pretest establishes a baseline score for the examiner to see what the child already knows. Following the pretest phase, the examiner spends a period of time instructing the child; this phase is the intervention or teaching phase. After the teaching phase, the examiner re-tests the child to measure the amount of learning that has taken place. The child's learning potential is measured by the amount of learning and the type of response during mediation. Gillam and McFadden (1994) outline pretest-intervention-posttest as 1) pretest is the standardized test that establishes the current levels of performance; 2) intervention consist of assisting the child to modify response strategies while learning a new task or skill; and 3) posttest documents the type and degree of change. For example, Peña, Iglesias, and Lidz (2001) examined the performance of culturally and linguistically diverse preschool children using a word learning task. The

pretest-intervention-posttest method was implemented to compare a mediation group to a non-mediation group. The intervention phase consisted of mediated strategies for teaching children about labels through discussion of single-word labels, in contrast to other ways of referring to objects, and discussion of the importance of labels. Children's performance during these sessions were also rated for modifiability. After mediation, posttest scores and modifiability rating scores were obtained. Results indicated that posttests and modifiability ratings differentiated the children with TD language from those with low language ability, who benefitted less from the short-term mediated learning experience. Culturally and linguistically diverse children with TD language improved their performance on the posttest scores and transferred learning to other areas of language, showing improved scores on other tests of language that did not specifically tap naming abilities.

Modifiability

Individuals are capable of changing their way of learning through changing the type of interaction between the individual and the environment. Cognitive modifiability is an individual's capacity to adapt cognitive strategies to changing demands during mediation (Feuerstein, 1981, 1979, 1977). Research suggests that performance levels increase during mediation prior to post testing (Feuerstein, 1980, 1970). Feuerstein (1980) indicated that children who present cognitive impairments are able to improve their performance on measures that assess their thinking and their intelligence through guided learning experiences. As a result, Feuerstein (1980) claimed that standardized assessments do not reflect the child's true ability or potential performance, especially those with cognitive impairments. Additionally, in studies that assess the value of DA,

modifiability posttest scores are considered good predictors for identifying children with LI (Peña et al., 1992).

Modifiability scales have been found to be reliable and useful to gauge change in DA (e.g., Gutiérrez-Clellen, Brown, Robinson-Zañartu, & Conboy, 1998; Peña et al., 1992). For instance, modifiability scales with Likert ratings are used to examine behaviors such as attention, frustration, and self-regulation. Other ratings are used to measure the child's responsiveness to mediation; the child's ability to transfer new skills to a novel task and the intensity of effort required by the mediator to induce change (Gutiérrez-Clellen & Peña, 2001). Peña (2000) measured the components of modifiability, planning, attention, motivation, transfer, responsivity, and examiner effort and found that these differentiated children having low language ability and typical developing language with the exception of motivation. Peña's (2000) findings suggest that modifiability is a useful construct in the DA framework for providing less biased assessment.

Dynamic Assessment with Native Americans

Current norm-referenced assessments are not considered valid assessments to assess Navajo children's language-learning needs because they fail to take into account the difference in language and communication skills from their mainstream peers who speak the American standard English. In fact, there are no assessments available that accurately diagnose Navajo children as having LI; therefore, when clinicians use standardized language assessments, they often misdiagnose children as having a LI. However, DA may be particularly appropriate for Native American children, in general, and Navajo children specifically, in offering a more effective and reliable measure of

language (Ukrainetz, Harpell, Walsh, & Coyle, 2000). Navajo children have difficulty responding to mainstream style questions that involve direct question-and-answer sequences and timed responses (Robinson-Zanartu, 1996). The mediation component of DA would allow Navajo children to become familiar with these testing procedures and show their strengths in an untimed, fair testing situation (Ukrainetz et al., 2000).

Two studies have examined Native American children's performance using DA of Language. Ukrainetz et al. (2000) investigated Native American kindergarten children's language-learning ability using DA with mediation focused on the categorization of objects. The authors found that modifiability and post-test scores were significantly higher for stronger language learners than weaker language learners, and the response to the modifiability elements (i.e., ability to attend, plan, and self-regulate) was a better discriminator than the learner strategies elements. Similarly, Kramer et al., (2009) investigated the accuracy of *Dynamic Assessment and Intervention: Improving Children's Narrative Abilities* (Miller, Gillam, & Peña, 2001) among 17 Native American third-graders who were classified as normal language learners or having possible language learning difficulties. The study was designed to provide a culturally sensitive evaluation of language learning abilities. Results indicated that both groups benefited from direct teaching of specific targets, but children in the group with typical language benefited more from the intervention. A discriminant analysis found that 94.1% of the children were accurately identified as typical language learners or as having possible language learning difficulties. These results suggest that the DA test may be a useful tool for identifying Navajo children with language and learning difficulties. In particular, there is a great need to reduce the over-representation of Head Start Navajo children in

special education and DA seems to be a promising approach. However, studies addressing the needs of preschool Native American or Navajo children are currently not available.

Dynamic Assessment of Narratives

The use of DA of narratives has the potential to be a less biased assessment tool than standardized assessments because it provides information about the child's thought process, emerging skills, and learning potential (Peña et al., 2007). Overall, the objective of using a DA in general and in using a DA of narratives specifically is to determine the child's modifiability of language ability (Hughes, McGillivray, Schmidek, 1997). DA of narratives should have ecological validity given that they are characteristically part of the discourse that occurs at home and at school. For example, in the mainstream home, parents often ask children to tell narratives about the experiences they have had, and children listen to and read narratives that are part of their language instruction in the schools (Geist & Aldridge, 2002; Jordan, Snow, & Porche, 2000). However, in Navajo homes, children are anticipated to listen to experiences that occurred in the past and are not likely to retell the narrative but to contemplate the moral of the narrative (Highwater, 1981; Westby, Moore, & Roman, 2002).

Studies suggest that DA of narratives accurately diagnoses culturally and linguistically diverse students as having LI. Peña and colleagues (2006) combined two studies that used a DA of narratives tasks among school-age children, examining the reliability and classification accuracy of DA. In the first study, 1st and 2nd grade students told two narratives using a wordless picture book and were rated based on macro- and microstructural aspects of language form and content. Pretest and posttest narratives

were compared for two groups of children, those receiving mediation and those not receiving any mediation. Results showed that the narrative measures applied to narratives about two different wordless picture books had good internal consistency and supported the use of two wordless picture books as stimulus materials for collecting narratives before and after mediation within a DA paradigm. In the second study, children participated in DA of narratives using the wordless picture books from the first study. Again, pretest and posttest narratives were compared for those receiving mediation and those not receiving any mediation. Results indicated that children with TD language who received mediation demonstrated gain in their posttest scores compared with children with LI and control groups. Classification analysis showed better specificity and sensitivity for measures of response to mediation and posttest storytelling than for measures of pretest storytelling. In addition, the studies observed that modifiability, alone, was the best indicator of LI. Therefore, it is expected that a DA of narratives will be a good indicator of LI in Navajo children.

Usefulness of Dynamic Assessment. Bachman and colleagues (1996) present a framework for evaluating the usefulness of language assessments. The most significant consideration in designing and developing a language assessment is the use for which it is intended, such as identifying children with language disorders (Bachman & Palmer, 1996; Leung & Lewkowicz, 2006). Test usefulness provides a metric by which assessments can be evaluated, encompassing all aspects of test development and use (Bachman & Palmer, 1996). For an assessment to be considered useful, it should consider six test qualities: reliability, construct validity, authenticity, interactiveness, impact, and practicality (Bachman & Palmer, 1996).

Authenticity. Authenticity is defined as “*the degree of correspondence of the characteristics of a given language test task to the features of a target language use task,*” the assessment should correspond to a real-life task capturing the characteristics of the test takers, the target language use, and the test task (Bachman & Palmer, 1996, p. 23). Authenticity is a vital caliber for language assessments for two reasons: 1) it offers a link between the performance and the target language use and domain, which should be generalized and 2) the way test takers observe the relative authenticity of test tasks can potentially facilitate their test performance (Bachman & Palmer, 1996). The DA of narratives presents adequate usefulness in regards to assessing the target language use in different contexts, such as in the children’s homes and in the classrooms, where both Navajo and English are spoken.

Interactiveness. Interactiveness is the level and type of participation of the test taker’s individual characteristics in accomplishing a test task (Bachman & Palmer, 1996). DA of narratives captures the test taker’s language ability, such as language knowledge, strategic competence, and metacognitive strategies. For example, the test task allows the test-taker to relate the topical content of the assessment input to his or her own topical knowledge and is likely to be relatively more interactive than a standardized assessment. DA of narratives are highly interactive considering the assessment requires individuals to interact with the examiner. DA of narratives targets language proficiency, language structure, vocabulary, background knowledge, and topic maintenance. Therefore, the individuals are required to be cognizant of language elements, pragmatics, and personal experiences and interests to communicate effectively during the assessment.

Impact. Impact includes how much influence the assessment has on the test taker in the educational system and society (Bachman & Palmer, 1996). Assessments should consider the societal, educational, and individual value systems that inform the test use. Impact has two levels: (1) macro-level, educational system and society, (2) micro-level, individuals who are affected by the particular test use (Bachman & Palmer, 1996).

Practicality. Practicality is the degree to which the demands of the precise test specifications can be met within the limits of existing resources (Bachman & Palmer, 1996). DA of narratives are considered practical for Navajo students – the design, development, the use of the assessment, and the resources (i.e., the test taker, examiner, testing material and time) are made available for the assessment. The design and development of DA of narratives achieves the optimum balance between the qualities of authenticity, interactiveness, impact, and practicality.

Predictive Early Assessment of Reading and Language

There are two measures available to evaluate narratives through DA, the *Dynamic assessment and intervention: Improving children's narrative skills* (Miller, Gillam, & Peña, 2001) and the *Predictive Early Assessment Reading Language* (PEARL; Petersen & Spencer, 2014). Neither of these two measures have been validated with Navajo children and only one is appropriate for preschool children (i.e., PEARL). Validating these measures with Navajo children could significantly increase the language assessments available for use with all Navajo children and will help reduce the over-identification of Navajo preschoolers into special education and speech and language services.

The PEARL uses a DA of narrative to measure modifiability in the areas of language production and comprehension (Petersen & Spencer, 2014). The PEARL was designed specifically for use by SLPs who work with preschool-aged children in domains such as vocabulary and story grammar (Petersen & Spencer, 2014). Specifically, the PEARL allows SLPs to assess the child's ability to comprehend and produce language that is required later in school (Petersen & Spencer, 2014). This assessment is individually administered, using a single session practice, to measure gains from pretest to posttest and the student's response to the intervention (Petersen & Spencer, 2014), which in turn helps the clinician determine the child's potential to learn new materials with ease or difficulty (Petersen & Spencer, 2014). The PEARL is intended to reduce assessment bias in culturally and linguistically diverse populations (Petersen & Spencer, 2014). In addition, the PEARL normative sample included not only a mainstream population sample, but also Latino and Native American population samples. Based on the manual's report, the predictive accuracy was above 80% when administered to culturally and linguistically diverse children. Therefore, the PEARL seems to be promising as a valid and reliable measure for the Navajo population, considering that narratives are at the core of teaching in the Navajo culture and skills necessary for academic success in the mainstream curriculum (Yazzie-Mintz, 2007).

Ultimately, a solution to the over-identification of Navajo children in special education has yet to be found. There is a mismatch between mainstream culture and Navajos in the use of narratives; they differ in terms of structure and purpose, resulting in poor academic performance among Navajo children. In addition, SLPs use of standardized assessments that are neither adequately normed for Navajo children nor

appropriate for accurate identification of Navajo children with LI leads to the over-identification problem in Navajo Head Start. Thus, rather than using standardized assessments to measure language ability among Navajo children, DA of narratives should be a better approach – narratives are considered to be the core teaching methods among Navajo elders and parents, and thus learning that there are two ways to tell narratives is important for Navajo children.

Research Questions of Interest

By assessing the effects of the intervention of Navajo children’s language production, clinicians and educators may identify what narrative aspects differentiate between Navajo children with TD language and those with possible LI. Examination of change in scores in language use and error patterns in Navajo children with and without LI will provide important data on language learning in Navajo children. Furthermore, using the theory of learning potential and mediated learning, it is possible that DA of narratives can help Navajo children produce mainstream standard narratives, which may prevent or decrease over-identification of Navajo children in special education. The specific questions of the current study are:

1. What is the relationship of the PEARL pretest to the a priori diagnosis of Navajo preschool children with LI and with TD language?
 - a. What is the accuracy of the PEARL pretest using the recommended cut score in identifying Navajo preschool children with LI and with TD language?
 - b. What pretest cut-off score most accurately classifies Navajo preschool children with LI and with TD language?

2. What is the relationship of the PEARL posttest to the a priori diagnosis of Navajo preschool children with LI and with TD language?
 - a. What is the accuracy of the PEARL posttest using the recommended cut score in identifying Navajo preschool children with LI and with TD language?
 - b. What cut-off score most accurately classifies Navajo preschool children with LI and with TD language?
3. What single or combination of PEARL subtest(s) (story grammar, language complexity, episode, and modifiability) best predict performances of the two ability groups on the PEARL?

CHAPTER II

INTRODUCTION (SHORT)

In 1996, the Navajo Head Start Program reported that 64% of Navajo students enrolled were identified with language impairment (LI). In 2000, 66% of Navajo students enrolled in Head Start were identified with LI, and in 2013, 71% of Navajo students were identified with LI. This trend indicates that a disproportionate number of children with typically developing (TD) language are qualifying for language services (Begay-Vining, 1997), which may be attributed to their unique cultural and linguistic characteristics that impact performances on assessments (Research Agenda Working Group et al., 2001), rather than true language disorders.

The Navajo Government, school administrators, teachers, and Navajo communities have been concerned with the over-identification of Navajo children in speech-language services and special education (Beaulieu, 2000; Deyhle & Swisher, 1997; Hillabrant et al., 1992). Standardized, norm-referenced assessments have traditionally been used to identify Navajo children with LI, which over-identifies children with TD language from linguistically and culturally diverse backgrounds, even though it is not considered the best practice for Navajo students (Allison & Vining, 1999; Failing, Stice, & Inglebret, 1993). There are several alternative approaches, such as language sample analyses and dynamic assessment (DA) that may better identify Navajo children as having LI or children with TD language, allowing for better diagnosis and treatment planning than standardized, norm-referenced assessments.

The Navajo Nation (2011) and the United States Department of Education (2007) require the Navajo Head Start Program to use child assessments that are developmentally, linguistically, and culturally appropriate. This requirement is a challenge for the program because there are no tools that are valid for the assessment of Navajo children's language; there is no known assessment available that specifically addresses the linguistic and cultural needs of Navajo children in order to identify whether they present with language or learning disabilities (Spiker, Hebbeler, & Barton, 2011). Therefore, there is a need for a valid assessment to prevent the inaccurate diagnosis of Navajo children and to correctly identify their strengths and weakness to ensure better educational interventions and outcomes (U. S. Department of Health and Human Services, 2005; Begay-Vining, 1997). In particular, Head Start staff and tribal leaders are interested in 1) accurately identifying children as having speech and language disorders and reducing the over-representation of children with TD language in special education; 2) determining the unique characteristics and learning styles among Navajo children with special needs; and 3) developing effective methods for identifying Navajo children with special needs (U. S. Department of Health and Human Services, 2005).

Possible causes of over-identification

Academic achievement. Navajo students display the poorest school performance in the US when compared to other language majority and minority students (Deyhle & Swisher, 1997; Mackety & Linder-VanBershot, 2008; Willetto, 1999). According to Mackety and Linder-VanBershot (2008), low academic achievement among Navajo students is due to the use and focus of the mainstream curriculum and teaching practices that do not incorporate the Navajo culture, their language, and teaching-interaction

approaches. For example, Navajo children do not answer questions to which answers are already known; therefore, teachers may interpret the lack of response as not knowing or unwilling to participate, which, in turn, can be interpreted as a developmental delay (Walsh, 1998). Differences in language and teaching-interaction approaches between the mainstream and Navajo culture may account for some of this low achievement in Navajo children (Harry & Klinger, 2006).

Low academic performance in the classroom frequently results in referring Navajo students to special education (i.e., 73% to 90%), which typically requires a language assessment from a speech-language pathologist (SLP; Begay-Vining, 1997). Achievement patterns in national assessments of language arts indicate that Navajo children in second grade perform 1.2 grade levels below their mainstream peers, and by fifth grade, Navajo children perform on average 2.5 grade levels below mainstream peers (National Caucus of Native American State Legislators, 2013).

Navajo-influenced English. Many Navajo children entering the school setting are expected to speak Standard American English, although they are considered a language minority group due to their bicultural and/or bilingual experiences (Hibel, Faircloth, & Farkas, 2008; Willetto, 1999). This results in many Navajo students speaking nonstandard dialects of English, which differ from the mainstream American English in grammar, vocabulary, pragmatics, and pronunciation. Further, Navajo Influenced English can be their native or second language (Leap, 1993, Willetto, 1999). These differences stem from the influence of the Navajo language and culture that the children or their parents speak at home and in their communities. For example, verbalization is a form of “showcasing” knowledge that is not considered culturally

appropriate for Navajo children; therefore, labeling objects or events are not a form of teaching by Navajo parents (Cargo, 1992).

Traditional Navajo teaching. Traditional teaching in the Navajo culture is based primarily on observation and children listening to narratives rather than telling narratives (Eber 1995; Leavitt, 1995; Meyer & Bogdan, 2001). Narratives are the means by which many Navajos learn to construct the meaning of life, of human beings, and of the universe; narratives are the way in which elders and other adults pass on this knowledge (Farella, 1984). Navajo elders and parents play an important role in learning because they share their history, culture, and traditions with their children from a very young age through narratives. Through oral narratives, they guide the child's interactions and way of life, and while the children listen, they are developing an understanding of their place in the world, their roles, and their culture. Elders and parents teach through observation, listening, and self-testing (Garrett, 1996). Therefore, Navajo children do not practice telling or rehearsing narratives like children from the mainstream US culture do in their homes, which can put them at a disadvantage in academic settings.

Standardized assessments and norming samples. Evaluation of language skills in Navajo children poses a significant challenge among speech-language pathologists (SLPs) because current standardized assessments are deemed inappropriate (Yazzie-Mintz, 2007), given that they tend to be normed with non-indigenous, mainstream, English-speaking children (Caesar & Kohler, 2009; Peña et al., 1992; Stockman, 2000). For example, the *Clinical Evaluation of Language Fundamental – Fourth Edition* (CELF – 4; Semel, Wiig, & Secord, 2003) included 11% of children under the category “other” ethnic minority students beyond African American and Hispanic children in their

norming sample; however, it does not state how many of those were of Native American ethnicity, nor how many were Navajo students. Such a low percentage of “other” ethnic minority students could not provide adequate representation of Navajo students; therefore, Navajo students’ performance on the *CELF – 4* may be low because the items were not adequately normed with a sufficient sample of Navajo students, and thus, it may be biased against them. Moreover, current standardized language assessments are often poor indicators of Navajo children’s true language ability because they do not match Navajo culture, language patterns, learning styles, and strengths (Banks & Neisworth, 1995). For example, CELF-4 includes culturally inappropriate items, such as following directions with sequences that are not expressed in Navajo, or scoring irregular plurals such as “childrens” for children as incorrect.

Characteristics of Navajo narratives. Navajo narratives differ from mainstream narratives in terms of how the narratives are told, why the narratives are told, and how their micro- and macrostructure are formulated (Berman & Slobin, 1994; Basso, 1990). These differences are related to the structure of the original language, and the cultural values and the purpose of storytelling (Westby, Moore, & Roman, 2002). Navajo narratives are used to entertain, to teach, to organize, to plan, and to warn. These represent different genres that differ in terms of who tells the narratives and how the information in the story is organized (Westby, Moore, & Roman, 2002). Cooley and Lujan (1982) found that the narrative lines of Navajo children told in the classrooms were not organized as their mainstream peers. Unlike students from mainstream backgrounds, Navajo students do not share narratives that involve a specific sequence, causality, and succession of actions. Consequently, the structure and organization of ideas in many

Navajo narratives are markedly different from mainstream US narratives (Highwater, 1981; Zolbrod, 1999).

Brady (1978) provided an example of a narrative structure in Navajo. Brady observed 10- and 11-year-olds telling narratives about skinwalkers, also known as shapeshifters. The Navajo children devoted their attention to characters, background, and setting rather than to the initiating events and consequences, information that is a typical mainstream child presents. For example, one child was telling a narrative about skinwalkers containing information about the setting and background:

My friend at Window Rock one time she told me this story about when she went to her grandma's at Tohatchi. Um she said they were playing, her, her cousins and her brother. And then they saw something black go across there. Then they told their uncle and then their uncle went out to find it. Then they keep running and then they caught up with that thing. It was a skinwalker...in a wolf, a black, wolfskin.

The Navajo child provided specific background information about the setting, she did not provide detailed events to lead up to one specific time when her friend saw the dark image. In fact, the narrative concluded with information about the characters, setting, and background. Events and consequences were not provided in the narrative, which indicates that the narrative could be continued at a later time (Eder, 2006).

Many educators incorrectly describe Navajo narratives as unorganized and rambling (Cooley & Lujan, 1982; Zolbrod, 1999), characteristics of an individual having LI in mainstream cultures. The concept of a non-linear narrative structure is typical in Navajo narratives, which contrasts with linear narrative structures among their mainstream peers and highlights the differences between mainstream children and Navajo children (Westby, Moore, & Roman, 2002; Zolbrod, 1999). Navajo narratives are structured with no episodic organization; narratives do not conform to an arrangement

that reflects causal relations and temporal sequence of events, but involve selecting, combining, and recombining “narrative chunks” to connect the narrative (Gough, 1990). “Narrative chunks” in Navajo narratives may be in one order in one situation, but in a different order or omitted in another situation (Westby, Moore, & Roman, 2002).

Perhaps, using DA of narratives may be the best assessment process that most accurately identifies Navajo children with LI. Mediation that is embedded within an assessment process may enable SLPs to properly assess Navajo children’s language learning capabilities and responsiveness to language learning experiences within a short period of time.

Dynamic Assessment

DA focuses on the child’s learning process and language development abilities through mediation by using a pretest-intervention-posttest format. DA embeds the intervention as part of the assessment process in order to estimate the extent to which student learning can then be modified (Bolig & Day, 1993; Haywood, Tzuriel & Vaught, 1991; Lidz, 1991). DA is a general term for procedures that directly link assessment to intervention (Haywood, Tzuriel & Vaught, 1992; Lidz, 1987). During the DA, the examiner is able to observe the child’s strengths and weaknesses (Waters & Stringer, 1997), which become apparent in relation to the tasks. Then, the examiner rates the child’s learning process, such as how the child defines, analyzes, and solves problems, offering a more accurate indication of the child’s true learning skills (Haywood, Brown, & Wingenfeld, 1990). Thus, when examiners use DA, they focus on the child’s ability to improve and change their learning processes and the child’s responses to remediation

(Lidz, 1987; Lidz, Jepsen, & Miller, 1997), rather than current knowledge, which is influenced by culture and experience.

Cognitive modifiability is an individual's capacity to adapt to strategies or performance to changing demands during mediation (Feuerstein, 1981, 1979, 1977). Research suggests that performance levels increase during mediation prior to post testing (Feuerstein, 1980, 1970). Feuerstein (1980) indicated that children who present cognitive impairments are able to improve their performance on measures that assess their thinking and their intelligence through guided learning experiences. As a result, Feuerstein (1980) claimed that standardized assessments do not reflect the child's true ability or potential performance, especially those with cognitive impairments. Additionally, in studies that assess the value of DA, modifiability and posttest scores are considered good predictors for identifying children with LI (Peña et al., 1992).

DA may be particularly appropriate for Native American children, in general, and Navajo children specifically, in offering a more effective and reliable measure of language (Ukrainetz, Harpell, Walsh, & Coyle, 2000). Navajo children have difficulty responding to mainstream style questions that involve direct question-and-answer sequences and timed responses (Robinson-Zanartu, 1996). The mediation component of DA would allow Navajo children to become familiar with these testing procedures and show their strengths in an untimed, fair testing situation (Ukrainetz et al., 2000).

Two studies have examined Native American children's performance using DA of Language. Ukrainetz et al. (2000) investigated Native American kindergarten children's language-learning ability using DA with mediation focused on the categorization of objects. The authors found that modifiability and post-test scores were significantly

higher for stronger language learners than weaker language learners, and the response to the modifiability elements (i.e., ability to attend, plan, and self-regulate) was a better discriminator than the learner strategies elements. Similarly, Kramer et al., (2009) investigated the accuracy of *Dynamic Assessment and Intervention: Improving Children's Narrative Abilities* (Miller, Gillam, & Peña, 2001) among 17 Native American third-graders who were classified as normal language learners or having possible language learning difficulties. The study was designed to provide a culturally sensitive evaluation of language learning abilities. Results indicated that both groups benefited from direct teaching of specific targets, but children in the group with typical language benefited more from the intervention than children with possibly having language learning difficulties. A discriminant analysis found that 94.1% of the children were accurately identified as typical language learners or as having possible language learning difficulties. These results suggest that the DA test may be a useful tool for identifying Navajo children with language and learning difficulties. In particular, there is a great need to reduce the over-representation of Head Start Navajo children in special education and DA seems to be a promising approach. However, studies addressing the needs of preschool Native American or Navajo children are currently not available.

Dynamic Assessment of Narratives

A DA approach that uses a mainstream narrative would help them learn language skills useful in the mainstream curriculum, while this DA approach will help SLPs to differentiate difference from disorders. Although there are two DA measures available that address narrative skills, only one is appropriate for preschool children. The Predictive Early Assessment of Reading and Language (PEARL) uses a DA of narrative

measuring modifiability in the areas of language production and comprehension (Petersen & Spencer, 2014). As an assessment of Navajo children's language abilities within a narrative context, the PEARL was designed specifically for SLPs who work with preschool-aged children in domains such as vocabulary and story grammar (Petersen & Spencer, 2014).

The PEARL is intended to reduce assessment bias in culturally and linguistically diverse populations (Petersen & Spencer, 2014). The PEARL normative sample included not only a mainstream population sample, but also Latino and Native American population samples. Based on the manual's report, the predictive accuracy was above 80% when administered to culturally and linguistically diverse children. Therefore, the PEARL seems to be promising as a valid and reliable measure for the Navajo population, considering that narratives are at the core of teaching in the Navajo culture and skills necessary for academic success in the mainstream curriculum (Yazzie-Mintz, 2007).

The solution to the over-identification of Navajo children in special education has yet to be found. There is a mismatch between mainstream culture and Navajos in the use of narratives; they differ in terms of structure and purpose, which results in poor academic performances among Navajo children. In addition, SLP's use of standardized assessments that are not adequately normed for Navajo children and appropriate for accurate identification of Navajo children with LI also leads to the over-identification problem in Navajo Head Start. Thus, rather than using standardized assessments to measure language ability among Navajo children, DA of narratives should be a better approach because narratives are considered to be the core teaching skills among the Navajo elders and parents. The goal of this study is to determine whether the PEARL is

useful in the assessment of young Head Start Navajo children's language ability within the narrative context.

Research Questions of Interest

By assessing the effects of the intervention of Navajo children's language production, SLP clinicians and educators may identify what narrative aspects differentiate between Navajo children with typical language and those with possible LI. Examination of change in scores in language use and error patterns in Navajo children with and without LI will provide important data on language learning in Navajo children. Using the theory of learning potential and mediated learning, it is possible that DA of narratives can help Navajo children produce mainstream standard narratives, which in turn will prevent over-identification of Navajo children in special education. The specific questions of the current study are:

1. What is the relationship of the PEARL pretest to the a priori diagnosis of Navajo preschool children with LI and with TD language?
 - a. What is the accuracy of the PEARL pretest using the recommended cut score in identifying Navajo preschool children with LI and with TD language?
 - b. What pretest cut-off score most accurately classifies Navajo preschool children with LI and with TD language?
2. What is the relationship of the PEARL posttest to the a priori diagnosis of Navajo preschool children with LI and with TD language?

- a. What is the accuracy of the PEARL posttest using the recommended cut score in identifying Navajo preschool children with LI and with TD language?
 - b. What cut-off score most accurately classifies Navajo preschool children with LI and with TD language?
3. What single or combination of PEARL subtest(s) (story grammar, language complexity, episode, and modifiability) best predict performances of the two ability groups on the PEARL?

CHAPTER III

METHOD

Participants

Ninety Navajo Preschool children (42 males, 48 females) ranging in age from 4.0 to 5.11 ($M = 4.6$; $SD = .45$) participated in the study. Forty-five children were identified as having LI and 45 children as having TD language. Initially, children with LI were recruited to ensure that the recommended number of LI participants was met; then children with TD language were recruited. Participants were recruited from 14 preschool programs, including Head Start, private and public preschools, during parent meetings and community chapter meetings throughout the Navajo Reservation located in New Mexico.

The primary language of all 90 participants was English as reported by the parents and guardians. English was reported as the first language learned by 82% ($n = 78$) of the participants, while the other 13% ($n = 12$) reported that both English and Navajo were the first language learned. Of the 90 participants, 92% ($n = 83$) of the parents reported that English and Navajo were spoken in the home and 8% ($n = 7$) reported that only English was spoken in the home. One of the 14 participating preschool programs teachers reported that they only spoke English in the classroom; however, 13 of the 14 preschool teachers reported that they used 50% English and 50% Navajo as suggested by the Department of Diné Education. Fifty-six percent ($n = 51$) of the mothers reported that high school was the highest level of education completed, while 18% ($n = 16$) of the mothers reported that they did not complete high school, and 26% ($n = 23$) of the mothers

reported that they have a college degree. Forty-four percent (n = 40) of the fathers reported that high school was the highest level of education completed, while 34% (n = 31) of the fathers reported that they did not complete high school, and 21% (n = 19) of the fathers reported that they have a college degree.

In total, 108 Navajo children were provided parent consent forms to participate in the study. However, thirteen children did not qualify for the study due to age (< 4.0), 4 parents declined to have their child participate in the study, and 1 consented but the family moved off the reservation during the study; therefore, the final sample included 90 children. Children had to (a) pass a pure-tone hearing screening at 20 dB HL at 500, 1000, 2000, and 4000 Hz in both ears (ASHA, 1997), and (b) had parents reported no history or concern for cognitive, neurological impairment, or psychological/emotional disability. After the completion of the study, the parent signed an incentive form indicating that their child received a \$10.00 gift card for participating in the study. Approval for this study was granted by the Navajo Nation Human Research Review Board (Appendix D), the Institutional Review Board of Arizona State University, and the cultural Institutional Review Board of Arizona State University (Appendix C).

Participant selection criteria for classification. Additionally, participants were identified as LI if they met 4 of the following 5 criteria: (1) teacher reported concerns for language or learning difficulties (Parnell, 1994); (2) parent revealed concern for language difficulties (Restrepo, 1998); (3) the participant scored at or below 74 on the *Clinical Evaluation of Language Fundamental – Preschool, Second Edition* (CELF – Preschool 2; Wiig, Secord, & Semel, 2004); (4) the participant scored 1.5 standard deviation below the mean on mean length of utterance – communication – units (MLU C-units) from a

narrative language sample, as analyzed by the SALT database (Eisenberg, Fersko, & Lundgren, 2001; Miller & Chapman, 1981); and/or (5) the participant having an Individual Education Plan that indicates he or she has moderate to severe LI.

Participants identified as having TD language met all 5 of the following criteria: (1) teachers reported no concerns for language or learning difficulties (Parnell, 1994); (2) parents revealed no concerns for language or learning difficulties (Restrepo, 1998); (3) the participant scored at or above 75 on the *CELF – Preschool 2* (Wiig, Secord, & Semel, 2004); (4) the participant scored a 1.5 or above the standard deviations from the mean on the mean length of utterance – communication – units (MLU C-units) from a narrative language sample, as analyzed by the SALT database; and (5) the participant did not receive any special education services.

General Procedures

Trained research assistants (RAs) assessed the children during the school day in a quiet area in the school. The children participated in two sessions for 30 – 40 minutes each. RAs were either assigned to test-session 1 or test-session 2 throughout the entire study to prevent any bias and performed the required tasks with 90% reliability. During test-session 1, the child completed a hearing screening, a story generation task in English, and the *CELF Preschool – 2*. During test-session 2, the child was given the *PEARL*. All tasks were completed within the same week.

Measures

Parent questionnaire. Participating parents completed the parent/guardian questionnaire (Appendix J), which consisted of twenty questions, with follow-up questions. The questionnaire used open-ended questions to allow parents to highlight

their concerns about their child's hearing, vision, speech, attention, and/or, of particular interest for this study, and their child's language abilities. Direct questions were avoided because culturally, these questions may be interpreted as accusing the family of wrongdoing (House, 2002). There were specific questions such as, "In the area of language development, what are you most concerned about for your child?" Further, the questionnaire obtained demographic information, including the child's primary language, languages spoken within the home, the parent's educational background, and whether parents/guardian received any type of special education services while they were in school. RAs or teachers distributed and collected parent questionnaires and consent forms at parent meetings.

Teacher questionnaire. Teachers completed a questionnaire (Appendix K) for each child whose parents agreed to have them participate in the study. The teacher questionnaire consisted of eight core questions with follow-up questions. Teachers reported what language they used within the classroom, what language the child used in the classroom, and if they had any concerns regarding the child's hearing, speech, language, attention, motor skills and social skills. Specifically, in the area of language skills, teachers either checked the box "Not concerned" or "Concerned."

Hearing screening. A hearing screening at 20 dB HL at 500, 1000, 2000 and 4000 Hz was administered bilaterally by a trained RA to rule out hearing issues that may impede the foundation of language development (ASHA, 1997).

Language sample. A spoken narrative using the wordless, picture storybook, *Frog where are you?* (Mayer, 1969) was used to elicit language samples, in English, from each child as part of the criteria to categorize participants as LI or participants with

TD language. The wordless, picture book illustrated a story sequence that involved an explicit episodic structure (e.g., initiating event, plan, goal attempts, and consequences). A trained RA probed the child to generate a narrative using the wordless storybook. The storybook has been used in a number of studies that involved collection of language samples to gather the child's language skills and has been shown to be an effective language assessment tool (Botting, 2002; Boudreau & Hedberg, 1999; Eriksson, 2001; Greenhalgh & Strong, 2001; Miles & Chapman, 2002; Norbury & Bishop, 2003; Pearce et al., 2003; Restrepo, 1998).

The participants' narrative productions were audio recorded and were downloaded to a password-protected laptop. RAs transcribed the language samples using the conventions of the Systematic Analysis of Language Transcripts (SALT; Miller & Chapman, 2004). They segmented utterances into communication units (C-units) to adhere to the reference database of the SALT. C-units consisted of one independent clause and any dependent clauses (Eisenberg, Fersko & Lundgun, 2001; Leadholm & Miller, 1992; Loeb et al., 2000; Miller & Chapman, 1981; Rice, Rice, & Remond, 2000; Rollins, Snow, & Willett, 1996). RAs did not transcribe unintelligible utterances and marked them as unintelligible.

After the transcriptions were completed, RAs coded language samples for grammatical errors. The coding process was examined at 3 levels, at each level different RAs reviewed all transcripts at different times to ensure reliability and accuracy of coding. Ungrammatical utterances were noted using the error code [UG] with a number to identify the occurrence of grammatical errors at the end of a C-Unit. For example, the utterance "Dog run away!" was coded as "[E:Art] dog run[E:Past] away [UG2]." Final

coded language samples were analyzed by the SALT for MLU, grammar, and language complexity.

Transcription accuracy. For the accuracy of language sample transcription, we used the procedure that Shriberg, Kwaikowski, and Hoffmann (1984) established. Initially, an RA transcribed each language sample. Another RA checked the transcription by listening to the recorded language sample while reading the initial transcriptions. A third RA checked the transcription using the same process as the second RA.

Three other English-speaking RAs were trained to code the transcriptions for MLU C-units, grammaticality, and language complexity. To ensure coding accuracy, each initial language samples were coded by one RA, then a second RA reviewed the initial codes. Finally, a third RA reviewed the codes that were coded by the first RA and reviewed by the second RA. Differences were discussed and agreement was obtained for both transcriptions and coding procedures. Interrater agreement was 95% for grammatical errors, 98% for MLU C-unit, and 96% for language complexity.

CELF – Preschool 2. The CELF – Preschool 2 (Wiig, Secord, & Semel, 2004) was used as a clinical measure to identify children as having LI. The assessment consists of three Core Language subtests: sentence structure, word structure, and expressive vocabulary. The intent of assessing Sentence Structure is to assess the child’s ability to understand spoken sentences of increasing length and complexity (Wiig, Secord, & Semel, 2004). The goal of Word Structure is to assess the child’s morphology (i.e., inflections, derivations, and comparison) and ability to use and select appropriate pronouns to refer to people, objects, and possessive relationships (Wiig, Secord, & Semel, 2004). The aim of the Expressive Vocabulary subtest is to examine the child’s

ability to label illustrations of people, objects, and actions (Wiig, Secord, & Semel, 2004). The internal consistency of the CELF – Preschool 2 is .73 – .96 and the test-retest is .77 – .92 for the subtests and .91 – .94 for the composite scores. The reported sensitivity score for Core Language is .85 and specificity as .82, which are both considered to be within the fair range (Plante & Vance, 1994; Wiig, Secord, & Semel, 2004).

The CELF - Preschool 2 was administered individually by a trained RA to all qualified participants (Wiig, Secord, & Semel, 2004). The assessment measured both expressive and receptive language skills. The assessment took about 15 to 20 minutes per participant depending on the child’s ability. The Core Language composite standard score was derived from the three subtest scores, which was based on a mean of 100 with a standard deviation of 15 (Wiig, Secord, & Semel, 2004), those scores were then used to classify children as LI or children with TD language. The CELF Preschool – 2 was scored immediately following the assessment session and a second RA scored the assessments listening to the audio recorder to ensure reliability of scores.

PEARL. The PEARL, our primary outcome measure in this study, is a dynamic assessment of narratives (Petersen & Spencer, 2014) that measures the concept of modifiability in language production and comprehension. According to the manual, sensitivity and specificity of the PEARL indicated that the language subtests yield sensitivity and specificity at or above .80 (Peterson & Spencer, 2014, p. 18). The inter- and intra-rater reliability reported that the language subtests agreement was at or above .90 across multiple examiners. Fidelity of administration reported at or above .95

for the language subtest. The pretest and posttest language subtests yielded significant correlation coefficients at or above .70 (Petersen & Spencer, 2014).

RAs administered the PEARL individually to participants and took about 20 minutes to administer depending on the student's performance. The components of the PEARL consist of a pretest and posttest that measures story grammar, language complexity, and episodic complexity; and four teaching phases that were completed between the pretest and posttest phase. The teaching phases were measured by the Responsiveness Scale using a 5-likert scale measuring prompts, confidence, disruptions, rate, which were all averaged out to obtain a score for learning. An additional RA was assigned to each PEARL session with a primary examiner for reliability purposes. All participants regardless if they scored above the pretest cut-score of 10 or not participated in the teaching phase. All RAs who administered the PEARL were blind to the children's classification.

Pretest/Posttest. During the pretest and posttest phase, the examiner asked the child to retell a story with no verbal or visual prompting from the examiner. The examiner scored the pretest and posttest in real time (Petersen & Spencer, 2014). The pretest and posttest scores were based on the story grammar (i.e., character, setting, problem, emotion, plan, attempt, consequences, ending, and ending emotions), language complexity (i.e., then, because, when, and after), and episode (i.e., Problem + attempt, Problem + Consequence, etc). The pretest and posttest used different narratives but were both equivalent in difficulty and structure (Petersen & Spencer, 2014). Respectively in the current study, reliability was 95% for the pretest and 91% for the posttest scores.

Teaching. The teaching phase consists of 4 phases, each providing a learning opportunity. During teaching phase 1, the examiner placed the PEARL Screener Stimulus book on the table so that the student could view the book while the examiner read the pretest narrative. The Screener Stimulus book contained story pictures and icons, including character, setting, problem, feeling, action, ending, and end feeling (Petersen & Spencer, 2014). The examiner pointed to the appropriate pictures and icons as they were naming each part of the story in order to model a story that contained all the parts of the book. In teaching phase 2, the students used the pictures and icons to retell the story to the examiner. If necessary, the examiner helped the student retell parts of the story using Level 1, open-ended prompts (e.g., What is the problem? or Who is the character?) and/or Level 2, modeled prompts (e.g., “Tony was *sad* because he fell off the scooter and scraped his elbow, now you say that.”) when they hesitated or were unsure of what happened or what came next (Petersen & Spencer, 2014, p. 13). In teaching phase 3, the examiner showed the child only the icons, and if necessary, the examiner helped the student retell parts of the story using Level 1 and/or Level 2 prompts (Petersen & Spencer, 2014, p. 13). In teaching phase 4, the student was shown a blank page while he/she was retelling the story. Again, if necessary, the examiner helped the student retell parts of the story using Level 1 and/or Level 2 prompts (Petersen & Spencer, 2014, p. 13). If the examiner provided assistance to the students, the child had to return to the previous picture or icon and proceed to the next picture and icon. As soon as the student completed the final teaching phase, the examiner immediately completed the Responsiveness Scales based on how the student responded to the examiner’s teaching. The Responsiveness Scales measured prompts, confidence, disruptions, rate, and learning

(Petersen & Spencer, 2014, p. 13). Inter-rater agreement was calculated using point-to-point agreement between interventionists and observers' record. The inter-rated reliability for the responsiveness scale in this study was 86%.

Prompts. Prompts measures how many times the student required assistance in order to retell the story using “few,” “some,” or “many” and also indicates the level of the prompts (i.e., Level 1 or Level 2).

Confidence. Confidence measures the level of comfort and frustration the student experienced with the task and was measured as “high,” “average,” and “low” (Petersen & Spencer, 2014, p. 13). Responses from the students such as “*I like this*” or “*This is easy*” received a high confidence behavior score and responses such as “*I don't know*” or “*I can't*” received low confidence (Petersen & Spencer, 2014, p. 13).

Disruption. Disruption measures challenging behaviors or difficulty maintaining attention during the teaching phase and is recorded as “none,” “some,” and “many.” Change of topic, refusal to perform tasks, consistently shifting in seat, looking at things other than the stimulus book, or any behavior that required redirecting the student back to the task were considered disruptions (Petersen & Spencer, 2014, p. 13).

Rate. Rate measures how long it took a student to complete the task and is recorded as “fast,” “moderate,” and “slow,” but only if the student was able to retell the entire story (Petersen & Spencer, 2014, p. 14).

Learning. Learning is the total score adding the scores of prompts, confidence, disruptions, and rate. The scores ranged from 0 to 4: a student who received a 4 told the story confidently at a fast rate with minimal prompting and without any disruptions; a student who received a 0 did not confidently retell the story, and told the story at a slow

rate that required many prompts and corrections. If the student needed constant redirecting during the task, then the student demonstrated difficulty learning (Petersen & Spencer, 2014, p. 14).

Posttest. In the posttest phase, the examiner read a story to the child and when the examiner was done reading the story, the child was asked to retell the story without any prompts from the examiner (Petersen & Spencer, 2014, p. 10). The posttest was scored based on story grammar, language complexity, and episode.

Inter-rater agreement. The audio recordings of the full sample (N = 90) assessment sessions of the PEARL were used to determine point-to-point inter-rater agreement between the examiner and observer. The second raters were blind to the examiner ratings and to the participants' language. All the participants had been given the assessment independently from each language ability groups. The ratings on each of the 8 items of the PEARL included the pretest subtest scores, modifiability scores and the posttest subtest scores. Point-to-point agreements of 90% were obtained across the 8 items.

Data analysis

To properly examine the relationship of the PEARL to the a priori diagnosis, a series of analyses were employed for pretest and then posttest. First, a logistic regression analysis was employed to assess the predictive relationship of total pretest score to the a priori diagnosis. This analysis was then repeated with individual subtest scores as predictors. Second, a receiving operating characteristic (ROC) analysis was used to determine the accuracy of the PEARL pretest, this is, the extent to which the PEARL accounted for the a priori diagnosis. Sensitivity and specificity were calculated to assess

the percentage of Navajo children with LI who were classified as having LI and the percentage of Navajo children with TD language who were classified as having TD language. Third, using the previously reported ROC analysis along with a chi-square tests of independence (an auxiliary analysis), were used to examine an optimal pretest cutoff score to accurately classify Navajo preschool children with LI taking into account the a priori diagnosis. This sequence of three analyses was repeated for the posttest analyses. Lastly, logistic regression analyses were employed to examine which single or combination of PEARL subtests best predicted performances of the two ability groups on the PEARL. A proportional reduction in deviance by the addition of PEARL subtest scores to the logistic regression analysis was employed to estimate the contribution of particular pretest scale scores to the prediction utility of the PEARL for a priori diagnosis.

CHAPTER IV

RESULTS

Descriptive Statistics and Correlations

Table 1 summarizes the descriptive statistics (means, SD, skewness, and kurtosis) for the pretest and posttest PEARL measures, separately for children with LI and children with TD language. The descriptive statistics include the mean, standard deviation, skewness, and kurtosis to best identify any measure with an extreme distribution. As shown in Table 1, there were no pretest episode scores noted for either children with LI or children with TD language. West, Finch, and Curran (1995) showed that variables having skewness greater than 2 or kurtosis greater than 7 posed estimation difficulties in the context of confirmatory factor analysis under maximum likelihood estimation. These values are often used as rough rules of thumb in other contexts to denote distribution difficulties. Of all measures reported in Table 1, pretest language complexity and posttest episode scores among children with LI exhibited a problematic distribution.

Table 2 provides zero-order correlations among all measures. In addition, the correlations of all measures with the a priori diagnosis of children with TD language versus children with LI are included. Diagnosis was coded as follows: LI = 1; TD = 0. Thus, a negative correlation between a measure and diagnosis indicates that children with LI had lower scores than did children with TD language on the measure. The pretest, posttest, and modifiability scores were highly positively interrelated. There were

significant correlations of all measures with a priori diagnosis. All these correlations were negative, indicating that LI children had lower scores than did children with TD language. Correlations of story grammar, language complexity, and episode subscale scores of the PEARL with the total PEARL score at each measure (pretest, posttest) are part whole correlations; therefore, standard significance levels do not apply. Overall, the pretest, posttest and modifiability of the PEARL were highly correlated with the a priori diagnosis of children LI versus children with TD language.

Pretest PEARL and a priori diagnosis of children with LI versus Children with TD language

Logistic regression, relationship of the Pearl pretest to a priori LI versus TD diagnosis. To determine the relationship of the PEARL pretest to the a priori diagnosis of children with LI and children with TD language, a logistic regression was conducted in which the PEARL pretest served as the predictor. The pretest scores contributed significantly to the prediction, odds ratio = .216 [.113, .413], $p < .001$. The logistic regression model yielded significant prediction of a priori diagnosis, $\chi^2(1) = 73.30$, $p < .001$. The model accounted for 74% (Nagelkerke R^2) of the model deviance in a priori diagnosis of children with LI versus children with TD language. The recovery of the a priori classification as children with LI as opposed to children with TD language was examined, with a statistical classification rule that the 50% of children with the highest predicted probability of being LI should be classified as LI and the remainder should be classified as children with TD language. In all, 89% of children were correctly classified statistically into their diagnostic category. Children with TD language were classified with higher accuracy (93%) than were children with LI (84%).

A second logistic regression was conducted in which the PEARL pretest subscale scores, story grammar, and language complexity served as predictors; episode was not included as a predictor since all episode scores were zero in both groups on the PEARL pretest. Story grammar and language complexity both contributed significantly to the prediction, story grammar: odds ratio = .228 [.118, .441], $p < .001$; language complexity: odds ratio = .137 [.030, .634], $p < .001$. The overall logistic regression yielded significant prediction of a priori diagnosis, $\chi^2(2) = 73.70$, $p < .001$. The model explained 75% (Nagelkerke R^2) of the model deviance in the a priori diagnosis of children with LI versus children with TD language. With a statistical classification rule that the 50% of children with the highest predicted probability of being LI should be classified as LI and the remainder should be classified as children with TD language, in all, 89% of children were correctly classified statistically into their diagnostic category. Children with TD language were classified with better accuracy (93%) than children with LI (84%).

ROC analysis of classification accuracy by the PEARL at pretest. The accuracy of the PEARL pretest in distinguishing children with LI versus children with TD language, as defined by the a priori diagnosis, was explored. Briefly, the ROC curve juxtaposes the sensitivity of a test in classifying a “case” as a “case” versus the specificity of a test in classifying a “noncase” as a “noncase.” Here, LI was defined as case, while TD was defined as noncase. The ROC curve display, shown in Figure 1, is created such that a straight line from the lower left to upper right of the graph represents random performance of the test, or complete failure of discrimination. The area to the upper left of the graph represents cases in which both sensitivity and specificity exceed random classification. The larger the area under an ROC curve in the upper left triangle of the

ROC display, the greater the combined sensitivity and specificity of the test. The ROC curve analysis for the pretest PEARL identified a large upper left-hand area under the ROC curve (AUC) and thus indicated excellent test accuracy in distinguishing LI versus DC children (AUC = .95, SE = .23, $p < .001$, CI 95 [.90 – 1.00]).

Optimal cutoff on the PEARL pretest for identifying children with LI. When the PEARL is employed in standard clinical practice, a cutoff of 10 is employed to screen out students who very likely do not have LI. Children with scores below 10 are candidates for the full dynamic assess process to better identify whether there is a difference or a disorder. The previously reported ROC analysis plus a series of chi-square tests of independence were employed to determine what cutoff score on the PEARL pretest most accurately classified Navajo Head Start children with LI when compared to children with TD language. Results are summarized in Table 3.

Specifically, the coordinates of the ROC curve (i.e., sensitivity and specificity) based on the PEARL pretest scores were examined to determine the best cutoff scores for children with LI identification. Sensitivity is defined as a measure's ability to correctly detect a disorder in those children who have a language disorder and specificity is defined as the measure's ability to correctly reject the presence of a language disorder in those children who are typically developing. Results of the examination of sensitivity and specificity of the PEARL pretest as a function of cutoff score from the ROC analysis are given in Table 3. Based on the ROC analysis, the optimal cutoff score was determined to be 6.50 with a sensitivity of 98% and a specificity of 73%. A cutoff of 6.5 was selected as an optimal score, as it exhibited excellent classification accuracy for children with LI. As an auxiliary analysis, four chi-square test of independence were performed to examine the

relationship between PEARL pretest scores dichotomized at a range of cutoffs and the actual a priori diagnosis of children with LI and children with TD language. A cut score of 5 on the total pretest PEARL distinguished Navajo children with LI and children with TD language, $\chi^2(1) = 43.64, p < .001$. However, with a cutoff score of 5, sensitivity was reported to be 98% and specificity of 69%. A cut score of 6 yielded $\chi^2(1) = 54.88, p < .001$, with sensitivity of 93% and specificity at 86%. Further, a cut score of 7 yielded $\chi^2(1) = 48.40, p < .001$, with associated sensitivity of 98% and specificity of 73%. Lastly, a cut score of 8 led to accuracy of classification, $\chi^2(1) = 22.50, p < .001$, with sensitivity of 100% and specificity of 40%. Therefore, a cut score of 7 was selected as the optimal score for the pretest.

Posttest PEARL and a priori diagnosis of children with LI versus children with TD language

Relationship of PEARL Posttest to a priori classification of LI versus children with TD language. Because the PEARL uses the test-teach-test format, participants are capable of making progress from the pretest to the posttest phase after mediation. The relationship of the PEARL posttest to the a priori diagnosis of children with LI and children with TD language was explored in a logistic regression. Posttest scores significantly contributed to the prediction, odds ratio = .383 [.262, .559], $p < .001$. The logistic regression model was statistically significant, $\chi^2(1) = 69.38, p < .001$. The model explained 72% (Nagelkerke R^2) of model deviance in a priori diagnosis of children with LI and children with TD language. Again, recovery of the a priori classification as children with LI as opposed to children with TD language was examined, with a statistical classification rule that the 50% of children with the highest predicted probability of being LI should be classified as LI and the remainder should be classified

as typically developing. This classification rule led to an 89% correct classification, where children with and without LI were both equally classified at 89%.

A second logistic regression was conducted in which the PEARL posttest subscale scores, story grammar, language complexity, and episode served as predictors. Story grammar, odds ratio = .382 [.234, .625], $p < .001$, and episode, odds ratio = .423 [.211, .847], $p < .001$, both significantly contributed to the prediction, but language complexity did not contribute to the prediction, odds ratio: .290 [.056, 1.509], $p > .05$. The logistic model was significant, $\chi^2(3) = 69.583$, $p < .001$. The model explained 72% (Nagelkerke R^2) of the model deviance in children with LI and children with TD language. In all, 90% of cases were correctly classified statistically into their diagnostic category. Children with TD language were classified with slightly better accuracy (91%) than children with LI (89%).

Further, a scatterplot of the modifiability scores shown in Figure 3 as a function of a priori classification illustrated that the modifiability scores exhibited complete separation between children with LI and children with TD language. Simply, modifiability yields 100% accuracy in the classification of children with LI and children with TD language. By complete separation is meant that the predictors variable completely separates an outcome variable (Bruin, 2006), that is, members of two groups, here LI and TD, share no score in common; a cutoff score on a predictor completely separates the two groups. With a display of points ranging between 0 to 4 identifying an absolute value of 1 (children with LI) or 0 (children with TD language), the scatterplot provided further evidence of complete separation of modifiability scores between the a

priori classification. In fact, all children with LI have scores of 0,1, of 2 on Modifiability, while all children with TD language have scores of 3 or 4.

Further exploration of how modifiability distinguished children with LI from children with TD language was carried out with focus on the four individual components of modifiability. A chi-square test of independence was performed to further examine the relation between each modifiability subscale (prompts, confidence, disruptions, and rate) and the a priori classification. There was overlap between scores of children with LI and children with TD language for prompts, confidence and rate. However complete separation was noted for disruptions. Results are shown in Table 4. Overlap in all cases consisted of the assignment of a score of 2 on a modifiability subscale to members of both groups.

ROC analysis of classification accuracy by the PEARL at posttest. Again, the accuracy of the PEARL posttest in distinguishing Navajo children with LI versus children with TD language, as defined by the a priori diagnosis was explored. In this analysis, Navajo children with LI were defined as case, while Navajo children with TD language children were defined as noncase. As shown in Figure 2, the ROC curve analysis for the posttest identified a large AUC and indicated excellent test accuracy (AUC = .93, SE = .27, $p < .001$, CI 95 [.88 - .99]).

Optimal cutoff on the PEARL posttest for identifying children with LI.

When the PEARL is used in standard clinical practice, a score below a 9, in conjunction with an examination of the modifiability scores, is employed to determine children with LI. Again, the previously reported ROC analysis plus a series of chi-square tests of independence were examined to determine what cutoff score of the PEARL posttest most

accurately classifies Navajo Heard Start children as LI. Specifically, the coordinates of the ROC curve (i.e., sensitivity and specificity) based on the PEARL posttest scores were examined to determine the best cutoff scores for children with LI. The examination results of sensitivity and specificity of the PEARL posttest as a function of cutoff score from the ROC analysis are provided in Table 3. Based on the ROC analysis, the optimal cutoff score was determined to be 8.5 with a sensitivity of 87% and a specificity of 89%, as originally proposed by the PEARL recommended cutoff score of 9. A cutoff of 8.5 was selected as the optimal score; it is the only cutoff score in which both sensitivity and specificity either exceeded .80 and featured a balanced classification, as recommended by Plante and Vance (1994). As an auxiliary analysis, four chi-square test of independences were performed to examine the relationship between PEARL posttest scores dichotomized at a range of cutoffs and the actual a priori diagnosis of children as LI and TD. A cut score of 6 on the total posttest PEARL distinguished Navajo children with LI and Navajo children with TD language, $\chi^2(1) = 30.90, p < .001$. However, with a cutoff score of 6, sensitivity is reported to be 51% and specificity at 100%. A cut score of 7 yielded $\chi^2(1) = 45.00, p < .001$; with sensitivity of 67% and specificity at 100%. Further, a cut score of 8, $\chi^2(1) = 55.43, p < .001$, with an associated sensitivity of 82% and specificity of 96%. Finally, a cut score of 9 yielded $\chi^2(1) = 54.44, p < .001$, with sensitivity of 89% and specificity of 89%. The original cutoff score of 9 again was found to better identify Navajo children with LI (89%) and Navajo children with TD language (89%); therefore, no new cut-off score is recommended.

Likelihood ratios

The likelihood ratios (LR) were calculated to determine the probability that the PEARL diagnoses as LI versus TD are correct to the *probability* that the assessment results are incorrect. Because the PEARL determines a binary outcome (children with LI and children with TD language), the LRs were calculated using the sensitivity and specificity outcome for each measure scores of the PEARL. The formula used to calculate the positive likelihood ratio (LR+) was: $sensitivity/(1 - specificity)$, and the formula for the negative likelihood ratio (LR-) was : $(1-sensitivity)/specificity$. An accurate diagnostic measure will have high LR+ (>10.0) and a low LR- (<0.2), indicating that it correctly classifies both people who have the target disorder and people who do not have the disorder (Dollaghan, 2004). Results are given in Table 5. Total pretest score is best at capturing the a priori classification.

Subtest(s) that best predict performances of Children with TD language versus Children

Contribution of each pretest subtest to classification. Two logistic regression analyses were employed to examine which subtest of the PEARL pretest taken alone (story grammar, language complexity) more accurately accounted for the a priori classification. Three aspects of each regression analysis were considered: (1) significance of the individual predictor, (2) a measure of model fit (the Nagelkerke R^2), and (3) the accuracy of classification of children with LI versus children with TD language by the subscale.

Story grammar alone. A logistic regression was employed in which pretest story grammar served as the only predictor. Story grammar contributed significantly to the prediction, odds ratio = .23 [.128, .424], $p < .001$. The logistic regression model yielded

significant prediction of the a priori diagnosis, $\chi^2(1) = 66.14, p < .001$. The model accounted for 69% (Nagelkerke R^2) of the model deviance in the a priori diagnosis of children with LI versus children with TD language. Overall, 87% of children were correctly classified statistically into their diagnostic category. Children with TD language and children with LI with both classified with good specificity (87%) and sensitivity (87%).

Language complexity alone. A second logistic was conducted in which pretest language complexity served as the only predictor. Language complexity contributed significantly to the prediction, odds ratio = .12 [.043, .349], $p < .001$. The logistic regression model yielded significant prediction of the a priori diagnosis, $\chi^2(1) = 18.74, p < .001$. The model accounted for 25% (Nagelkerke R^2) of the model deviance in the a priori diagnosis of children with LI. In all, 71% of children were correctly classified statistically in their diagnostic category. Children with LI (87%) were well classified; however, language complexity alone failed to distinguish children with TD language from children with LI. Only slightly more than half (56%) of the children with TD language were classified at TD based on language complexity. In sum, pretest story grammar was the stronger predictor of the a priori classification of the children.

Language complexity added to story grammar. A third logistic regression carried out to examine whether language complexity added prediction over and above story grammar. In two steps, story grammar was first entered, and then on a second step language complexity was added. With both predictors in the model, language complexity and story grammar each contributed significantly to the prediction, story grammar: odds ratio = .14 [.030, .634], $p < .05$; language complexity: odds ratio = .23 [.118, .441], $p <$

001. The logistic regression model yielded significant prediction of a priori diagnosis, $\chi^2(2) = 73.70, p < .001$. The model accounted for 75% (Nagelkerke R^2) of the model deviance in a priori diagnosis of children with LI versus children with TD language, an increase of 6% reduction in deviance relative to 69% with story grammar alone, according to the Nagelkerke R^2 index. With both predictors included, classification as children with TD language versus children with LI was only slightly improved to 89% from 87%. Children with TD language (93%) were better classified than children with LI (84%).

Story grammar added to language complexity. A fourth logistic regression was conducted where language complexity was first entered as the only predictor, followed by story grammar as a second predictor. Repeating the above analysis, language complexity and story grammar contributed significantly to the prediction, language complexity: odds ratio = .14 [.030, .634], $p < .05$; story grammar: odds ratio: .23 [.118, .441], $p < .001$. The logistic regression model yielded significant prediction of a priori diagnosis, $\chi^2(2) = 73.70, p < .001$. When story grammar was added to language complexity, there was a gain in reduction in deviance from only 25% from language complexity alone to 75% reduction in deviance, according to the Nagelkerke R^2 index. Classification accuracy improved markedly from 71% with language complexity alone to 89% with both predictors. Children were correctly classified statistically into their diagnostic category. Specifically, children with TD language (93%) were better classified than children with LI (84%). In sum, story grammar was a stronger predictor than language complexity. This was so when each predictor was examined alone and

when the gain in prediction by the addition of story grammar to language complexity was considered.

Finally, in logistic regression there are multiple indices of goodness of fit of the logistic regression equation and of improvement in fit from the addition of predictors. The Nagelkerke R^2 employed above is one such index. A second index, the proportional reduction in deviance, sometimes referred to as R_L^2 , is also employed (Hosmer, Lemeshow, & Sturdivant, 2013). Results are shown in Table 6. This measure employs the deviance measures, that is, measures of the lack of fit of a logistic model (Cohen, Cohen, West, & Aiken, 2003). These measures are useful for comparing models in model building. The following equations were used where D_{SG} is the deviance of a model containing only story grammar as a predictor, D_{LC} is the deviance of model contains only language complexity as a predictor, and D_{LC+SG} is the deviance of a model containing both language complexity and story grammar as predictors.

$$\frac{D_{SG} - D_{SG+LC}}{D_{SG}} = \frac{58.631 - 51.068}{58.631} = \frac{7.563}{58.631} = .1290$$

$$\frac{D_{LC} - D_{LC+SG}}{D_{LC}} = \frac{106.025 - 51.068}{106.025} = \frac{54.957}{106.025} = .5183$$

The first equation shows the deviance in a model containing only $D_{SG} = 58.631$; this measure can be conceptualized as residual deviance in prediction of a priori classification in a model containing only story grammar. This equation also shows the deviance from a model containing both story grammar and language complexity, $D_{SG+LC} = 51.086$. The resulting value .1290 is the proportion reduction in deviance by the addition of Language Complexity to a model containing Story Grammar.

These fit indices corroborate the findings with the Nagelkerke R^2 , story grammar is the greater contributor to prediction in the presence of the other predictor. In addition, when taken alone, story grammar is the stronger predictor. Language complexity fails to classify children with TD language as children with TD language. Based on results above story grammar was a better predictor than was language complexity.

Contribution of each posttest subtest to classification. Three logistic regression analyses were utilized to investigate which subtest of the PEARL posttest taken alone (story grammar, language complexity, or episode) best accounted for the a priori classification.

Story grammar alone. A logistic regression was used where the posttest story grammar functioned as the only predictor. Story grammar provided significantly to the prediction, odds ratio = .30 [.188, .491], $p < .001$. The logistic regression model yielded significant prediction of a priori diagnosis, $\chi^2(1) = 60.33, p < .001$. The model accounted for 65% (Nagelkerke R^2) of the model deviance in a priori diagnosis of children with LI versus children with TD language. In all, 86% of children were correctly classified statistically into their diagnostic category. Children with TD language (87%) were better classified than children with LI (84%).

Language complexity alone. A second logistic regression analysis was employed in which posttest language complexity served as the single predictor. Language complexity contributed significantly to the prediction, odds ratio = .077 [.018, .323], $p < .001$. The logistic regression model yielded significant prediction of a priori diagnosis, $\chi^2(1) = 24.45, p < .001$. The model accounted for 32% (Nagelkerke R^2) of the model deviance in a priori diagnosis of children with LI. In all, 64% of children were correctly

classified statistically in their diagnostic category. Children with TD language (98%) were accurately classified; however, language complexity alone failed to distinguish TD from LI children. Fewer than half (31%) of the children with LI were classified as LI based on language complexity.

Episode alone. A third logistic regression was employed in which posttest episode served as the lone predictor. Episode, like the two previous subscales, contributed significantly to the prediction, odds ratio = .27 [.161, .461], $p < .001$. The logistic regression model yielded significant prediction of a priori diagnosis, $\chi^2(1) = 29.94$, $p < .001$. The model accounted for 38% (Nagelkerke R^2) of the model deviance in a priori diagnosis of children with LI. Overall, 77% of children were correctly classified statistically in their diagnostic category. Children with LI (84%) were well classified; however, episode alone, like language complexity, failed to distinguish TD from LI children. However, 31% of the children with TD language were classified as LI based on episode. Based on the three individual logistic regressions, story grammar appeared to be the strongest predictor of the a priori classification of the children.

Story grammar added to episode. A fourth logistic regression was executed to analyze whether story grammar added prediction over and above episode. In two steps, episode was first entered, and then on the second step, story grammar was added. Episode and story grammar both contributed significantly to the prediction, episode: odds ratio = .42 [.212, .829], $p < .05$; story grammar: odds ratio = .34 [.210, .552], $p < .001$. The logistic regression model yielded significant prediction of a priori diagnosis, $\chi^2(2) = 66.96$, $p < .001$. The model accounted for 70% (Nagelkerke R^2) of the model deviance in a priori diagnosis of children with LI versus children with TD language, an increase of

32% reduction in deviance relative to 38% with episode alone, according to the Nagelkerke R^2 index. With both predictors included, classification as children with TD language versus children with LI was improved from 77% to 87%. Children were correctly classified statistically into their diagnostic category. Children with LI (89%) were better classified than children with TD language (84%).

Language complexity added to episode. A fifth logistic regression was completed to evaluate whether language complexity added prediction over and above episode. In the two steps, episode was first entered, then language complexity. Episode and language complexity both contributed significantly to the prediction, episode: odds ratio = .30 [.172, .532], $p < .001$; language complexity: odds ratio = .095 [.021, .532], $p > .001$. The logistic regression model yielded significant prediction of a priori diagnosis, $\chi^2(2) = 45.41$, $p < .001$. The model accounted for 53% (Nagelkerke R^2) of the model deviance in a priori diagnosis of children with LI versus children with TD language, an increase of 15% in model deviance accounted for. With both predictors included, classification as children with TD language versus children with LI was improved from 77% (episode only) to 81% of children, who were correctly classified statistically into their diagnostic category. Children with TD language were slightly better classified (84%) than children with LI (78%).

Language complexity added to story grammar. A sixth logistic regression was completed to evaluate whether language complexity added prediction over and above story grammar. In two steps, story grammar was first entered, and then on a second step, language complexity was added. Story grammar, alone, contributed significantly to the prediction and language complexity did not, story grammar: odds ratio = .35 [.212, .560],

$p < .001$; language complexity: odds ratio = .29 [.060, .560], $p > .05$. The logistic regression model yielded significant prediction of a priori diagnosis, $\chi^2(2) = 63.30$, $p < .001$. The model accounted for 67% (Nagelkerke R^2) of the model deviance in a priori diagnosis of children with LI versus children with TD language, an increase of 2% to 65% with story grammar alone, according to the Nagelkerke R^2 index. With both predictors included, classification as children with TD language versus children with LI was improved from 86% to 88% of children who were correctly classified statistically into their diagnostic category. Children with TD language (91%) were better classified than children with LI (84%).

Language complexity added to story grammar and episode. A seventh logistic regression was implemented in which episode was entered first, then story grammar was entered, and, finally, language complexity was entered in the third step. With all three predictors in the model, episode and story grammar each contributed significantly to the prediction, while language complexity did not, episode: odds ratio = .42 [.211, .847], $p < .05$; story grammar: odds ratio = .38 [.234, .625], $p < .001$; language complexity: odds ratio = .90 [.056, 1.509], $p > .05$. The model accounted for 72% (Nagelkerke R^2) of the model deviance in a priori diagnosis of children with LI versus children with TD language, an increase of 2% to 70% with story grammar and episode, based on the Nagelkerke R^2 index. With all three predictors included, classification as TD versus children with LI was slightly improved from 87% to 90% of children, who correctly classified into their diagnostic category. Children with TD language (91%) were better classified than children with LI (89%).

Lastly, the proportional reduction in deviance was employed (Hosmer, Lemeshow, & Sturdivant, 2013) as an index of model comparison. Again, the measures are practical for comparing models in model structuring; a series of model comparisons was carried out to highlight which PEARL posttest subscale score(s) had the greatest strength of prediction of the a priori classification. Results are shown in Table 7. The following model comparisons were carried out.

$$\frac{D_E - D_{E+SG}}{D_E} = \frac{94.822 - 57.808}{94.822} = \frac{37.014}{94.822} = .3937$$

$$\frac{D_E - D_{E+LC}}{D_E} = \frac{94.822 - 79.357}{94.822} = \frac{15.465}{94.822} = .1630$$

$$\frac{D_{SG} - D_{SG+LC}}{D_{SG}} = \frac{64.440 - 61.469}{64.440} = \frac{2.971}{64.440} = .0461$$

$$\frac{D_{SG} - D_{SG+E}}{D_{SG}} = \frac{64.440 - 57.808}{64.440} = \frac{6.632}{64.440} = .103$$

$$\frac{D_{LC} - D_{LC+SG}}{D_{LC}} = \frac{100.318 - 61.469}{100.318} = \frac{38.849}{100.318} = .387$$

$$\frac{D_{LC} - D_{LC+E}}{D_{LC}} = \frac{100.318 - 79.357}{100.318} = \frac{20.961}{100.318} = .209$$

$$\frac{D_{null} - D_{E+SG+LC}}{D_{null}} = \frac{124.766 - 55.184}{124.766} = \frac{69.582}{124.766} = .557$$

These fit indices agree with the findings with the Nagelkerke R^2 , that story grammar is the strongest contributor to prediction in the presence of the other predictors. Further, when taken alone story grammar, as shown in the pretest results, is the strongest predictor. Language complexity and episode failed to classify TD as TD. Again, based on results above story grammar was superior as a predictor to either language complexity or episode taken alone or together.

CHAPTER V

DISCUSSION

General overview

The purpose of the current study was to determine whether the PEARL could potentially assist SLPs and other professions in accurately classifying Navajo preschool children with LI and with TD language. Specifically, we examined the following questions: (a) what is the relationship of the PEARL pretest and posttest to the a priori diagnosis of children with LI and Navajo children with TD language, (b) determining the best cut-off scores that most accurately classifies Navajo Head Start children with LI, (c) determining which measures best predicts the performances of the two language ability groups.

Classification Accuracy

Classification accuracy of pretest measures. The present study examined the relationship of the PEARL pretest and posttest to the a priori diagnosis of Navajo children with LI and children with TD language. The logistic regression revealed that the PEARL pretest indicated good classification accuracy with sensitivity at 93% and specificity at 84%. Overall, 89% of the children were correctly classified in their diagnostic category. The pretest scores in this study are similar to standardized measures,

as they were determined prior to the mediated learning experience (Peña et al., 2006). In pretest, children with LI performed poorer on all narrative tasks than children with TD language which is consistent with research that found similar results in which there are differences between ability groups in narrative production tasks in a variety of ages (Bishop & Adams, 1992; Boudreau & Chapman, 2000; Fey, Catts, Proctor-Williams, Tomblin, & Zhang, 2004; Gilliam & Johnston, 1992; Greenhalgh & Strong, 2001; Newman & McGregor, 2006; Scott & Windsor, 2000).

Optimal cut-off score at pretest. A ROC analysis was also used to assess the diagnostic accuracy of the PEARL. The AUC of the ROC analysis indicated that the pretest measure reports to have an excellent classification accuracy. Overall, our findings indicate that children with LI and children with TD language are distinguishable from each other on the PEARL pretest. Both sensitivity and specificity of the assessment needs to be known in order to assess its usefulness for a diagnosis. Therefore, an assessment should have a sensitivity and specificity close to 100%; however, assessments used to diagnosis LI should yield a sensitivity and specificity at or above 80% (Plante & Vance, 1994).

In the present study, the ROC analysis along with an auxiliary analysis, revealed two new potential cut-off scores, 6 and 7, that would better identify Navajo preschoolers as having LI. Using a cut-off score of 6 (sensitivity = 84%, specificity = 93%) better classifies children with LI and children with TD language than a cut-off score of 7 (sensitivity = 98%; specificity = 73%). However, using a cut-off score of 7 would over-identify children with TD language as LI in the pretest phase but would identify most of the children with LI. Because the PEARL is a screener that uses the test-teach-test

approach, children with TD language that were identified as having LI would be correctly classified as children with TD language after mediation. So with a cut-off score of 7, only 27% of Navajo children with TD language will be identified as having LI and 73% of Navajo children with TD language will be correctly identified as children with TD language. Therefore, resetting the recommended cutoff score to 7 results in improvement in sensitivity than compared to test recommended cut score of 10, but reduces over-representation of Navajo children with LI being identified as TD.

Classification accuracy of posttest measure. A logistic regression analysis indicated that the PEARL posttest, also, had good classification with both sensitivity and specificity at 89% (Plante & Vance, 1994). Overall, 89% of the children were correctly classified in their diagnostic category. The posttest scores were obtained after four mediation phases which took into account: (1) how many prompts were given, (2) how confident the child was in retelling the narrative, (3) how many times the child was being disruptive, (4) and how quickly the child completes the task. In posttest, children with LI performed poorer on the narrative task than children with TD language, which shows that mediation reliably differentiated the two language groups.

Cutoff score of posttest. The ROC curve analysis, along with an auxiliary analysis, indicated that there was no better cut-off score other than 9 that best identifies Navajo preschoolers as LI. Again, to further investigate diagnosis of the PEARL accuracy, a ROC analysis was also employed using the recommended cut score. The AUC of the ROC analysis revealed that the posttest measure reported to have excellent classification. Again, our findings reveal that children with LI and children with TD language are distinguishable from each other on the PEARL posttest. The AUC for the

posttest indicates excellent accuracy in distinguishing Navajo children with LI from children with TD language. A new cut-off score for the posttest was not recommended as both groups were accurately classified with a recommended cutoff score of 9 with a sensitivity of 89% and specificity of 89%.

Classification analysis of modifiability. A logistic regression was attempted to determine the a priori diagnosis of children with LI and with TD language using the modifiability scores as the only predictor. However, due to complete separation an output could not be provided by SPSS because a perfect fit (100%; Nagelkerki R^2) was detected in the model, which immediately stops the computation. A complete separation occurs when the outcome variable completely separates a predictor variable, in this case the modifiability scores; which is also defined as “*a vector correctly allocates all observations to their groups*” (Albert & Anderson, 1984). Therefore, a scatterplot was used to best analyze modifiability, as shown in Figure 3. In the present study, modifiability completely differentiated children with LI from children with TD language. After mediation, children with TD language showed significantly higher performances on the posttest, controlling for performance on the pretest, than children with LI. While there were differences between ability groups on the PEARL’s posttest scores, children with LI and with TD scored higher on the posttest than the pretest. In this study, a teaching component with four phases resulted in changes in storytelling for Navajo children. There were pretest – posttest changes in story grammar, language complexity, and episode, revealing that mediation has an effect on language ability.

Modifiability scores not only distinguish children with LI from children with TD language, it also serves as the best measure in identifying Navajo children with LI. These

modifiability results are consistent with earlier studies that examined the effects of mediation. Kramer and colleagues (2009), found that modifiability scores were the strongest component that distinguished First Nations children with possible language learning difficulties from normal language learners. Further, Peña and colleagues (2006) report that modifiability was the best predictor for identifying children with LI, where 71 first and second grade children participated in the dynamic assessment. The study concluded that the use of DA accurately classified school-age children with LI.

In this study, children with LI and with TD language both benefited from the one-on-one instruction. However, results of the current study indicate that Navajo children with LI had more difficulty learning and incorporating new information into their narratives than children with TD language. Children with LI are most likely to have learning difficulties that are associated with academic, behavioral, and social difficulties (Bashir & Scavuzzo, 1992), which modifiability measures. Children with LI have difficulties in the area of social (e.g., lack of confidence and needing more time to express themselves) and behavioral development (e.g., requiring more prompts and exhibit more disruptions) (Redmond & Rice, 1998). Further, children with LI become easily frustrated because they require more time to express themselves (National Educational Psychology Service, 2015), which deteriorates their confidence when communicating with their peers or teachers (Coster, Goorhuis-Brouwer, Kakken, & Spelber, 1999). Paul and Kellogg (1997) found that children with LI are easily distracted or have poor attention span because their communicating partner may use unfamiliar vocabulary or abstract concepts that are not easily understood. Therefore, the subtest of modifiability may have captured these difficulties with the modifiability scores.

Likelihood ratios. Results of the study indicated that for Navajo children changing the cut score of the pretest from 10 to 7 will reduce the number of children needing to receive the full measure of the PEARL. However, results of the posttest scores indicates good sensitivity and specificity that would accurately classify Navajo children with LI. Moreover, the LR+ and LR- of the measures vary in how strongly they are able to identify children with or without LI. The total pretest scores yield the strongest LR+ (12.59) and LR- (.167), while the total posttest scores yield a LR+ less than 10 (8.00) but a strong LR- (.125).

Clinical implication

This study has determined that the PEARL is an assessment that accurately differentiates Navajo preschool children with LI from those with TD language. Therefore, SLPs using the PEARL among Navajo preschool children should use a cutoff score of 7 for the pretest phase; and children who score below a 7 should then receive mediation. Children receiving mediation should participate in all four phases to accurately measure modifiability. After mediation, children who have scored below the recommended cut score of 9 would then be identified as “at-risk” for LI. The PEARL could potentially decrease the over-representation of Navajo preschoolers in special education and language services.

Predictors of Dynamic Assessment of Narratives

Story grammar, in pretest and posttest, was the single best predictor that accounted for differences in the performance on the PEARL between children with LI and children with TD language. In the current study, and children with LI and TD differed in the scores on the story grammar during pretest and posttest. In the pretest,

using story grammar (D_{SG}) as the base and then adding language complexity (D_{SG+LC}) to story grammar, results in a lower goodness of fit indicating that language complexity does not improve the goodness of fit for the this model. However, using language complexity (D_{LC}) as the base and then adding story grammar (D_{LC+SG}) to language complexity, results in a higher value of goodness of fit. In posttest, using episode (D_E) as the base and adding story grammar (D_{E+SG}) to episode, results indicate a higher goodness of fit. Also, using language complexity (D_{LC}) as the base and then adding story grammar (D_{LC+SG}), results indicate a higher goodness of fit. Overall, story grammar reveals to be the best single predictor of how Navajo children perform on the PEARL.

Research has shown that story grammar abilities across age and ability levels show that students with learning disabilities do not develop a sense of story grammar when compared to their TD peers (Griffith, Dastoli, Ripich, & Nwakanma, 1985; Montague, Maddux, & Dereshiwhki, 1990; Wilkinson, Elkins, & Bain, 1995). Also, researchers have found that differences between children with LI and TD in storytelling are due to difficulties in producing and comprehending story grammar (e.g., Liles, 1985, 1987; Merritt & Liles, 1987, 1989). Further, prior research that found children with LI produced narratives that had fewer story grammar components than children with TD language (Paul, Hernandez, Taylor, & Johnson, 1996; Merritt et al., 1987).

Language complexity. Language complexity and episode were not the best predictors in distinguishing the performances of both language groups on the PEARL. In this study, children with LI produced lower language complexity in the pretest and posttest when compared to children with TD language, which is consistent with Gillam and Johnston's (1992) study and multiple studies in which differences are found

(Newman & Macgregor, 2006; Gillam, McFadden, & Van Kleeck, 1995). Additionally, Newman and Macgregor (2006) found differences between children with LI compared to children with TD language on language complexity in narrative production. Children with LI produced shorter utterances and underdeveloped narrative themes that contributed to low quality of the narrative productions. These findings suggest that Navajo children with LI have difficulties with the linguistic abilities needed for narration. In line with other studies (Gillam, McFadden, & Van Kleeck, 1995; Merrit & Liles, 1987; Roth & Spekman, 1986), narratives produced by Navajo children with LI used less grammatical components, less episodes, and fewer cohesion elements when compared to their TD peers.

Episode. According to Warner and Nelson (2004), preschoolers should be developing skills for telling/retelling narratives and emerging narrative organizational structures of episodes beginning with (1) abbreviated episodes with the goal for addressing a central problem, (2) a complete episode with the intention to achieve the goal, and (3) eventually a complex episode, in which the main character overcomes obstacles while implementing the plan.

The pretest results indicated that, in general, Navajo children may not have the concept of episodes due to age or cultural differences in storytelling. These results were consistent with Gough (1990), who found that Navajo narratives lack episodic organization, when compared to mainstream narratives that are structured with more episodic organization. In the posttest phase of this study, Navajo children with LI produced fewer episodes ($M = .30$) when compared to children with TD language ($M = 1.4$). These results were consistent with other studies (Lu, Cheung, & Chaou, 2003; Peña

et al., 2006; Warner, 2014) that reported that after mediation children told complete narratives. Also, Roth and Spekman (1986) found that children with learning disabilities reported fewer complete episodes than their normally achieving peers. Developmentally this is remarkable because preschool children are just in the early stages of developing true narratives that include episodes. However, after mediation, in alignment with Warner and Nelson's (2004) organizational structures of episodes, Navajo children with and without LI were able to, occasionally, produce complete episode (e.g., problem + attempt).

Cultural Differences Versus Deficits

In this study, we were sensitive to cultural differences in storytelling. Specifically, Navajo children were taught to tell narratives that were similar to those of their mainstream peers, and were not discouraged to eliminate their cultural style of storytelling. In the mainstream classrooms, teachers use mainstream narratives to teach and assess new information (Feagans, 1982; Snow 1983; Wells; 1985); therefore, it is important for Navajo children to understand the structure narratives according to mainstream curriculum expectations to reduce any "concerns" for academic performance, also to value their cultural traditions and the transfer of cultural norms through Navajo stories.

Several sources of individual variation should be considered while evaluating narrative skills of Navajo children. First, there are individual differences and variation within the Navajo population in terms of culture, language use, and storytelling across the Navajo reservation. It is important to know that significant cultural differences influence the way Navajo children structure their narratives; yet, they are able to learn the

mainstream narrative structure after one-on-one mediation. Therefore, such cultural differences must be carefully distinguished from individual deficits. Specific examples of cultural differences are discussed below using the subtest of the PEARL pretest and posttest.

Character. In the pretest phase, children with LI identified the character as “he,” “him” and sometimes “she,” using sentences such as “Him at park” or “He/she go.” However, children with TD language, were able to recognize the character as “Tony” or “The boy.” In the posttest phase, children with LI made minimal gains in accurately identifying the character. As mentioned above, they continued to classify the character as “the boy” or “he/him.” Children with LI still had difficulty recalling the name of the character after mediation. However, children with TD language were able to identify the character as “Tony” or some other name deemed acceptable in the manual; yet, some children with TD language still identified the character as “the boy.” Nevertheless, our findings are consistent with Highwater (1981), results indicated that characters in Navajo narratives are more generally identified by gender than by name, which would account for Navajo children with and without LI scoring low on the PEARL.

Setting. Navajo children with and without LI were able to reference the setting in the narrative. During the pretest phase, children with LI were able to determine the setting by using sentences such as “Him at park.” However, children with TD language were able to identify the setting with better details, such as “The boy was at the park” or “He is going to the park on his scooter.” In the posttest phase, children with TD language made exceptional gains when compared to children with LI. Again, this study shows that Navajo children focus on the setting in their narrative descriptions more than other

elements of the story grammar. Typically, Navajo narratives contain in-depth details of the setting because storytelling was the preferred form of entertainment among elders who did not grow up with television or electricity (Zolbrod, 2004). Navajo storytellers must provide specific details of the setting to provide his or her audience a mental picture or movie image of the setting (Scollon & Scollon, 1981; Stein, 1982).

Problem. In the pretest phase, children with LI did not specifically identify the problem in the narrative when compared to children with TD language. Children with TD language were able to provide the problem of the narrative providing sentences such as “The boy scraped his elbow” or “Tony fell off the scooter”; while children with LI used sentences such as “Him cry” or “Him on the ground.” Children with LI did not specifically identify the outcome of the fall but rather gave a more general cause. However, after mediation, children with LI were able to increase their scores when compared to the pretest scores. Nevertheless, children with TD language also scored higher than children with LI in the posttest. The results of this study were consistent with Yazzie-Mintz (2007), who reported that Navajo children are able to identify the problem.

Emotions. Both groups were able to identify the emotion of the character. In the pretest phase, children with LI used sentences, or words, such as “He cried” or “Cried,” while children with TD language provided sentences such as “Tony fell off the scooter and cried.” However, after mediation, children with LI and children with TD language did not demonstrate significant improvement when compared to the pretest scores; both groups still identified “sad” and “cried” as emotions in the posttest phase. Because most Navajo storytellers want to connect with their audience, they express their feelings/emotions using specific vocal intonations and using precise descriptions of

feelings (Scollon & Scollon, 1981). Again, for the audience to “experience” the full narrative, the storyteller must provide specific details of their characters (Stein, 1982).

Attempt/Consequence. Because attempts and consequences are at the emerging stage for children ages 4- to 6-years of age, preschoolers should occasionally include attempt and consequence (Hoffman, 2004). Applebee (1978) found that 6- to 7-year olds should produce true narratives consisting of attempts and consequences. In the pretest phase, children with and without LI did not provide any attempts in their narratives. This may be due to cultural differences in storytelling, where Navajo children are exposed to a narrative structure that differs greatly from the mainstream culture or due to developmental issues of narratives. However, in the posttest phase very few Navajo children with and without LI were able to include attempt and consequence into their narrative retell task after mediation. Therefore, low scores in this area are due to a combination of developmental and cultural characteristics, and thus, they may take slightly longer to develop.

Plan/Ending. Additional findings from the study indicate that Navajo preschoolers were not able to include a plan and/or an ending in their narratives at pretest or posttest. An effort to resolve the narrative problem are not usually produced until about 6- to 7-years old (Applebee, 1978). In the pretest and posttest phase, Navajo children with and without LI had difficulty providing a plan and an ending. Navajo teaching forbids individuals to plan the future (Eber, 1995), which may have contributed to the children’s narratives. Further, as a result to Navajo children lacking an ending to their narrative may be a result to Navajo narratives not having an ending (Zolbrod, 1999); many Navajo narratives are meant to be told in “narrative chunks” or series (Gough,

1990). This practice allows the listener to reflect on the narrative until the narrative continues again at a later time, which may be the next day or the following week. Many Navajo narratives are told in a continuous manner, which may not always have an ending (Eber, 1995). Despite mediation there were no gains made by the children from either group. However, prior research indicates that a plan is not observed until after age six, which was well above the participants age level (Glenn & Stein, 1980; Hedberg & Westby, 1993; Liles, 1993; Peterson and McCabe, 1983; Stein, 1988).

Ending emotion. In this study, children were not able to produce an ending to their narratives, but they were able to identify the characteristics ending emotion. In the pretest phase, children with LI and children with TD language were able to identify the character's ending emotion in a more general context such as "he smiled" or "he felt better." However, in the posttest phase, children with LI and children with TD language began to use specific emotions such as "He was happy" or "Him happy." Initially, the children were able to identify the character's ending emotion in a more general context; however, after mediation they were able to specifically provide the character's ending emotion. Again, ending emotion aligns with the cultural values of emotion as discussed above.

Limitations and Future Directions

The current study addressed language assessment of Navajo preschool children. Although the study covered a large area, the Navajo Nation is the largest Native American reservation in the US, and we were able to cover the Eastern Navajo Agency, which makes up only 20% of the reservation; therefore, the results only take into account the language abilities of those living in this agency. Ideally to have full representation of

Navajo children, we should sample children from the different agencies and areas of the reservation. Therefore, we caution that our results should not be generalized to Navajo children living on and off the Navajo Reservation

Some Navajo children on the reservation are bilingual. In the current study 40% of children, reportedly spoke Navajo and English; however, in the current study, we only examined English language development. This was due to the measure being only available in English, and the measure complimented academics skills addressed in the mainstream classrooms. Ideally, when we evaluate bilingual and language minority children, we should examine all the languages the children speak. Future research should address both languages, especially as Navajo narrative structure and use differ from mainstream narratives. Their evaluation can provide insight on the language abilities of Navajo children.

A third limitation is the classification accuracy of Navajo children with LI. Because there is no “Gold Standard” to classify Navajo children with LI, we have attempted to use an appropriate classifying criteria in this study. A future direction of a similar study would be to include Navajo children from all five Navajo agencies to account for all language and dialect differences among the Navajo Reservation and use the current findings to streamline the assessment process in collecting language norms based on region, age, and sex. This avenue will direct researchers to develop a “Gold Standard” which will help identify Navajo children with LI.

For future direction, this study should be replicated to further investigate narratives among Navajo preschoolers from all agencies from the Navajo Reservation. Inclusion of all agencies will provide comparisons of how Navajo children structure their

narratives from each agency. Further, a replication of this study among other Native American tribes will also determine the differences of narrative structures between all tribes. These findings may assist educational leaders to create a curriculum that addresses both mainstream and Native American narratives. It is expected that these results will be replicated.

Summary and Conclusion

There is an urgent need to develop a more valid assessment for Navajo children. This study explored the classification accuracy of the PEARL with Navajo preschoolers, many of whom were exposed to both the Navajo and English language. The PEARL, uses a test-teach-test format, reliably identified Navajo preschoolers previously classified as LI or TD. High classification accuracy for this group of Navajo children indicates that it is possible to make a reasonably accurate judgment of language ability using the PEARL. Although English-speaking Navajo children were the primary focus in this study, it may be possible to use the PEARL among other Native American children. However, not all Native American children share the same language and cultural teaching with regards to storytelling and therefore a similar study with a different Native American population may produce different results.

Children with TD language and children with LI displayed differences on ratings of the modifiability scale, a measure in which the examiner rates learning characteristic displayed during the teaching phase. Children with TD language displayed a higher mediation (i.e., prompts, rate, confidence) posttest score, as expected, whereas children with LI made little gains during this mediation period. Pretest, modifiability, and posttest

scores provided important information toward diagnosis of LI in Navajo preschool children.

Data from the current study yield promising results for using the PEARL as an alternative method for evaluating Navajo preschool children's language abilities. Standardized assessments do not always accurately identify Navajo children with or without LI (Henderson & Restrepo, 2016). But narrative tasks seem to be a particularly sensitive instruments for assessing language skills (Paul & Smith, 1993). The children's potential to change through adult mediation in the narrative learning task used in the current study was a good indicator of their overall language abilities (Vogotsky, 1978). Further support of such outcomes would have significant clinical implications for the differentiation of Navajo children who present with language differences from those who have LI. Examining language skills as opposed to existing language knowledge reduces bias of previous language experience (Ukrainetz et al., 2000). Additionally, the assessment of the child's response to mediation seems to provide evidence for an accurate diagnosis. Using the PEARL, clinicians can address these areas by using teaching principles and evaluating them more systematically. This study suggests that DA of narrative identify Navajo children with LI, and despite cultural differences, Navajo children are able to learn mainstream narrative structures after mediation.

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APPENDIX A

TABLES

Table 1

Means and Standard Deviations of Measures by Group of PEARL Scores at Pretest and Posttest.

Measures	LI (<i>n</i> = 45)				TD (<i>n</i> = 45)			
	M	SD	Skewness	Kurtosis	M	SD	Skewness	Kurtosis
Pretest Story Grammar	3.4	1.7	-0.3	-0.3	5.3	1.5	-0.1	1.6
Pretest Language Complexity	0.1	0.3	2.2	3.1	0.6	0.5	-0.2	-2.0
Pretest Episodes	0.0	0.0	0.0	0.0	0.0	0.0	0.0	0.0
Pretest Scores	3.5	1.8	-0.3	-0.2	5.7	1.6	-0.2	2.6
Modifiability Scores	1.2	0.6	-0.2	-0.6	3.4	0.5	0.5	-2.0
Posttest Story Grammar	4.6	2.0	-0.4	0.0	7.1	1.7	0.5	1.1
Posttest Language Complexity	0.7	0.5	-0.4	-0.6	1.2	0.5	.5	-2
Posttest Episode	0.3	0.7	2.1	3.0	1.4	1.0	-0.7	-1.3
Posttest Scores	5.6	2.7	0.1	0.2	8.4	2.1	0.8	0.8

Note. LI = children with language impairment; TD = children with typical language development

Table 2

Zero-Order Correlations among all PEARL Measures for Full Sample ($n = 90$) using TD-LI Classification.

Measures	1	2	3	4	5	6	7	8	9	10
1. TD versus LI	-									
2. Overall Pretest	-.75**	-								
3. Pretest – Story Grammar	-.72**	.98 ^a	-							
4. Pretest – Language Complexity	-.44**	.50 ^a	.34**	-						
5. Pretest – Episodes ^b	-	-	-	-	-					
6. Overall Posttest	-.74**	.92**	.90**	.50**	-	-				
7. Posttest – Story Grammar	-.69**	.90**	.89**	.40**	-	.96 ^a	-			
8. Posttest – Language Complexity	-.58**	.57**	.52**	.49**	-	.61 ^a	.50**	-		
9. Posttest – Episodes	-.56**	.62**	.57**	.46**	-	.72 ^a	.53**	.30**	-	
10. Modifiability	-.89**	.71**	.68**	.44**	-	.74**	.71**	.54**	.48**	-

Note. ** $p < .01$. TD and LI: LI = 1; TD = 0. a. Correlation of the PEARL subscales (story grammar, language complexity, and episodes with the PEARL pretest scores) are all part-whole correlations, not subject to usual significance levels. b. No episodes.

Table 3

Optimal cutoff Scores, Sensitivity, Specificity on the basis of PEARL pretest and posttest.

PEARL Pretest Cutoff					
ROC			Chi-Square		
Sensitivity	Specificity	Cutoff	Sensitivity	Specificity	Cutoff
69%	98%	4.50	69%	98%	5
84%	93%	5.50	84%	93%	6
97%	73%	6.50*	98%	73%	7*
100%	40%	7.50	100%	40%	8
100%	13%	8.50	100%	13%	9
100%	9%	9.50	100%	9%	10

PEARL Posttest Cutoff					
ROC			Chi-Square		
Sensitivity	Specificity	Cutoff	Sensitivity	Specificity	Cutoff
51%	100%	5.50	51%	100%	6
67%	100%	6.50	67%	100%	7
82%	96%	7.50	82%	96%	8
89%	89%	8.50*	89%	89%	9*
89%	71%	9.50	89%	71%	10

Note. *Recommended cutoff score at pretest and posttest.

Table 4

Results of Chi-square Test of Independence for Modifiability subscale by a priori diagnosis

	LI (n = 45)	TD (n = 45)
Prompts^a		
4	0 (0%)	15 (33%)
3	0 (0%)	28 (62%)
2	8 (18%)	2 (4%)
1	20 (44%)	0 (0%)
0	17 (38%)	0 (0%)
	100%	95.6%
Confidence^b		
4	0 (0%)	17 (38%)
3	0 (0%)	26 (58%)
2	18 (40%)	2 (4%)
1	25 (56%)	0 (0%)
0	2 (4%)	0 (0%)
	100%	95.6%
Disruptions^c		
4	0 (0%)	17 (38%)
3	0 (0%)	28 (62%)
2	16 (36%)	0 (0%)
1	23 (51%)	0 (0%)
0	6 (13%)	0 (0%)
	100%	100%
Rate^d		
4	0 (0%)	8 (18%)
3	0 (0%)	23 (51%)
2	4 (9%)	14 (31%)
1	24 (53%)	0 (0%)
0	17 (38%)	0 (0%)
	91%	100%

Note. a. $\chi^2 = 83.60$, $df = 4$. b. $\chi^2 = 82.80$, $df = 4$. c. $\chi^2 = 90.00$, $df = 4$. d. $\chi^2 = 77.56$, $df = 4$. * $p < .001$. Numbers in parentheses indicate column percentages.

Table 5

Positive likelihood ratios, negative likelihood ratios for differentiating LI and Children with TD language from the a priori diagnosis.

Variable	χ^2	LR+	LR-
Pretest Scores ^a	73.26*	12.59	.167
Story Grammar	66.14*	6.52	.153
Language Complexity	18.74*	1.95	.239
Posttest Scores ^b	69.37*	8.00	.125
Story Grammar	60.33*	6.65	.134
Language Complexity	24.45*	14.13	.704
Episode	29.94*	2.84	.168

Note. * $p < .001$. a. Total pretest (story grammar + language complexity, episode not included). b. Total scores of posttest (story grammar + language complexity + episode).

Table 6

Comparison of Prediction of a Priori Classification in Models with Two Pretest Predictors.

Predictors	χ^2	Nagelkerke R ²	Overall Classification	Sensitivity	Specificity
D_{SG}	66.135*	69%	87%	87%	87%
D_{LC}	18.742*	25%	71%	87%	56%
D_{SG+LC}	51.068*	75%	89%	84%	93%

Note. * $p < .001$. SG = story grammar, LC = language complexity.

Table 7

Comparison of Prediction of a Priori Classification in Models with One, Two and Three Posttest Subtests as Predictors Versus with all Three Posttest Subtest as Predictors

Predictors	χ^2	Nagelkerke R^2	Overall Classification	Sensitivity	Specificity
D_{SG}	60.33*	65%	86%	84%	87%
D_{LC}	24.45*	32%	64%	31%	98%
D_E	29.94*	38%	77%	84%	69%
D_{E+SG}	57.81*	70%	87%	89%	84%
D_{E+LC}	79.36*	53%	81%	84%	78%
D_{SG+LC}	61.47*	67%	88%	84%	91%
D_{SG+E}	66.96*	70%	87%	89%	84%
D_{LC+SG}	63.30*	67%	88%	84%	91%
D_{LC+E}	45.41*	53%	81%	84%	78%
$D_{E+SG+LC}$	55.18*	72%	90%	89%	91%

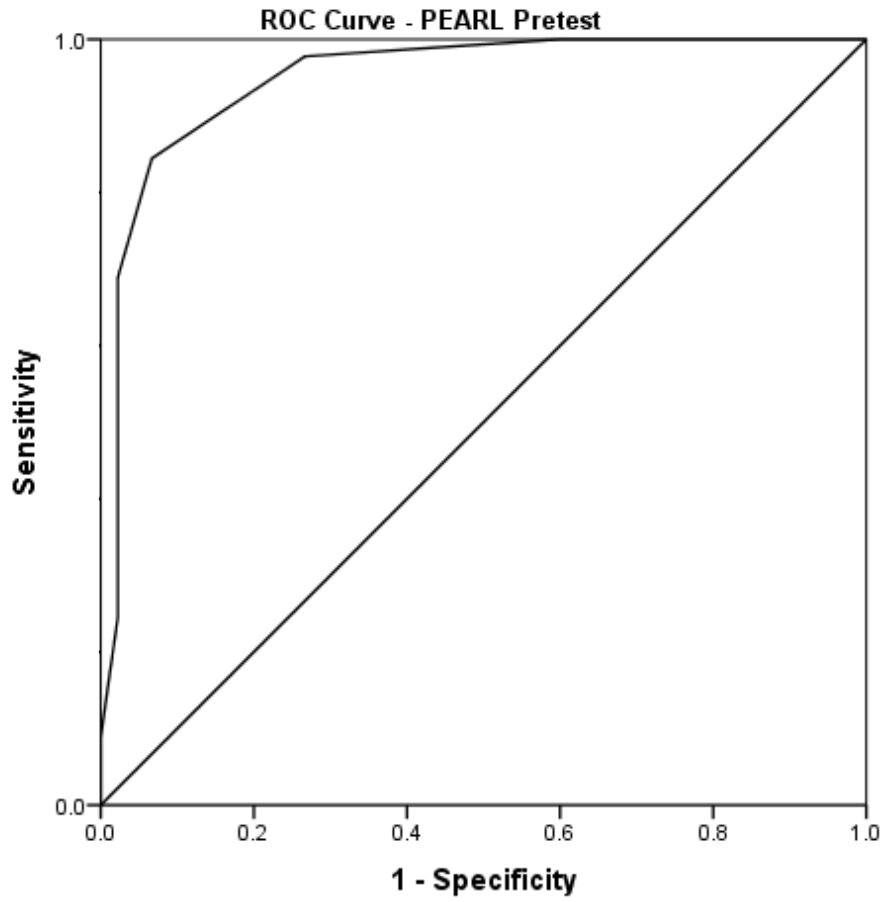
Note. * $p < .001$. E = episode, SG = story grammar, LC = language complexity.

APPENDIX B

FIGURES

Figure 1

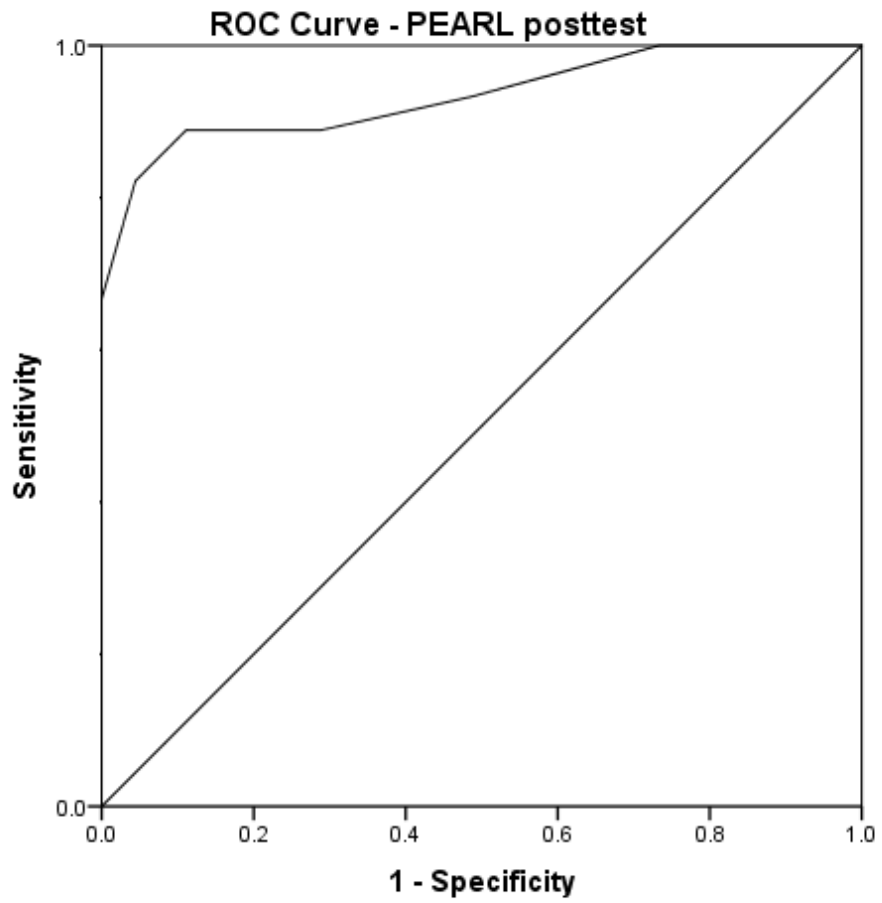
Receiver operating characteristic curve for the overall PEARL pretest performance.



Diagonal segments are produced by ties.

Figure 2

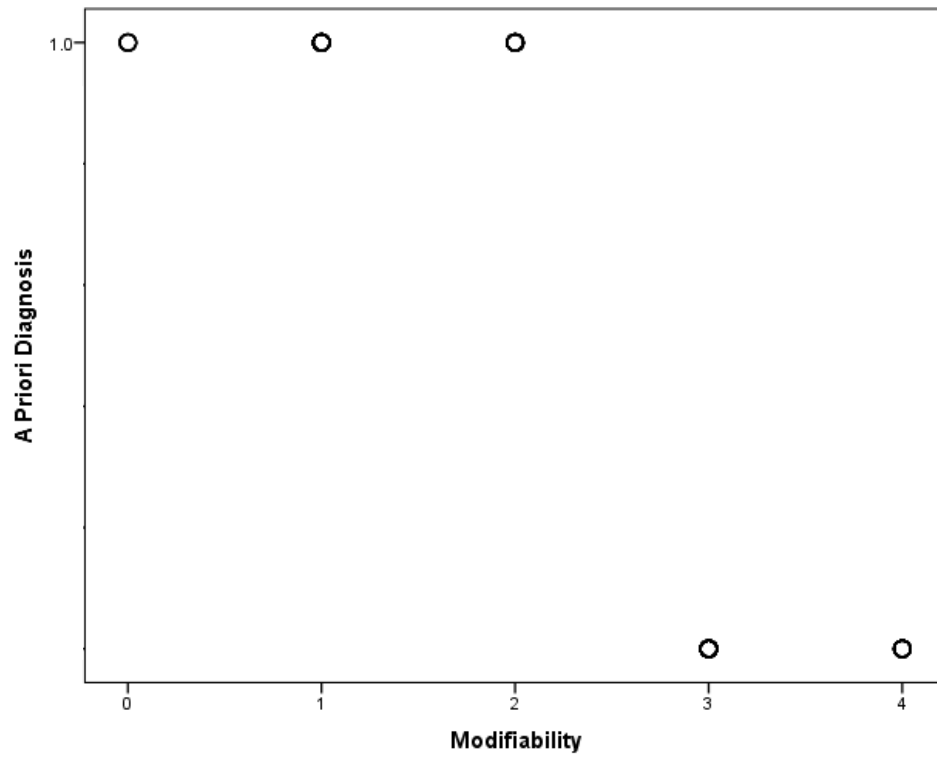
Receiver operating characteristic curve for the overall PEARL posttest performance.



Diagonal segments are produced by ties.

Figure 3

Scatterplot for overall PEARL modifiability scores.



APPENDIX C
ARIZONA STATE UNIVERSITY
INSTITUTIONAL REVIEW BOARD APPROVAL

APPROVAL

Maria Restrepo
Speech and Hearing
480/727-8795
Laida.Restrepo@asu.edu

Dear Maria Restrepo:

On 9/8/2015 the ASU IRB reviewed the following protocol:

Type of Review:	Initial Study
Title:	Dynamic Assessment of Narratives among Navajo Preschoolers
Investigator:	Maria Restrepo
IRB ID:	STUDY00002903
Category of review:	(6) Voice, video, digital, or image recordings, (7)(b) Social science methods, (7)(a) Behavioral research

The IRB approved the protocol from 9/8/2015 to 9/8/2016 inclusive. Three weeks before 9/8/2016 you are to submit a completed Continuing Review application and required attachments to request continuing approval or closure.

If continuing review approval is not granted before the expiration date of 9/8/2016 approval of this protocol expires on that date. When consent is appropriate, you must use final, watermarked versions available under the "Documents" tab in ERA-IRB.

In conducting this protocol you are required to follow the requirements listed in the INVESTIGATOR MANUAL (HRP-103).

Sincerely,



Susan Metosky

IRB Administrator

cc: Davis Henderson

APPENDIX D
THE NAVAJO NATION
HUMAN RESEARCH REVIEW BOARD APPROVAL



THE NAVAJO NATION

RUSSELL BEGAYE PRESIDENT
JONATHAN NEZ VICE PRESIDENT

September 16, 2015

Davis E. Henderson
P.O. Box 870102
Tempe, Arizona 85287

Dear Mr. Henderson,

This is to advise you that the **Study #NNR-15.215T: "Dynamic Assessment of Narratives among Navajo Preschooler"** has been presented to the Navajo Nation Human Research Review Board (NNHRRB) on **September 15, 2015**, and the following action taken subject to the conditions and explanation provided below.

On Agenda For:	Procedure
Reasons:	New Title
Description:	Requesting Acceptance and Approval of New Protocol.
NNHRRB Action:	<u>Accepted and Approved, from September 15, 2015 – September 15, 2016</u>
Conditions:	With All Standard Conditions

The Navajo Nation Human Research Review Board has added a very important additional contingency regarding failure to comply with NNHRRB rules, regulations, and submittal of reports which could result in sanctions being placed against your project. This could also affect your funding source and the principal investigator. Under Part Five: Certification, please note paragraph five wherein it states: *"I agree not to proceed in the research until the problems have been resolved or the Navajo Nation Human Research Review Board has reviewed and approved the changes."* Therefore, it is very important to submit quarterly and annual reports on time and if continuation is warranted submit a letter of request sixty (60) days prior to the expiration date.

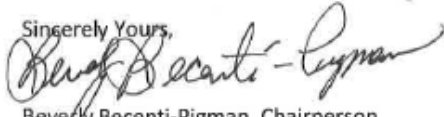
The following are requirements that apply to all research studies:

1. The Navajo Nation retains ownership of all data obtained within its territorial boundaries. The Principal Investigator shall submit to the NNHRRB a plan and timeline on how and when the data/statistics will be turned over to the Navajo Nation;
2. Only the approved informed consent document(s) will be used in the study;
3. Any proposed future changes to the protocol or the consent form(s) must again be submitted to the Board for review and approval prior to implementation of the proposed change;
4. If the results of the study will be published or used for oral presentations at professional conferences, the proposed publication, abstract and/or presentation materials must be submitted to the Navajo Research Program for Board review and prior approval;
5. Upon Board approval, three (3) copies of the final publication must be submitted to the Navajo Research Program;
6. All manuscripts must be submitted to the Navajo Research Program for Board Review and prior approval;
7. The Principal Investigator must submit a dissemination plan on how the results of the study and how these results will be reported back to the Navajo Nation;

8. The Principal Investigator must share specifically how these results will generally benefit or improve the health of the Navajo people. This can be completed by:
 - a. Conducting an educational in-service for the community people and health care providers on the Navajo Nation and present the findings. Provide documentation of these in-services presented.
 - b. Developing educational materials for use by the health care providers and the community people and providing the training on how to use the materials; and
 - c. Presenting and sharing the results of the study at a research conference sponsored by the Navajo Nation for its health care providers and the Navajo people.
9. The Principal Investigator is expected to submit documentation on 8a, b, & c;
10. The Principal Investigator must submit quarterly and annual reports as scheduled.

Please begin using Study #**NNR-15.215** for all Study correspondences. If you have any questions on this subject, please call the Navajo Research Program at (928) 729-4415.

Sincerely Yours,



Beverly Becenti-Pigman, Chairperson
Navajo Nation Human Research Review Board

cc: #NNR-15.215 file

APPENDIX E
THE NAVAJO NATION
EASTERN AGENCY COUNCIL APPROVAL



EASTERN NAVAJO AGENCY COUNCIL

THE NAVAJO NATION

P.O. Box 668
Crownpoint, New Mexico 87313
Phone: (505) 786-2090
Fax: (505) 786-2097

Ben Shelly, President

Ervin Chavez
President

Johnny Johnson
Vice-President

Rex Lee Jim, Vice-President

FemieYazzie
Secretary/Treasurer

ENAC 03-2015-02

RESOLUTION OF THE EASTERN NAVAJO AGENCY COUNCIL

THE EASTERN NAVAJO AGENCY COUNCIL APPROVES AND SUPPORTS DAVIS E. HENDERSON, M. A., A. B. D., CCC – SLP (C# 430, 478) AND M. ADELAIDA RESTREPO, PH. D., CCC – SLP, OF ARIZONA STATE UNIVERSITY TO CONDUCT RESEARCH AND COLLECT DATA ON THE EASTERN NAVAJO AGENCY.

WHEREAS:

1. The Eastern Navajo Agency Council is comprised of all duly elected officials from the thirty-one (31) Chapters of the Eastern Navajo Agency having the power and authority to consider, approve, oppose and/or make recommendations by resolution on any proposals affecting the people and communities of the Eastern Navajo Agency; and
2. Per the 2 N.N.C. SECTION; 4028; the Eastern Navajo Agency Council is vested with government authority to review all matters affecting the community and to make most appropriate recommendations when necessary to the Navajo Nation, County, State, Federal and other local agencies for beneficial to the organization; and
3. The Eastern Navajo Agency Council is endowed with perennial responsibilities to advocate for its citizens and community within the Eastern Navajo Agency and for Navajo Nation citizens as a whole; and
4. The Eastern Navajo Agency Council has the authority to make decisions and act upon issues that will impact such citizens; and
5. Davis E. Henderson, M. A., A. B. D., CCC – SLP is a voting member of Pueblo Pintado, and having worked as a Speech-Language Pathologist on the Navajo Reservation for 5 years, Gallup-McKinley County Schools and Region I/Region II Head Starts, continues to involve himself with his surrounding community and tribe; and

6. Davis E. Henderson is currently a 3rd year Ph. D. student at Arizona State University and is now engaged to completing his dissertation; and where he is currently servicing as Vice President on the American Indian Graduate Student Association, a Ph. D. Representative on the National Student Speech Language Hearing Association and a member of University Honor Society; and
7. M. Adelaida Restrepo, Ph. D., CCC – SLP, is a Professor at Arizona State University, who has been serving as Davis E. Henderson’s mentor since Fall 2012; Dr. Restrepo was named American Speech-Language Hearing Association – Fellow in 2013; and
8. The Eastern Navajo Agency Council is aware that the purpose of this study is to demonstrate the efficacy of dynamic assessment as a non-biased approach to language evaluation in the Navajo Population; and this research study will be part of a larger investigation which will utilize a pretest-teach-posttest methodology of narratives.
9. The Eastern Navajo agency Council is made aware that the study will recruit Head Start and/or School-age Navajo children who attend BIE, Private, Charter, Public Schools who may live on and off the Navajo Reservation; and
10. The Eastern Navajo Agency Council is made aware that participation in this research is voluntary; and participates will have the right to refuse to participate without ~~penalty~~ or loss of benefits to which the child/ren are otherwise entitled; and *Penalty E.C.*
11. The Eastern Navajo Agency Council is made aware that all participates will receive an incentive upon their completion of their participation; and
12. The Eastern Navajo Agency Council is made aware that obtained information and results will be kept strictly confidential at all times; and results of this study may be used in reports, presentations and publications; per Navajo Nation IRB, no data will be kept by researchers once study has been completed; and
13. The Eastern Navajo Agency Council is made aware that there are no known risks (psychological, emotional, physical or other) expected as a result of participating in this study; and no bodily fluids will be collected from the participants; participants will not be exposed to any toxins or chemicals; and
14. The Eastern Navajo Agency Council believes that Davis E. Henderson and Dr. Restrepo will prove to be responsible, reliable and advocate researchers for the Navajo students who attend schools on the Eastern Navajo Reservation; and

15. Davis E. Henderson and Dr. Restrepo have also firmly committed to supporting the American Indian Education with attention paid to the differences among Navajo communities with respect to language and culture; and
16. Eastern Navajo Agency Council believes that Davis E. Henderson and Dr. Restrepo will bring much needed Native American perspective to the Navajo Nation Education and New Mexico/Arizona State Education;

NOW THEREFORE BE IT RESOLVED THAT:

The Eastern Navajo Agency Council approves and supports Davis E. Henderson, M. A., A. B. D., CCC – SLP (C# 430, 478) and M. Adelaida Restrepo, Ph. D., CCC – SLP, of Arizona State University to conduct research and collect data on the Eastern Navajo Agency.

CERTIFICATION

We hereby certify that the foregoing resolution was duly considered by the Navajo Nation Eastern Agency Council at a duly called meeting in *Borrgo Pass School, Borrego Pass, New Mexico* at which a quorum was present and that the same was passed by a vote of 62 in favour, and 0 opposed, and 1 abstaining, this 7th day of March, 2015.

Motioned by: David Lee

Seconded By: Louise Haskie



Ervin Chavez, President
EASTERN NAVAJO AGENCY COUNCIL

ATTEST:



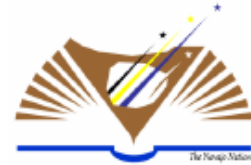
Fernie Yazzie, Secretary/Treasurer
EASTERN NAVAJO AGENCY COUNCIL

APPENDIX F
THE NAVAJO NATION
DEPARTMENT OF DINÉ EDUCATION



**DEPARTMENT OF DINÉ EDUCATION
THE NAVAJO NATION**

P.O. Box 670 · Window Rock, Arizona 86515
PHONE (928) 871 – 7475 · FAX (928) 871 – 7474



Russell Begaye
President

Jonathan Nez
Vice-President

NNBEJY-295-2015

Relating to Education; Recommending Approval from the Navajo Nation Human Research Review Board for Davis E. Henderson and Dr. M. Adaida Restrepto to Conduct Their Research Project Titled “Dynamic Assessments of Navajo Head Start Children’s Narrative Ability.”

WHEREAS:

1. The Department of Diné Education (hereinafter the “Department”) is the administrative agency within the Navajo Nation with responsibility and authority for implementing and enforcing the educational laws of the Navajo Nation [2 N.N.C. § 1801 (B); 10 N.N.C. § 107 (A)]; and
2. The Navajo Nation Board of Education (hereinafter the “Board”) is the education agent in the Executive Branch for the purposes of overseeing the operation of all schools serving the Navajo Nation. [10 N.N.C. § 106 (A)] The Board carries out its duties and responsibilities through the Department of Diné Education [10 N.N.C. §106 (G)(3)]; and
3. The Department is under the immediate direction of the Board [10 N.N.C. § 107 (B)]; and
4. Davis E. Henderson & Dr. M. Adaida Restrepo are seeking a resolution of support from Navajo Nation Board of Education and Department of Diné Education, which supports Davis Henderson’s dissertation research study on the Navajo Reservation. The resolution will be presented before the Navajo Nation Human Research Review Board to receive final approval to conduct their research. The purpose of this study is to examine Navajo narratives and language characteristics using a dynamic assessment of narrative to differentiate Navajo Head Start children as being “at-risk’ for language impairment or typically developing. and
5. Because the proposed research project involves researching and interviewing human subjects, the Board recommends that the Navajo Nation Human Research Review Board to grant their approval to conduct research; and
6. The Board is in receipt of all the documentation to support the proposed research project and finds this research project is in the best interests of the Navajo Nation.

BOARD OF EDUCATION

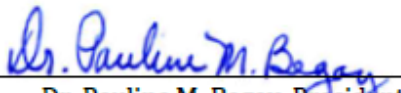
*Dr. Pauline M. Begay, President · Gloria Johns, Vice President · Marlene Burbank, Secretary
Members: Dolly C. Begay · Delores Greyeyes · Dr. Bernadette Todacheene · Patrick D. Lynch · Bennie Begay
Dr. Tommy Lewis, Jr., Superintendent of Schools*

NOW THEREFORE BE IT RESOVED:

1. The Navajo Nation Board of Education supports and recommends that the Navajo Nation Human Research Review Board grant their approval for Davis E. Henderson and Dr. M. Aaida Restrepto to conduct their research project titled "Dynamic Assessments of Navajo Head Start Children's Narrative Ability."
2. The Navajo Nation Board of Education hereby recommends and empowers the Superintendent of Schools to take any actions deemed as necessary and proper to carry out the purposes of this resolution.

CERTIFICATION

I hereby certify that the foregoing resolution was duly considered by the Board of Education of the Navajo Nation at a duly called meeting at Window Rock, Arizona (Navajo Nation) at which a quorum was present, motion by Bennie Begay and Delores Greyeyes seconded by and that the same was passed by a vote of 5 in favor; 2 opposed; 0 abstained, this 10th day of July 2015.



Dr. Pauline M. Begay, President
Navajo Nation Board of Education

APPENDIX G
THE NAVAJO NATION
NAVAJO HEAD START APPROVAL



THE NAVAJO NATION
P.O. Box 9000
Window Rock, Arizona 86515
(928) 871-6000



Russell Begaye
President

Jonathan Nez
Vice President

May 15, 2015

Davis E. Henderson, M. A., CCC – SLP,
M. Adelaida Restrepo, Ph. D., CCC - SLP,
Arizona State University
Speech and Hearing Science Department
P.O. Box 870102
Tempe, Arizona 85287-0102

Re: Dynamic Assessment of Narratives among Navajo Students

Dear Davis E. Henderson and Dr. Restrepo,

The Navajo Head Start is a federal program that promotes the school readiness of children ages birth to 5 from low-income families by enhancing their cognitive, social and emotional development. Therefore, the Navajo Head Start grants permission for children and staff to participate in the research project with Davis E. Henderson and Dr. M. Adelaida Restrepo from the Department of Speech and Hearing Science at Arizona State University.

The purpose of this study is to demonstrate the efficacy of dynamic assessment as a non-biased approach to language evaluation in the Navajo population. This research study will be part of a larger investigation which will utilize a pretest-teach-posttest methodology of narratives. We fully support and give permission to Davis E. Henderson and associated research staff from ASU to collect child, teacher and parent questionnaires, data and language samples. The permission is granted for the 2015 – 2016 school year.

The Navajo Head Start has known Davis E. Henderson since 2000. From 2000 – 2005, Davis Henderson volunteered as a student worker and student teacher, he worked closely with the teachers, teacher aides and other Head Start professionals to ensure that student needs were met. From 2007 to 2012, Davis E. Henderson worked with the Navajo Head Start as a Speech-Language Pathologist. As a Speech-Language Pathologist, Davis evaluated and provided therapy services to 10 rural Navajo Head Start centers which the Navajo Head Start appreciates.

The Navajo Head Start handles all documents pertaining to children and their family with confidentiality, written or verbal. Findings may be published, but children and families will never be identified by name. Therefore, the Navajo Head Start will ask Mr. Henderson to adhere to our confidentiality policy.

As part of this project there will be incentives for the children to participate in the study. The school would greatly benefit from accurate knowledge about the best strategies for implementing alternative language assessments to Navajo children. Additionally, the Navajo Head Start will

Navajo Head Start
P.O. Box 3479
Window Rock, Arizona
(928) 871-6902 • Fax (928) 871-7866

establish and maintain a strong partnership collaboration with families and resources, like Mr. Henderson, to promote a comprehensive Early Childhood Education Program, through Ké.

In partnership, Mr. Henderson will provide several trainings and presentations to the Navajo Nation Head Start staffs and parents about the fundamentals about culture and language to establish stability for learning and sustaining the philosophy of early childhood development of human growth and development. Further, Mr. Henderson will train and present of development of educational services with focus on classroom management, peer mentoring and measurement tools to ensure student and parent/teacher success.

Further, in partnership with Davis E. Henderson, the goal of this research project is to ensure accountability and effective use of resources through the development and implementation of sound procedures and training in response to Navajo Head Start needs of assessments.

The Navajo Head Start looks forward to collaborating with ASU, specifically, Davis E. Henderson, Dr. Restrepo and their research assistance in this project.

Respectfully,

NAVAJO HEAD START



Sharon H. Singer, M.Ed., Assistant Superintendent

Navajo Head Start
P.O. Box 3479
Window Rock, Arizona
(928) 871-6902 • Fax (928) 871-7866

APPENDIX H

ST. BONAVENTURE NAVAJO MISSION SCHOOL



St. Bonaventure School
Post Office Box 610 Thoreau, NM 87323
Tel. (505) 862-7465 Fax: (505) 862-7790
Ms. Griffin (Principal) tgriffin@sbms.k12.nm.us

December 11, 2015

M. Adelaida Restrepo, PhD., PI
Davis E. Henderson, MA., Co-PI
Arizona State University
PO Box 870102
Speech and Hearing Science Department
Tempe, Az 85287-0102

Re: Dynamic assessment of narrative among Navajo preschool age children

St. Bonaventure School grants permission for children and staff to participate in the research project with Dr. M. Adelaida Restrepo and Davis Henderson from the Department of Speech and Hearing Science at Arizona State University. The purpose of the study is to investigate how Navajo Preschool and Kindergarten children, who are "at-risk" for language impairment, but otherwise developing typically, perform on the Predictive Early Assessment of Reading and Language (PEARL). We give permission to Davis E. Henderson and associated research staff from ASU to collect child, teacher and parent questionnaires. Findings may be published, but children and families will never be identified by name. The permission is granted for the current school year 2015-2016.

As part of this project there will be incentives for the children to participate in the study. The schools would greatly benefit from accurate knowledge about the best strategies for implementing alternative language assessments to Navajo Children.

At St. Bonaventure School, we are looking forward to our collaboration with ASU, specifically, Dr. Restrepo, Mr. Henderson and their research assistants in this project.

Sincerely,


Ms. Trudi Griffin (Principal)


Mrs. Denise Whelan (Kindergarten)


Sr. Marietta Brown, SND
(Preschool Administrator)

APPENDIX I

DIBE YAZHI HABITIIN OLTA, INC.

(BORREGO PASS SCHOOL) APPROVAL



BORREGO PASS SCHOOL MOUNTAINEERS
"Weaving our Future with the Threads of Learning"

P.O. BOX 679 – CROWNPOINT, NM 87313 – PH: (505)786-5237 – FAX: (505)786-7078

December 6, 2015

M. Adelaida Restrepo, PhD., PI
Davis E. Henderson, MA., Co-PI
Arizona State University
PO Box 870102
Speech and Hearing Science Department
Tempe, Az 85287-0102

Re: Dynamic assessment of narrative among Navajo preschool age children

Dibe Yazhi Habitiin Olta, Inc. (Borrego Pass School) grants permission for children and staff to participate in the research project with Dr. M. Adelaida Restrepo and Davis Henderson from the Department of Speech and Hearing Science at Arizona State University. The purpose of the study is to investigate how Navajo Preschool children, who are "at-risk" for language impairment and typically developing, perform on the Predictive Early Assessment of Reading and Language (PEARL). We give permission to Davis E. Henderson and associated research staff from ASU to collect child, teacher and parent questionnaires. Findings may be published, but children and families will never be identified by name. The permission is granted for the current school year 2015-2016.

As part of this project there will be incentives for the children to participate in the study. The schools would greatly benefit from accurate knowledge about the best strategies for implementing alternative language assessments to Navajo Children.

At Dibe Yazhi Habitiin Olta, Inc., we are looking forward to our collaboration with ASU, specifically, Dr. Restrepo, Mr. Henderson and their research assistants in this project.

Sincerely,

John E Bach Jr.
Principal



BORREGO PASS SCHOOL MOUNTAINEERS
"Weaving our Future with the Threads of Learning"

P.O. BOX 679 – CROWNPOINT, NM 87313 – PH: (505)786-5237 – FAX: (505)786-7078

DIBE YAZHI HABITIIN OLTA, INC.
(Borrego Pass School)

The Dibe Yazhi Habitiin Olta, Inc., (Borrego Pass School) Governing School Board hereby approves and gives permission for the ASU research study involving the "Dynamic Assessment of Narratives Among Navajo Preschool Age Children" by Davis Henderson and his Team.

CERTIFICATION

We hereby certify that Dibe Yazhi Habitiin Olta, Inc., duly considered the foregoing proposal at a duly called Governing School Board meeting at Dibe Yazhi Habitiin Olta, Inc., Borrego Pass, New Mexico, at which a quorum was present and that same was passed by a vote of 3 in favor, 0 opposed and 1 abstained on this 12th day of January, 2016.

Motion: Louise Long

Second: Janet Mariano



President



Vice-President



Member



Member

APPENDIX J
PARENT QUESTIONNAIRE

Today's Date

PARENT/GUARDIAN QUESTIONNAIRE

Dynamic Assessments of Navajo Head Start Children's Narrative Ability

Please return this questionnaire with your parent consent form

(This first page of this form is removed to protect confidentiality after we receive it)

Please Print Child's Full Name

Child's Birthdate

Child is a: BOY GIRL

Print Name of Person Completing this Form

Relationship to Child

Print Parent/Guardian Name

Parent/Guardian Home/Cell Phone Number

Print Parent/Guardian Mailing Address

Street/PO Box

City

Zip Code

Print Name of Child's School

Print Name of Child's Teacher and grade

Please answer each item in questions 1 – 7.

1. In the area of language development, what are you most concerned about for your child:

2. In the area of hearing, what are you most concerned about for your child:

3. In the area of Vision, what are you most concerned about for your child:

4. At any point in time, have your child's teacher ever been concerned about your child's:

Hearing No Yes

Vision No Yes

Speech No Yes

Language No Yes

Attention No Yes

5. At any point in time, has your child's doctor ever been concerned about your child's:

Hearing No Yes

Vision No Yes

Speech No Yes

Language No Yes

Attention No Yes

6. Has your child ever received any Early Intervention?

No Yes if yes, what services were provided? _____

7. Is your child currently receiving any special education services?

No Yes If yes, what services are being provided? _____

8. Is your child currently receiving language therapy?

No Yes If yes, how many long (e.g., 30- or 60-mins.)? _____

9. Does your child have any serious medical problems?

No Yes If yes, what medical problems? _____

10. Select your child's **primary** language. (Please fill in one square)

Navajo English Other: _____

11. What language(s) is/are spoken in the child's home?
 Only Navajo Only English Navajo and English Other: _____
12. What language(s) did your child first learn to speak?
 Only Navajo Only English Navajo and English Other: _____
13. What language(s) does your child use more frequently in your home?
 Only Navajo Only English Navajo and English Other: _____
14. How well does the student understand the Navajo language?
 Very well only a little Not at all
15. In your opinion, how well does the student understand the English language?
 Very well only a little Not at all
16. Which language do you use to communicate with your child at home and in public?
 Navajo only English only English and Navajo

17. Please provide information about the number of years of education completed by parent or guardian.

	Mother/Female Guardian (Please fill in one square)	Father/Male Guardian (Please fill in one square)
8 th grade or less	<input type="checkbox"/>	<input type="checkbox"/>
9 th grade	<input type="checkbox"/>	<input type="checkbox"/>
10 th grade	<input type="checkbox"/>	<input type="checkbox"/>
11 th grade	<input type="checkbox"/>	<input type="checkbox"/>
12 th grade	<input type="checkbox"/>	<input type="checkbox"/>
1 year of college/technical school	<input type="checkbox"/>	<input type="checkbox"/>
2 year of college/technical school	<input type="checkbox"/>	<input type="checkbox"/>
3 year of college/technical school	<input type="checkbox"/>	<input type="checkbox"/>
4 year of college/technical school	<input type="checkbox"/>	<input type="checkbox"/>
5+ years of college	<input type="checkbox"/>	<input type="checkbox"/>

18. Please indicate the highest diploma or degree earned by parent or guardian.

	Mother/Female Guardian (Please fill in one square)	Father/Male Guardian (Please fill in one square)
High School Diploma	<input type="checkbox"/>	<input type="checkbox"/>
Associates Degree	<input type="checkbox"/>	<input type="checkbox"/>
Bachelors Degree	<input type="checkbox"/>	<input type="checkbox"/>
Masters Degree	<input type="checkbox"/>	<input type="checkbox"/>
Doctor of Philosophy	<input type="checkbox"/>	<input type="checkbox"/>

19. How many years has your child attended the Navajo Head Start?

- 1 year
 2 years
 3 years

20. Please provide information about your child's family. Fill in the squares for Yes or No for each relative in the following questions.

Have any of your child's relatives received special education?

Mother	<input type="checkbox"/> No <input type="checkbox"/> Yes	What services?
Father	<input type="checkbox"/> No <input type="checkbox"/> Yes	What services?
Sister(s)	<input type="checkbox"/> No <input type="checkbox"/> Yes	What services?
Brother(s)	<input type="checkbox"/> No <input type="checkbox"/> Yes	What services?

APPENDIX K
TEACHER QUESTIONNAIRE

Child ID #: _____
Date of Birth: _____

Teacher: _____
Head Start Center: _____

Teacher Questionnaire

Dynamic Assessments of Navajo Head Start Children's Narrative Ability

1. Rate your concern for about your student's development skills:

- | | | | |
|-----------|--------------------------------------|--|---|
| Hearing | <input type="checkbox"/> No concerns | <input type="checkbox"/> Some concerns | <input type="checkbox"/> Very concerned |
| Vision | <input type="checkbox"/> No concerns | <input type="checkbox"/> Some concerns | <input type="checkbox"/> Very concerned |
| Speech | <input type="checkbox"/> No concerns | <input type="checkbox"/> Some concerns | <input type="checkbox"/> Very concerned |
| Language | <input type="checkbox"/> No concerns | <input type="checkbox"/> Some concerns | <input type="checkbox"/> Very concerned |
| Attention | <input type="checkbox"/> No concerns | <input type="checkbox"/> Some concerns | <input type="checkbox"/> Very concerned |

a. If language, what is your main concern?

2. Rate your student's use of Navajo in the classroom:

- | | | | | |
|----------------------------------|--------------------------------|---------------------------------------|-------------------------------------|---------------------------------|
| Speak to you in Navajo | <input type="checkbox"/> Never | <input type="checkbox"/> Occasionally | <input type="checkbox"/> Frequently | <input type="checkbox"/> Always |
| Speaks to other adults in Navajo | <input type="checkbox"/> Never | <input type="checkbox"/> Occasionally | <input type="checkbox"/> Frequently | <input type="checkbox"/> Always |
| Speak to classmates in Navajo | <input type="checkbox"/> Never | <input type="checkbox"/> Occasionally | <input type="checkbox"/> Frequently | <input type="checkbox"/> Always |

3. Rate your student's use of English in the classroom:

- | | | | | |
|-----------------------------------|--------------------------------|---------------------------------------|-------------------------------------|---------------------------------|
| Speak to you in English | <input type="checkbox"/> Never | <input type="checkbox"/> Occasionally | <input type="checkbox"/> Frequently | <input type="checkbox"/> Always |
| Speaks to other adults in English | <input type="checkbox"/> Never | <input type="checkbox"/> Occasionally | <input type="checkbox"/> Frequently | <input type="checkbox"/> Always |
| Speak to classmates in English | <input type="checkbox"/> Never | <input type="checkbox"/> Occasionally | <input type="checkbox"/> Frequently | <input type="checkbox"/> Always |

4. Does your student currently receive language therapy: Yes No

- a. For how long is the child serviced (e. g., 30- or 60-mins)? _____
- b. Are services provided in English and/or Navajo? _____