SPEECH, LANGUAGE, AND HEARING RISK FOR SAMOAN CHILDREN K TO 3

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2010
SPEECH, LANGUAGE, AND HEARING RISK FOR SAMOAN CHILDREN K TO 3

A Thesis

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____________________________, Department Chair
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Department of Speech Pathology and Audiology
Abstract

of

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In 2006, at the request of the American Samoan (AS) government, 206 AS students in grades K to 3 were screened for speech, language, and hearing. The results included a high incidence of “non-pass” (65%) for the speech/language/cognitive portion, along with a similarly high hearing non-pass rate, and 76% incidence of children with impacted cerumen. The screening was then administered to Sacramento Samoan (SS) children. A control-group of Sacramento non-Samoan children (SNS) was compared to the two groups. The SNS group performed the highest out of all three groups in all areas screened. Possible contributing cultural, linguistic, educational, socioeconomic, and environmental factors are considered, along with ways in which the needs of Samoan children can be most effectively determined.

_____________________, Committee Chair
Larry Boles, PhD., CCC-SLP

______________________________
Date
ACKNOWLEDGMENTS

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Chapter 1

INTRODUCTION

Purpose of the Study

In 2006, at the request of the American Samoan (AS) government, two speech-language pathologists and four graduate students from California State University, Sacramento traveled to American Samoa to screen children for speech, language and hearing. The screener, created by Larry Boles, PhD., CCC-SLP, and his colleagues, was translated into Samoan by two Samoan special educators. Ten Samoan special educators then administered the screener to 206 public school students in grades K through 3. The surprising results included a high incidence of “non-pass” (65%) for the speech/language/cognitive portion, along with a similarly high rate of hearing non-pass (48%). Further, an alarming 76% of the children had impacted cerumen.

For the second portion of this study, the screener was translated back into English and administered to 43 Sacramento Samoan (SS) children. The third portion of the study, which this thesis documents, entailed administering the screener to a control group of Sacramento students of non-Samoan descent (the SNS group). The results of the AS, SS, and SNS portions of the study were then compared, and various linguistic, cultural, and environmental variables that may have influenced the results (of the hearing screenings, the language screenings, or both) were considered.

One key issue that must be considered is whether the screener overestimated the incidence of language deficits in AS children. It was anticipated that comparing the results of the AS students with those of the SS group to the SNS group would help to
answer some of the concerns about the screener’s validity, as well as offering directions for further research. It was hypothesized that if the AS and SS results were similar, it was reasonable to assume that the screener was not biased. However, if the SS group performed at higher levels than the AS group for most or all tasks in the speech, language and cognitive portion of the screener, at least five explanations would be possible.

First, the screener may indeed be biased. Item selection may be easier in the English version, or the Samoan version may be more stringent in ways we have yet to discover. Language can be a barrier to accurate assessment of Samoan children due to Samoan words that have multiple meanings and to English words without a Samoan equivalent (Mokuau & Tauili‘ili, 2004).

The second possibility is that American Samoa has an urgent need for speech and language services. Currently, the Samoan public schools are without a practicing ASHA-certified speech-language pathologist (SLP). Previously, there had been one ASHA-certified SLP practicing in the Samoan public schools; that equated to one speech pathologist per 19,000 children in grades K to 12 (U.S. Census, 2006). By contrast, in the Sacramento City Unified School District alone, there are approximately 55 full time speech-language pathologists serving a total K to 12 population of approximately 50,000 students, which amounts to a ratio of better than one SLP per 1000 students (Pieretti, personal communication, 2008). Prior to this screening, census data indicated that over 4,000 children in American Samoa would be eligible for speech and language services based on the criteria used to determine eligibility in U.S. schools.
Third, U.S. students may have lower levels of impacted cerumen; this could account for some variability in both hearing and language results, and could point to possible genetic/ethnic differences, especially if the SNS group were to have significantly lower hearing non-pass rates than either the AS or SS groups. Earwax phenotypes vary between ethnic groups (Tomita et al., 2002), and certain indigenous groups have increased risk of middle ear dysfunction (Pugh, Burke, & Brown, 2004). It has been observed that the incidence of hearing impairment among Samoans and other Asian groups is particularly high (Davis, Gentry, & Hubbard-Wiley, 2002). Some authors have recommended consideration of national screenings for Pacific Island children, to identify those with chronic OME and other otological disorders (Paterson et al., 2006). Hearing loss is generally believed to negatively affect language development (Roberts et al., 2004); frequent OME in early childhood has been specifically linked to narrative skills at 5 and 7 years of age (Feagans et al., 1987).

Fourth, Samoan public schools are officially English-only. When children speak one language at home and another at school, they may not progress as far in either language as they might if they were monolingual or fully bilingual (Roseberry-McKibbin, 2008). Additionally, public instruction in Samoa is based on oral recitation and rote memorization, and relies on a collective rather than individually based educational model. Children may be unaccustomed to interacting directly with adults, and thus may perceive individualized testing situations as confusing, disorienting, or distressing.

A fifth possibility is that cultural differences may have influenced the results of the language screener. Cultural differences can cause artificially high “non-pass” rates on
language tests, especially when the culture is collective rather than competitive; when this happens, the “problem” is not cognitive but cultural (Colapinto, 2007; Everett, 2005). Test-taking itself “is a cultural phenomenon that by its very nature is biased against children who are raised in families that do not provide many out-of-context test-like situations” (Laing & Kamhi, 2003). Parent-child communication styles differ from one culture to another in ways which might influence the results of language tests. The ways in which adults and children interact verbally are different in Samoa than in the U.S.; Samoan mothers do not respond to infant utterances as intentional or social, for example, and there is little emphasis on early language development (Cheng, Nakasato, & Wallace, 1995; Murphy, personal communication, June 2007). Since Samoan children are expected to accommodate to adults, most Samoan mothers do not simplify their vocabulary or use “motherese.” If a child says something unintelligible, the mother may ignore the utterance or respond by calling attention to the problem (Roseberry-McKibbin, 2008).

Other environmental factors may also have played a role. Some Pacific Islanders have limited access to health care; others may call upon faith healers or folk medicine practitioners when a child is ill (Harrigan, Gollin, & Caskin, 2003; Roseberry-McKibbin, 2008). Islanders are also at increased risk for unsafe levels of mercury consumption because of the amount of seafood in their diets (Hightower et al., 2006). Children prenatally exposed to mercury are at risk for developmental delays, lowered I.Q.s, and impaired hearing (Health & Environment Alliance, 2006; Olusanya, 2007). Tuna, one of the main staples in the Samoan diet, can contain 500% of the FDA’s allowable levels of
mercury; a fifty-pound, seven-year-old child who eats fish twice a day may have a mercury blood level fourteen times higher than the EPA’s recommended “safe” level (Ramin, 2007). In addition, some researchers have noted that Pacific Islanders may be at elevated risk for lead exposure due to water and soil contamination from industry; children in this population may be particularly vulnerable to cognitive impairment and general health problems due to such exposure (Balakrishnan et al., 2003).

Any or all of these variables may have affected the results of this study. This thesis will examine each of them, while discussing directions for future research to improve needs assessment, and therefore service delivery, for Samoan children.

This chapter will present a review of the literature on the effects conductive hearing loss on language acquisition. The effects of bilingualism and language acquisition, along with the role of screenings in bilingual populations, will also be discussed.

Review of Literature

Conductive hearing loss is a result middle ear dysfunction, and can be caused by numerous factors, including blockage in the ear canal from impacted cerumen, a perforated tympanic membrane, congenital deformities such as those commonly found in individuals with Down Syndrome, or infections of the middle ear. While most conductive hearing loss can be corrected with medication or surgery, its negative impact on language is clear in children who are suffering from middle ear maladies (Katz, Burkhard, Medwetsky, 2002). Language and speech development require adequate auditory input. When a child receives auditory information that is inconsistent, partial, or absent during
key developmental periods, the effects on language and speech can be pervasive. Voiceless speech sounds such as \( p, t, k, s, \text{th}, \text{sh}, \) and \( f \) may be difficult for children to hear if there is a 20 to 30dB conductive hearing loss, and even more difficult to hear and discriminate if the hearing loss is compounded by classroom noise levels that may be 40 to 50 dB (Reichman & Healey 1983). Children who experience recurrent conductive hearing disorders may experience delays in auditory comprehension, speech, and language which will impact their academic success (Lyon & And 1986).

Bilingualism is the ability to understand and speak two different languages. There are two types of bilingual language acquisition are simultaneous bilingualism and sequential bilingualism. Simultaneous bilingualism occurs when an individual acquires two languages are acquired at the same time before three years of age. There are three distinct stages in simultaneous bilingualism. During the first stage, although children have two separate lexicons, mixing of words or parts of words between the two languages may occur. In stage two, around the age of four, the child begins to distinguish the two languages and separate use of each language begins to occur. The third stage is characterized by greater flexibility between the two languages with correct syntactic and lexical choices made between the two languages. Simultaneous bilingualism leads to greater language proficiency in both languages at an early age (Roseberry-McKibbin, 2008). Sequential bilingualism, typically occurring after age three, is when another language is learned after the first language has been relatively established. Competence in the first language influences the acquisition of the second language. Difficulties in language acquisition which may be seen in sequential bilingualism include loss of or
regression in the first language as competence advances in the second language, decreased flexibility in both languages, greater syntactic and lexical errors in both languages, and decreased competence in both languages where either language does not fully develop (Roseberry-McKibbin, 2008).

Speech and language screenings are currently used in many academic settings as a method to determine a possible need for further evaluation with the use of standardized and/or dynamic assessments. Typically, a fifteen-minute screening is sufficient to obtain a sample of a child's articulation, language skills, fluency, voice quality, and pragmatic language abilities. Screenings which are administered in a child's dominant language and are culturally relevant are more likely to yield accurate information by indicating a possible delay in speech and/or language abilities only where such a delay actually exists (Roseberry-McKibbin, 2008).
Chapter 2

METHOD

Participants

For the first part of this study, the participants were 206 K to 3 public school children in regular, mainstream classrooms in American Samoa. Participants were chosen based on logistics, availability, and willingness of classroom teachers to allow the students to be screened. The screener was administered to the students at their schools by ten special educators.

For the second portion of the study, the participants were 43 Sacramento Samoan schoolchildren attending mainstream public school classrooms in grades K to 3. Due to the relative scarcity of Samoan participants in the Sacramento area (there are no Sacramento-area elementary schools with especially high concentrations of Samoan students), access to the participants was obtained with the assistance of a Sacramento-based Samoan ministers’ group (located via the National Office of Samoan Affairs). All available K to 3 students who were willing and able to verbally answer questions in English and to have their hearing tested (and whose parents were willing and able to answer questions in English, sign consent forms, and agree to the testing of their children’s speech, language and hearing) were screened after worship services at five Sacramento Samoan churches. Each child had been born to Samoan parents. Although no attempt was made to differentiate or exclude children who had been born in Samoa, two potential participants were excluded due to insufficient receptive and expressive English skills (in both cases made apparent when a parent stepped forward to offer to act as
For the third portion of the this study, the SNS control group was established by selecting a K through 6 public elementary school in which greater than 50% of the students were considered to be of low socioeconomic status. The SNS children in kindergarten through third grade whose primary language was English were sent consent forms for their parents to sign and return. Of the 100 consent forms sent out, 30 children with completed forms were screened for speech, language, and hearing by six to eight graduate and undergraduate students from California State University, Sacramento on March 25 and 26, 2010.

**Materials**

The Samoan version of the screener (see Appendix A) was used with the AS group; the English version of the screener (see Appendix B) was used with the SS and SNS groups. In both versions, questions were divided into four areas or sections: articulation tasks, wherein participants were asked to repeat common one- and two-syllable words (e.g. boat, thumb, mother) while examiners noted any misarticulated phonemes; listening tasks, which required phonological manipulation (“Say ‘cup’; now say ‘cup’ without saying /k/”) and the ability to follow simple two- and three-step commands, as well as some semantic and conceptual knowledge (“Before you touch your ear, raise your hand and then touch your nose”); narrative skills, for which participants were asked to “tell a story” using a given picture; and cognitive-linguistic tasks, which required conceptual understanding of similarities (“How are a car and a boat alike?”), differences (How are a
bird and a dog different?”), functions of common objects (“What do you do with a spoon?”), naming items within categories (“Tell me three things that you wear”), solutions (“What do you do when you are hungry?”) and classification (“Nose, eyes, and feet are all what?”).

For both the AS and SS groups, the picture used for the narrative task was a “Samoanized” version of the “cookie theft” picture from the Boston Diagnostic Aphasia Examination—3rd Edition (Goodglass & Kaplan, 2000). The SNS group was given the regular version of the “cookie theft” picture. A health history and general information questionnaire was given to each participant’s parent for the SS group; parents either completed the form themselves, or gave verbal answers to an examiner who asked the questions and recorded the answers in writing on the form. This form contained questions concerning the family’s general income level (for control-group matching purposes) and primary language, in addition to the child’s age, grade, educational status (regular education, special education, or mainstream program), health history (including hearing, immunizations, accidents, and illnesses), and diet. For both the SS and SNS a consent form was given to, and signed by, each participant’s parent; this consent form included space for the examiner to indicate the manner in which the child’s own verbal consent to participate was given.

Hearing testing equipment included otoscopes, audiometers, and tympanometers. All equipment was examined prior to the screening sessions to ensure that it was in working order and had been recently calibrated.
Procedures

For the Samoan (AS) portion of the study, participants were screened at their schools, in whatever quiet rooms were available at each school. For the Sacramento (SS) portion, participants were screened at their churches, and the same general procedure was followed; facilities varied at each location, and it was often challenging locating reasonably quiet (albeit usually less than ideal) rooms or testing areas, one for audiometric assessment and one for language assessment. Dr. Larry Boles, along with a group of between three and six undergraduate and graduate students (number varied according to expected need and projected number of participants at each location), all from the California State University, Sacramento Department of Speech Pathology and Audiology, served as examiners. After obtaining both parental consent and completed health history questionnaires, examiners screened each child for hearing and then for language, or vice versa. For the SNS control-group portion, participants were screened at one school location in three quiet classrooms. A group of between four to eight undergraduate and graduate students from the CSU, Sacramento Department of Speech Pathology and Audiology served as examiners on two consecutive days.

Speech and language screening consisted of examiners asking the children the questions on the screener and writing down their answers, transcribing any articulation errors. Pass criteria for the speech, language, and cognitive portion of the screener varied by grade level (see Table 1).
Table 1
Samoan screener non-pass criteria

<table>
<thead>
<tr>
<th>Grade</th>
<th>Measure</th>
<th>Non-pass criteria</th>
<th>Non-pass score</th>
</tr>
</thead>
<tbody>
<tr>
<td>Kindergarten</td>
<td>Articulation</td>
<td>Any of the measures</td>
<td>Less than 7 correct</td>
</tr>
<tr>
<td></td>
<td>Cognitive/Linguistic</td>
<td></td>
<td>Less than 3 correct</td>
</tr>
<tr>
<td></td>
<td>Commands</td>
<td></td>
<td>Less than 2 correct</td>
</tr>
<tr>
<td>First grade</td>
<td>Articulation</td>
<td>Any 2 measures</td>
<td>Less than 10 correct</td>
</tr>
<tr>
<td></td>
<td>Cognitive/Linguistic</td>
<td></td>
<td>Less than 9 correct</td>
</tr>
<tr>
<td></td>
<td>Commands</td>
<td></td>
<td>Less than 2 correct</td>
</tr>
<tr>
<td></td>
<td>Listening(phonological</td>
<td></td>
<td>Less than 2 correct</td>
</tr>
<tr>
<td></td>
<td>awareness)</td>
<td></td>
<td></td>
</tr>
<tr>
<td></td>
<td>Narrative</td>
<td></td>
<td>Less than 4 correct</td>
</tr>
<tr>
<td>Second grade</td>
<td>Cognitive/Linguistic</td>
<td>Any 2 measures</td>
<td>Less than 13 correct</td>
</tr>
<tr>
<td></td>
<td>Commands</td>
<td></td>
<td>Less than 2 correct</td>
</tr>
<tr>
<td></td>
<td>Listening(phonological</td>
<td></td>
<td>Less than 5 correct</td>
</tr>
<tr>
<td></td>
<td>awareness)</td>
<td></td>
<td></td>
</tr>
<tr>
<td></td>
<td>Narrative</td>
<td></td>
<td>Less than 4 correct</td>
</tr>
<tr>
<td>Third grade</td>
<td>Cognitive/Linguistic</td>
<td>Any 2 measures</td>
<td>Less than 14 correct</td>
</tr>
<tr>
<td></td>
<td>Commands</td>
<td></td>
<td>Less than 3 correct</td>
</tr>
<tr>
<td></td>
<td>Listening(phonological</td>
<td></td>
<td>Less than 5 correct</td>
</tr>
<tr>
<td></td>
<td>awareness)</td>
<td></td>
<td></td>
</tr>
<tr>
<td></td>
<td>Narrative</td>
<td></td>
<td>Less than 4 correct</td>
</tr>
</tbody>
</table>

The hearing screening consisted of otoscopic examination, tympanometry, and pure tone audiometry (25 dB tones presented to each ear at 500, 1000, 2000, and 4000 Hz). A participant was judged to have failed the hearing screening only if he or she heard fewer than seven tones, or if tympanometry showed that both ears were “non-type-A.” The only exception to this rule was that if a child had two type A tympanograms and
failed audiometric testing bilaterally only at 500 Hz, he or she was judged to have passed the hearing screening.

Whenever a child failed the hearing screening, was found to have impacted cerumen, and/or exhibited potentially significant difficulty with speech or language, a recommendation was made to the parent for a referral to his or her pediatrician and/or appropriate school support personnel, so that the child’s needs could be addressed.

After children had completed both parts of the screening, they were each allowed to choose a new children’s book or a painting activity as a thank-you gift for participating. A Committee for the Protection of Human Subjects procedure was employed throughout the study with all participants.
Chapter 3

RESULTS

As a group, the Sacramento non-Samoan (SNS) participants tended to outperform the American Samoan (AS) and Sacramento Samoan (SS) age-mates on both the hearing and speech/language/cognitive portions of the screener.

Overall hearing pass rates were 51% for the AS group, 81% for the SS group and 90% for the SNS group. The hearing screening was composed of a pure tones section and a tympanometry section. Pure tone audiometry revealed a 74% pass rate for the AS group, an 83% pass rate for the SS group, and a 100% pass rate for the SNS group. Tympanometry pass rates were 67% for the AS group, 95% for the SS group, and 90% for the SNS group. The Mann-Whitney Test showed there was not a significant difference between pass/non-pass in the AS group and the SS group (p=0.11). There was a significant difference between pass/non-pass in the AS group and the SNS group (p=0.001) in tympanometry. There was also a significant difference between the SS group and the SNS group (p=0.006).

The speech/language/cognitive portion of the screener consisted of several sections. Overall pass rates were 48% for the AS group, 67% for the SS group, and 87% for the SNS group. ANOVA revealed a significant difference between overall pass/non-pass rates for the speech/language/cognitive portion for AS, SS and SNS groups and was found to be statistically significant (F = 18.67; df = 2, 274; p<0.05). Multiple comparisons were conducted to compare the AS, SS, and SNS means (number correct)
for individual sections of the speech/language/cognitive screener, and all tests were evaluated using Scheffe post-hoc analysis for statistical significance at the .05 level.

For the Articulation section, the AS group missed significantly fewer items ($M = 13.76, SD = 0.75$) than the SS group ($M = 12.98, SD = 2.45$); $F(2,244), p < .05$. For the Phonological Awareness section, however, the AS group missed significantly more items ($M = 2.17, SD = 1.91$) than the SS group ($M = 3.07, SD = 2.18$) and the SNS group ($M = 5.07, SD = 0.88$); $F(2, 274), p < .05$. For the section on Following Commands, the AS group missed more items ($M = 2.84, SD = 1.28$) than the SS group ($M = 3.60, SD = 0.88$) and the SNS group ($M = 3.60, SD = 0.51$), but the difference was not significant, $F(2, 273)$.

The cognitive/linguistic section of the screener comprises Similarities, Differences, Functions, Categories, Solutions, and Classifications subsections. For the cognitive section overall, the differences between the AS and SS groups were negligible, however, the difference between the AS and SS groups to the SNS group was significant ($F(2, 269) p < 0.05$). The AS group mean was 13.38 ($SD = 3.61$), the SS group mean was 13.71 ($SD = 3.91$) and the SNS group mean was 16.73 ($SD = 1.03$). For the Similarities subsection, the AS group missed significantly more items ($M = 1.34, SD = 1.12$) than the SS group ($M = 1.89, SD = 1.18$) and the SNS group ($M = 2.60, SD = 0.74$), $F(2, 273), p < 0.05$. For the Differences subsection, the AS group missed more items ($M = 1.66, SD = 1.07$) than the SS group ($M = 1.98, SD = 1.22$), the difference was not significant; however, the AS group missed significantly more items than the SNS group ($M = 2.67, SD = 0.62$), $F(2,247), p < 0.05$. For the Functions subsection, the AS group performed
almost identically ($M = 2.90, SD = 0.37$) to the SS group ($M = 2.87, SD = 0.34$) and the SNS group ($M = 3.00, SD = 0.0$), the results were not significant, $F(2, 274)$. For the Categorization subsection, the AS group also performed similarly ($M = 2.45, SD = 0.88$) to the SS group ($M = 2.41, SD = 0.86$) and the SNS group ($M = 2.87, SD = 0.35$) but the difference was not significant, $F(2, 229)$. For the Solutions subsection, the AS group performed similarly ($M = 2.63, SD = 0.80$) to the SS group ($M = 2.65, SD = 0.65$), and the SNS group performed slightly higher than both groups ($M = 2.87, SD = 0.35$) but the difference was not significant, $F(2, 272)$. For the Classification subsection, no significant differences were found between the three groups.

A Narrative section of the screener asked the children to describe a picture. A greater number of words was used and more narrative features were employed by the AS group ($M =3.26, SD = 2.06$) and SNS group ($M = 4.40, SD = 0.91$), than in the SS group ($M = 2.44, SD = 1.62$), $F(2, 263), p < 0.05$ (see Table 2 for comparison of descriptive statistics results).
Table 2

Mean number of correct answers for speech/language/cognitive screeners and subsections.

<table>
<thead>
<tr>
<th>Screener Section</th>
<th>AS</th>
<th>SS</th>
<th>SNS</th>
</tr>
</thead>
<tbody>
<tr>
<td></td>
<td>M</td>
<td>SD</td>
<td>M</td>
</tr>
<tr>
<td>Overall</td>
<td>-</td>
<td>-</td>
<td>-</td>
</tr>
<tr>
<td>Speech/language/cognitive</td>
<td></td>
<td></td>
<td></td>
</tr>
<tr>
<td>Articulation</td>
<td>13.76*</td>
<td>0.75</td>
<td>12.98</td>
</tr>
<tr>
<td>Phonological Awareness</td>
<td>2.17*</td>
<td>1.91</td>
<td>3.07***</td>
</tr>
<tr>
<td>Following Commands</td>
<td>2.84</td>
<td>1.28</td>
<td>3.11</td>
</tr>
<tr>
<td>Overall Cognitive</td>
<td>13.38**</td>
<td>3.61</td>
<td>13.71***</td>
</tr>
<tr>
<td>Similarities</td>
<td>1.34*</td>
<td>1.12</td>
<td>1.89</td>
</tr>
<tr>
<td>Differences</td>
<td>1.66**</td>
<td>1.07</td>
<td>1.98</td>
</tr>
<tr>
<td>Functions</td>
<td>2.90</td>
<td>0.37</td>
<td>2.87</td>
</tr>
<tr>
<td>Categorization</td>
<td>2.45</td>
<td>0.88</td>
<td>2.41</td>
</tr>
<tr>
<td>Solutions</td>
<td>2.63</td>
<td>0.80</td>
<td>2.65</td>
</tr>
<tr>
<td>Classifications</td>
<td>2.87</td>
<td>1.27</td>
<td>3.00</td>
</tr>
<tr>
<td>Narrative</td>
<td>3.26*</td>
<td>2.06</td>
<td>2.44***</td>
</tr>
</tbody>
</table>

*=Significant (p<.05) difference between American Samoan and Sacramento Samoan Groups

**=Significant (p<.05) difference between American Samoan and Sacramento Non-Samoan Groups

***=Significant (p<.05) difference between Sacramento Samoan and Sacramento Non-Samoan Groups
Chapter 4

DISCUSSION

The purpose of this study was to compare the results of a screening of the speech, language, and hearing of American Samoan (AS), Sacramento Samoan (SS), and Sacramento non-Samoan (SNS) children in kindergarten through third grade. The hearing results will be discussed first. The AS group had a substantially lower hearing “pass” rate (51%) than either the SS and SNS groups (81% and 90%, respectively). This result suggests that environmental factors particular to American Samoa, and not shared to the same degree by either the SS or SNS groups, may have contributed to the lower pass rate of the AS group. These factors may have included higher rates of cerumen impaction, greater prevalence of untreated otitis media, and inadequate healthcare, even though all three of these problems were noted to some degree in each of the three groups. The fact that the SS group had a higher hearing pass rate than the AS group suggests that simply being Samoan, while possibly one of several or many risk factors, was insufficient alone to have caused the lower hearing pass rate of the AS group (Davis et al., 2002).

Research has supported the belief that hearing dysfunction, if not addressed in a timely fashion, can negatively impact speech and language development as well as social skills (Pugh et al., 2004). Preventative health screenings which include hearing screenings, are vitally important for children as they enter the public school system. The hearing of public school children in the United States is routinely screened throughout their academic years as mandated by the Individuals with Disabilities Education Act (IDEA, 2004). Although American Samoan children with suspected disabilities receive
hearing screenings in the public school setting (Department of Education, 2008), there is a current lack of pediatric audiological services as well as limited access to healthcare in American Samoa (“Health Situation”, 2005) for adequate follow-up. Children with undetected hearing loss may experience speech and language delays that may go unnoticed and therefore unremediated until they are too far into the educational system for remediation to prove entirely effective (ASHA, 2010).

Another possible factor affecting children's speech, language, and/or hearing in American Samoa may be the consumption of foods with higher concentrations of fat than those consumed by U.S. children (Elstad, Tusiofo, Rosen, & McGarvey, 2008), and/or the consumption of greater amounts of fish and therefore higher level of mercury (Ramin, 2007). Exposure to lead has also been suggested as an environmental factor that may predispose Pacific Islanders to greater incidence of hearing loss, and therefore higher rates of language impairment (Balakrishnan et al., 2003). Cerumen impaction, which was noted in both the AS group and SS group but not the SNS group, could possibly be exacerbated by a high fat diet rather genetic factors alone (“Health Situation”, 2005); however, more research is needed to determine the exact extent of the influence of diet on cerumen impaction.

Another major issue for the researchers conducting the second portion of this study was whether the speech and language screener was biased in overestimating language or speech deficits in the AS participants. The overall pass rate for the speech/language/cognitive portion of the screener for the AS group was 48%, compared to 67% for the SS group and 87% for the SNS group. In the articulation portion of the
screener, the AS group produced fewer sound errors than the SS group and SNS group. The sounds on the Samoan and English versions of the screener in the Articulation section consisted of sounds produced by typically developing children in kindergarten through third grade. The lower performance of the SS group may have been due to the bilingualism of many, if not most, of the SS participants. Despite the fact that the SS participants' parents all stated that English was their child's primary language, if this was not accurate, and if the SS participants were therefore not screened in their primary language but rather in their second language, then comparison results of SS results with results from the SNS and AS groups would not represent a valid comparison of the children's language abilities.

In the cognitive/linguistic section of the screener, specifically the categories of Solutions and Classification, the AS group missed more items than either the SS group or the SNS group, but the difference was not significant. The AS and SS groups performed similarly in the categorization subsection, with the SNS group performing slightly higher, but the difference between the AS and SS groups and the SNS group was not significant. A possible confounding factor influencing the SS results was the internal validity for this group. The internal consistency of how the data were documented for the SS group was also questionable and may have increased errors in measurement. Prior to screening the SS group, the researchers had very little time to collaborate and discuss how the screener should be given, what answers were acceptable, and if any rephrasing or multiple repetitions of individual test items should be given to the participants. Another possible confound was that, possibly due to the Samoan culture's shared values related to
collective, rather than individual, learning and problem-solving, some SS parents and older siblings attempted to “help” the SS participants by providing unsolicited advice and/or answers during language screenings. Since the screenings occurred under less than ideal conditions, many children were in close proximity with one another and may have discussed the questions and answers with other children without the researchers' knowledge. Because the researchers were aware of these possible confounding variables by the time of the SNS screenings, the SNS screenings were held in rooms where the children could either be screened in isolation, with no other children within sight or hearing, or with more than twelve feet distance from all other children so that answers could not be shared.

The narrative portion of the screener tested the child's ability to tell a story after being shown a single picture stimulus and given a verbal prompt. The picture used was the "cookie theft" picture from the *Boston Diagnostic Aphasia Examination-3rd Edition* (BDAE-3; Goodglass, Kaplan, & Barresi, 2000) which had been "Samoanized", for both the AS and SS groups, and the child was instructed to tell what he or she thought was happening in the picture. The picture used for the SNS group was the regular “cookie theft” from the BDAE-3. The SNS group provided more narrative features that included labeling characters, stating a problem and possible solution, and providing more description, which resulted in a higher performance than the AS and SS groups and the result was significant. It was hypothesized that since the Samoan culture is typically an oral narrative one (Roseberry-McKibbin, 2008), the AS group would out-performed both the SS and SNS groups. The SNS group may have performed better than both of the other
groups on the narrative because of the value that U.S. parents place on reading to children as well as engaging children in dialogue. In the U.S., it is typical for children to engage in conversation with adults; however, in the Samoan culture, children's primary communication partners tend to be other children and there is less emphasis on the importance of adults conversing with children (Roseberry-McKibbin, 2008). Anecdotally, this tendency was apparent during one screening session with the SS group. A researcher was gathering data from the mother of one of the participants when the child answered one of the researcher's questions before the mother could respond. The mother reacted by slapping the child across the face, turning back to the researcher with a smile, and apologizing for her child having spoken “out of turn.” She then continued by answering the question the child had previously answered. Another reason for the lower score in the narrative portion for the SS group may have been the degree of the participants' bilingualism, as has been discussed previously. The SS group tended to simply features within the picture, whereas the AS and SNS group narrated a story including elements such as character identification, statement of the problem and possible outcome.

Results of this study suggest a vital need for access to quality healthcare in the AS and SS groups as well as a need for speech and language services in the AS group. There is shortage of medical specialists in American Samoa, and accessibility of medical assistance may be limited given the low income of the average Samoan family (United States Government Department Accountability Office, 2004). American Samoa also currently has a shortage of specialists in the fields of audiology and speech pathology. As
of 2007, there was one ASHA-certified speech-language pathologist practicing in American Samoa. Currently there is one speech-language assistant but no certified speech-language pathologist in the American Samoa school system ("IDEA 2008 Part C", 2010). Assessment tools utilized by SLPs to determine if a child is in need of special education services and are typically in the English language. As American Samoan children enter the Samoan public school system, they are taught in the English language, even though their primary language is Samoan. Administration of normed-based assessments in English is not valid if the assessment used was not normed on the American Samoan population (Saltis, 2006). A screener is a quick pass/fail tool used to determine the need for further assessment (Moore & Montgomery, 2008). There is a need for assessments and informal screenings to be normed in American Samoa so that AS children requiring speech and language services can be accurately identified. Screenings that are sensitive to culturally and linguistically diverse clients may help to identify those in need of further evaluation (Shipley & McAfee, 2004).

Directions for future research include development of a means of assessing the speech and language needs of American Samoans using a normed, culturally sensitive screening instrument. Also, further study is warranted to determine the extent to which the diet of American Samoans affects their speech and language acquisition as well as their hearing status. The needs of American Samoan children must be addressed by ensuring that those children who qualify for speech and language services are able to receive them.
APPENDICES
APPENDIX A

Sample Screener in American Samoa
APPENDIX A

Suega Fa’ata’ita’i a le Tautala ma le Gagana

(Screening of speech and language)

1. Tusi lou igoa ma le aso

<table>
<thead>
<tr>
<th>Name</th>
<th>Level</th>
<th>Date</th>
<th>Teacher</th>
<th>School</th>
</tr>
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</table>

I. Articulation

Ask the child to repeat the following words. If they repeat it correctly, make a checkmark. If they speak a different word, write what they said. For example, if they say “tiva” instead of “siva,” write “t/s.” (if any incorrect, refer)

fale If different, ______  pusi If different, ______  va’a If different, ______
gutu If different, ______  salu If different, ______  valu If different,_____
lima If different, ______  siva If different, ______  vai  If different,_____
naifi If different, ______  timu If different, ______  karoti (kaloti) If different,_____
moa If different, ______  teine If different,_____

II. Listening tasks [K5’s can delete a syllable. If L1’s delete a single phoneme (sound), OK. If L2-3 get any incorrect, refer.]

Simply read the instructions to the child. Do NOT cue him/her. If they repeat the entire word (e.g., “togafiti,”), repeat the instructions (Toe fai mai le upu, ae aua taua fiti) once. If they do not respond correctly after that, go to the next item.

Practice items

a) Fai mai le upu lima, ae aua taua ma [li]  b) Fai mai le upu timu, ae aua taua ti [mu]
Fai mai le upu togafiti, Toe fai mai le upu, ae aua taua

fiti [toga]
Fai mai le upu vaomatua, Toe fai mai le upu, ae aua taua

vaomatu [matua]
Fai mai le upu moana, Toe fai mai le upu, ae aua taua

na [moa]
Fai mai le upu talofa, Toe fai mai le upu, ae aua taua

Following Directions: “Fa’atino mai” or “fai mai” or “fa’aali” [any incorrect—refer]

2 part: Faaali mai lou laulaufaiva ma tago i lou taliga Faaali mai lou isu ma patipati ou lima

3 Part: Tu’u ou lima i luga o lou ulu, fa’aali mai lou laulaufaiva ma, tu’u ou lima i tua.

Tu’u o’u lima i tua, tilotilo i luga ma moeiini ou mata.

III. Narrative

Use the picture and ask the child (in Samoan) to “tell a story using this picture.”

Check any of the following items that apply, regardless of age. Prompt: “Oh, what do you think will happen next?”

Narrative Checklist

□ Tells where story occurs (all) □ Describes a problem or event that motivates a character to act (L2-3)

□ used words denoting place (e.g., “in the kitchen, at home”) (all) □ Tells when story occurs (L3)

□ used words to give reasons (all) □ Names characters (L3)

□ names objects/pictures (all) □ Provides dialogue (L3)
- Sequences events (L3)
- Describes a solution to the problem (L3)
- Provides an ending to the story (L3)

**Atypical characteristics**

- used words denoting recurrence (L3)
- story was disorganized
- word finding problems

**Fluency Checklist**

**Typical characteristics**

- Occasionally repeats part of a word (n-n-n-name)
- Occasionally repeats whole words (my my my name)

**Atypical characteristics (if present, refer)**

- Frequently repeats part of a word (n-n-n-name)
- Frequently repeats whole words (my my my name)
- Has difficulty getting words out; appears to get “stuck” on some words
- Has eye twitches when talking
- Pauses excessively when talking

**Voice Checklist**

**Atypical characteristics (if present, refer)**

- Voice sounds hoarse, rough, or breathy
- Coughs or clears throat often
- Voice sounds different from other children of the same age and sex

- Voice sounds like the child is “talking through his/her nose,” or as though the child has a “stuffy nose”

**Social/Pragmatic Checklist**

- Responds to your questions

**IV. Cognitive-Linguistic Tasks**

*Read the following instructions. Put a line through any part the child does not do correctly*
O le ā le eseesega o le taavale ma le va’a? (L1-3 incorrect, refer)

O le ā le mea e tutusa ai le taavale ma le va’a? (L2-3 incorrect, refer)

O le ā le eseesega a le fa’i ma le talo? (L1-3 incorrect, refer)

O le ā le mea e tutusa ai le fa’i ma le talo? (L2-3 incorrect, refer)

O le ā le eseesega a le TV ma le letio? (L1-3 incorrect, refer)

O le ā le mea e tutusa ai le TV ma le letio? (L2-3 incorrect, refer)

Faaogaina (functions) (K5-L3 incorrect, refer):

O le a le mea e faaoga ai le seleulu?

O le a le mea e faaoga ai le peni?

O le a le mea e faaoga ai le fa’i?

O se tali (giving solution) (L1-3 incorrect, refer):

O le ā le mea e fai pe a ē fia ‘ai?

O le ā le mea e fai pe a ē fia inu?

O le ā le mea e fai pe a ē fia moe?

Vaega (categories) (L2-3 if incorrect, refer):

Ta’u mai ni mea se tolu e ai.

Ta’u mai ni mea se tolu e te tietie ai.

Ta’u mai ni mea se tolu e te ofu ai.

Vaevae i vaega (classification) (L3 incorrect, refer):

O le seleni, tala, ma le tasi sene mo _? [tupe]

O le pisupo, sosisi, alaisa mo ____? [mea’ai]

Mumu, moana, samasama mo ____? [lanu]

O le isu, mata, ma vae mo_? [vaega o le tino]

Refer Pass
<table>
<thead>
<tr>
<th>Tympanometry:</th>
<th>Right ear</th>
<th>Left ear</th>
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</thead>
<tbody>
<tr>
<td>Type A</td>
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<td>Type B</td>
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<tr>
<td>Type C</td>
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<td>Type C</td>
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Type A = (normal middle ear functioning)
Type B = (often indicates fluid in middle ear)
Type C = (negative middle ear air pressure)

**Pure tone screening at 25 dB**  
Re: ANSI, 1969

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<td>Left Ear</td>
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</table>

Passed ____  
Needs to be retested ____

Make an appointment with your doctor ____
APPENDIX B

Sample Screener in English
Appendix B

Suega Fa’ata’ita’i a le Tautala ma le Gagana

(Screening of speech and language)

<table>
<thead>
<tr>
<th>Name</th>
<th>Level</th>
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I. Articulation

Ask the child to repeat the following words. If they repeat it correctly, make a checkmark. If they speak a different word, write what they said. For example, if they say “teal” instead of “seal,” write “t/s.”

boat  If different, _____
gum  If different, _____
pear  If different, _____
seal  If different, _____
top  If different, _____
zebra  If different, _____
diaper  If different, _____
five  If different, _____
keys  If different, _____
thumb  If different, _____
mother  If different, _____
chain  If different, _____
shake  If different, _____
jar  If different, _____

II. Listening tasks

Simply read the instructions to the child. Do NOT cue him/her. If they repeat the entire word (e.g., “tiger,”), repeat the instructions (Say tiger. Now say tiger without /g/) once. If they do not respond correctly after that, go to the next item.

Practice items

a) Say popcorn. Now say popcorn without saying pop. corn  
b) Say meet. Now say meet without saying /t/. me
1. Say cup. Now say cup without saying /k/.
   up
2. Say mat. Now say mat without saying /m/.
   at
   top
4. Say time. Now say time without saying /m/.
   tie
5. Say tiger. Now say tiger without saying /g/.
   tire
   pay

Following Directions (Commands) “Now do what I say, but wait until I finish.”

2-part

1. Touch your nose and then your ear
2. Raise your hand before you touch your nose.

3-part

3. Touch your nose, raise your hand, and then touch your knee.
4. Before your touch your ear, raise your hand and touch your nose.

III. Narrative Use the picture and ask the child to “tell a story using this picture.” Check any of the following items that apply, regardless of age. Prompt:

“Oh, what do you think will happen next?”

Narrative Checklist

- Tells where story occurs (all)
- used words denoting place (e.g., “in the kitchen, at home”) (all)
- used words to give reasons (all)
- names objects/pictures (all)
- Describes a problem or event that motivates a character to act (L2-3)
- Tells when story occurs (L3)
- Names characters (L3)
- Provides dialogue (L3)
- Sequences events (L3)
- Provides an ending to the story (L3)
- Describes a solution to the problem (L3)
- used words denoting recurrence (L3)
□ used words denoting time (e.g., “and then, before, after”) (L3)

Atypical characteristics

□ story was disorganized

□ word finding problems

Fluency Checklist

Typical characteristics

□ Occasionally repeats part of a word (n-n-n-name)

□ Occasionally repeats whole words (my my my name)

Atypical characteristics (if present, refer)

□ Frequently repeats part of a word (n-n-n-name)

□ Frequently repeats whole words (my my my name)

□ Has difficulty getting words out; appears to get “stuck” on some words

□ Has eye twitches when talking

□ Pauses excessively when talking

Voice Checklist

Atypical characteristics (if present, refer)

□ Voice sounds hoarse, rough, or breathy
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□ Voice sounds different from other children of the same age and sex

□ Voice sounds like the child is “talking through his/her nose,” or as though the child has a “stuffy nose”

Social/Pragmatic Checklist

□ Responds to your questions

IV. Cognitive-Linguistic Tasks

Read the following instructions. Put a line through any part the child does not do correctly.

<table>
<thead>
<tr>
<th>(similarities)</th>
<th>(differences)</th>
</tr>
</thead>
<tbody>
<tr>
<td>1. How are a car and a boat alike?</td>
<td>1. Think of a boat and a car, how are they different?</td>
</tr>
<tr>
<td>2. How are a banana and a apple alike?</td>
<td>2. Think of a hat and a shoe, how are they different?</td>
</tr>
<tr>
<td>3. How are a TV and a radio alike?</td>
<td>3. Think of a bird and a dog, how are they different?</td>
</tr>
</tbody>
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<table>
<thead>
<tr>
<th>(functions) (K5-L3 incorrect, refer):</th>
<th>(categories) (L2-3 if incorrect, refer):</th>
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</thead>
<tbody>
<tr>
<td>1. What do you do with a book?</td>
<td>1. Tell me three things that you eat</td>
</tr>
<tr>
<td>2. What do you do with a spoon?</td>
<td>2. Tell me three things that you ride in</td>
</tr>
<tr>
<td>3. What do you do with a crayon?</td>
<td>3. Tell me three things that you wear</td>
</tr>
</tbody>
</table>

<table>
<thead>
<tr>
<th>(giving solution) (L1-3 incorrect, refer):</th>
<th>(classification) (L3 incorrect, refer):</th>
</tr>
</thead>
<tbody>
<tr>
<td>1. What do you do when you are hungry?</td>
<td>1. Pizza, French fries, bananas are all what?</td>
</tr>
<tr>
<td>2. What do you do when you are sleepy?</td>
<td>2. Red, blue, yellow are all what?</td>
</tr>
<tr>
<td>3. What do you do when you break a toy?</td>
<td>3. nose, eyes, feet are all what?</td>
</tr>
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Pass

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Passed _____ Needs to be retested_____ Make an appointment with your doctor_____
REFERENCES


Retrieved November 1, 2008, from

http://www.asha.org/uploadedFiles/research/memberdata/Schools08Caseload.pdf


the challenges they face. In L.-R. L. Cheng (Ed.), *Integrating language and
learning for inclusion: An Asian-Pacific focus* (pp. 63-106). San Diego, CA:
Singular.


Colapinto, J. (2007, 16 April). The Interpreter: Has a remote Amazonian tribe upended
our understanding of language? *The New Yorker*, pp. 118-137.


Performance Report*. Retrieved April 18, 2010, from


