SYNTACTIC ABILITIES
- The use of the TSA Screening Test

with selected sub-populations of hearing-impaired students -

by

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ABSTRACT

In the Spring of 1978, the Screening Test (Form 1 & 2) of the Test of Syntactic Abilities was administered to a large hearing-impaired population for the first time. Performance scores were collected from a British Columbian sample of 233 prelingually hearing-impaired students between the ages of eight and nineteen years, who were enrolled in a public school or a school for the deaf. Examination of these data showed the two forms of the test to be parallel, possess good content validity, and high reliability for all nine syntactic structures and total screen scores. Reliability remained high when results were examined for different hearing loss categories (<59, 60-89, >90 dB). As the severity of hearing loss increased from mild to profound, scores decreased significantly, but there was a marked increase in the discriminating power of the screens. These results indicate that while the test was valid for the severely and profoundly deaf, its use with mildly or moderately hearing-impaired students is questionable. Two way analysis of variance showed that performance differed significantly among age groups for the syntactic structure, conjunction; and among hearing loss groups for determiners, question formation, pronominalization, relativization, complementation and nominalization. Correlations were moderate to strong between the screen variables and the diagnostic test of the Test of Syntactic Abilities. Such consistently high correlations suggested the existence of a common underlying language factor, which while permitting the test to provide an accurate measure of syntactic functioning may prevent it from discriminating strengths and weaknesses in individual structures.
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INTRODUCTION

Much has been written about the way children acquire and develop language. For most of us, mastering our mother tongue was an unconscious and spontaneous feat, and by the time we entered kindergarten we had acquired most of the basic grammatical structures of English. Such painless learning is even more impressive when one considers that: "Grammatical speech does not begin before 1.5 years of age; yet as far as we can tell, acquisition is virtually complete by 3.5 or 4 years" (McNeill, 1966, p.10).

Language mastery is more than the ability to handle a set of rules or learning to read and write. It includes the power to use a system of interrelated relationships derived from cognitive, social and personal experiences (Blackwell, et al., 1978). The high-level language acquisition of the young child derives from a process not unlike that used by adults in research and is neither automatic nor merely a function of maturation. In his search for linguistic competence, the young child formulates hypotheses and tests them against his environment. Language production is preceded by understanding (McCarthy, 1954) and imitation (Fraser, et al., 1963; Nurse & Day, 1971). During development it displays different patterns of word combinations such as pivot and open class words (Braine, 1963; Brown & Bellugi, 1964), where pivot words are akin to the function words of adult speech (e.g. all gone, my, pretty, here) and open words resemble the content (e.g. boy, mommy, baby, milk). Many examples of open-open (baby car) and pivot-open word patterns (all gone milk) can be observed in the language of young children and have been recorded in the research literature (Brown & Fraser, 1963;
Brown & Bellugi, 1963, Ervin, 1964, Miller & Ervin, 1964, Braine, 1963). Brown and Fraser (1963) discuss a language pattern they call telegraphic speech because of its similarity to the technique used by adults when sending telegrams. Herein the young child cuts down his sentence pattern by omitting articles, prepositions and auxiliary verbs, (e.g. hear bus, see car daddy, John make tower). But "telegraphic speech" is more than a poor imitation of adult speech in that it also omits inflections on verbs and nouns (e.g. two boot or there go mommy) and often includes ungrammatical combinations (e.g. a gas here) that an adult would seldom use in composing his telegram. Patterns like "telegraphic speech" are generated from pivot and open class word combinations and indicate a "child grammar" that forms part of the process towards mastering language and further shows that the infant learner does not merely absorb language from his environment but rather uses this environment to gain understanding and formulate patterns which he then tests against those with which he comes into contact. McNeill (1966) sums up language acquisition by regarding it as consisting of two parts: a source of hypotheses and an ability to test hypotheses against adult speech.

Hearing impairment at or close to the time of birth places a major obstacle in the way of language acquisition because it deprives the child of using his environment to acquire language "naturally" through the ear and makes formal intervention necessary if any degree of understanding and proficiency is to be attained. Such impairment is even a greater handicap when testing hypotheses (McNeill, 1966), and the time hearing deprivation occurs is obviously critical when one considers that hearing children have acquired most language structures by the age of four years.

Lenneberg (1965) suggests that the capacity to acquire language may
be transitory, reaching a peak around ages two to four years, and declining thereafter until it may even disappear altogether as a special capacity with the beginning of adolescence. If this, in fact, is true, it should guide our approach to teaching language to the hearing-impaired and be mirrored in the curricula of schools and programs for the deaf.

The whole question of how the deaf child learns language has held the attention of teachers of the deaf throughout the ages. Every effort has been made to improve techniques that will enable the child with impaired hearing from an early age (i.e. prelingually deaf) to develop receptive and expressive language in an efficient and meaningful way. In their efforts educators have placed a great deal of importance on communication methods and for a time it appeared that whether one used speech or signs was becoming more important than the use of language itself. Today, despite improved auditory trainers and a multitude of communication modes such as Auditory Oral, Visual Oral, Total Communication, Rochester Method, Cued Speech and others, teachers of the hearing-impaired continue to expound the difficulties that confront their students in understanding and producing language.

Schmitt (1966) gives a good account of the various approaches to teaching language that have been used with the deaf. He begins with the rather pessimistic view held in ancient times that the deaf were unteachable, and takes us through the early attempts of educators like Ponce de Leon (Spain, 1520-1584), the Abbe de L'Epée (France, 1712-1789), and Samuel Heinicke (Germany, 1729-1790). Despite their differences in communication methods, most of these early teachers favoured a formal approach to language teaching. L'Epée's signing system was developed not only for word concepts but also to cover inflections, articles, tenses and other
grammatical parts of the French language (Schmitt, 1966). Clerc (1851) in his address to the American Instructors of the Deaf outlined Sicard's (France, 1742-1822) "theory of ciphers", a device consisting of five numbered columns: 1. Nominative Case, 2. Verb, 3. Objective case, 4. Preposition, and 5. Object of the Preposition. He then went on to complain about the deaf children's inability to rehearse more than 15 to 20 of the 44 verb inflections and modes each containing affirmative, negative, and interrogative forms, again pointing to the rigid grammatical approaches used at the time (Schmitt, 1966). During the 19th Century there was a marked trend towards a more natural approach to teaching language to the deaf, which coincided with a swing to the oral method of communication. Joseph Watson (England, 1765-1829) encouraged his students to develop their sentences without learning rules of syntax and Schmitt (1966) tells us that Guilio Tarra (Italy, 1832-1889) stated in his writings that the teacher should be acutely aware of grammar, but should not "inflict it on the feeble understanding of the pupils". Other notable advocates of this natural approach were Alexander Graham Bell who used toys and play activities to develop language in a five year old deaf boy (Bell, 1883) and Friedrich Moritz Hill (Germany, 1805-1874) who espoused the "mother method" which attempted to duplicate the way a hearing child learns language. So strong were Hill's convictions about his method that he stated if children are motivated to learn language by seeing its usefulness and provided with appropriate language whenever needed, the deaf child's education should gradually approach that of the hearing child as he progresses through school (Schmitt, 1966).

Unfortunately, Hill's predictions have not come true and teachers of the deaf are still searching for that "breakthrough" which will enable their students to progress on a par with hearing students. Many language
schemes have been tried and guide materials published. For the most part these materials have emphasized structure and order in teaching language to the deaf. The Wing Symbols (1887) labelled language structures by means of letters and numbers, and the Barry Five Slate (1899) attempted to provide deaf children with a fixed visible sentence skeleton into which simple language could be fitted (Schmitt, 1966). In 1920 Croker, Jones and Pratt published their widely-used series of language practice books for children. These books, still in use today, provided stories with new vocabulary and plenty of opportunity for question work and exercises based on new language principles. Perhaps the greatest impact on language teaching in the early part of this century came with the publication of "Straight Language for the Deaf" in which Edith Fitzgerald (1926) described a sentence pattern guide which became known as "The Fitzgerald Key".

Schmitt (1966) describes it as follows:

The Key itself consists of six columns headed by interrogative words and symbols indicating parts of speech and sentence functions: (1) subject (Who;, What:); (2) Verb and predicate words; (3) indirect and direct objects (What:, Whom:); (4) phrases and words telling Where; (5) other phrases and word modifiers of the main verb (For:, From:, How:, How often:, How much:, etc.); (6) words and phrases telling When:. Phrases and dependent clauses may be fitted into appropriate places in the column, and the use of connective symbols allows for compound sentences. Young deaf children begin language development by classifying words according to the more basic headings, such as Who:, What:, and = (verb). The child's first few years in school are spent "building the Key". New language patterns and principles are explained in terms of the Key, and it serves as a reference and a self-correction device for the children to use in live and written language work. In her book, Fitzgerald gives numerous suggestions for building the Key. Although a sequence of language development is indicated, Fitzgerald states that the actual order of introduction of language structures should depend upon the needs of the children. (p. 81)

The larger schools for the deaf (e.g., Central Institute for the Deaf, Clarke School, Lexington, and St. Joseph's) printed their own language outlines and teachers throughout the English speaking world began to follow
the language principles and teach from the vocabulary lists in the hope that these procedures would hold the key to language acquisition. In 1958, Mildred Groht's "Natural Language for Deaf Children" provided a "new look" at language teaching based on Davidson's (1914) view that the teacher's job is "to develop the facilities of her pupils through language itself". This system emphasized the value of meaningful situations over artificial structures and drill exercises and stressed picture discussions, conversations and incidental teaching as the way to make language comprehensible to the deaf child. For years, teachers of the deaf developed their curricula from one or more of the generally recognized language schemes and today many classes still combine parts of Groht's natural approach with the more formal procedures given in the Fitzgerald Key or Croker, Jones and Pratt.

It has been argued that there is nothing new in language instruction for the deaf. Schmitt (1966) suggests that it is more evolutionary than revolutionary in nature. Ideas tend to appear, disappear and then return again in slightly different form. For example, Sicard's ciphers, Barry's five slates, and the Fitzgerald Key have many elements in common as do the philosophies of Hill (1805-1874), Groht (1958) and van Uden (1970).

However, one radical break from traditional approaches of teaching language to deaf children can be linked to the work of Noam Chomsky (1957) and those who follow his concept of transformational generative grammar. This "new grammar" suggests that each language has a basic sentence pattern from which all sentences can be generated by transforming the basic sentence - that is, by re-arranging sentence word order, combining sentences, or deleting words or groups of words according to specific rules (Streng, 1972). Chomsky and his followers challenge the vocabulary based
language schemes by pointing out that the meaning and part of speech assigned to a word is determined by its relationship to other vocabulary in a sentence. Paula Menyuk (1969) expands this view when she says: "In a sentence the Subject is the Noun Phrase of the sentence, Object is the Noun Phrase of the Verb Phrase and the Predicate is the Verb Phrase of the sentence. To understand and generate sentences the child must observe the functional relationships in a sentence, then define types of classifications and then observe selectional constraints on the combinations of these classes," (p. 23).

Chomsky also introduced the concept of two levels of sentence functioning; surface structure or that which is actually spoken and heard, and deep structure which reflects the actual meaning of the sentence. Transformations occur between the two structures, and the surface structure is generally made up of one or more transformations of the deep structure (Blackwell, et al., 1978, Streng, 1972). In order to master a language the child must be able to recognize the deep structure or meaning from what is presented in the surface structure and show understanding of the transformations that relate the two. Power (1971) illustrates the difficulty deaf children have with this process by the example: "the girl pushed the boy". Quigley, et al., (1976) further show that deaf children rely heavily on surface structure and have great difficulty handling transformations of any complexity.

Such findings give substance to statements by Moores (1978) and others that although deaf children do develop language skills, they usually do not acquire proficiency in the Standard English dialect used by a majority of the hearing persons with whom they come into contact.
Quigley's research will be discussed more fully in the ensuing chapters of this work as it provides the motivation, background and instrument for this study. The present thesis will discuss how well prelingually hearing-impaired students in various age and hearing loss categories recognized and comprehended the main syntactic structures of Standard English. It will also examine how effectively the Screening Test of the Test of Syntactic Abilities (Quigley, et al., 1978) demonstrated syntactic strengths and weaknesses in such students.
Teachers of the deaf are quick to explain that their hearing-impaired students have considerable difficulty in learning the English language. We have already seen that educators throughout history have tried to overcome the problem with various teaching strategies, but despite the many methodologies that have been tried, the underlying problem of helping the hearing-impaired to master language competency remains with us. Until recently, most research into the use of language by the hearing-impaired has been conducted by psychologists who were primarily interested in language performance in a non-linguistic form. That is, conventional achievement tests were generally used to measure language levels or test teacher observations, and little attention was paid to areas of unique linguistic development or the various language systems being used by teachers of the deaf. Partly because of the instruments used, and partly because of the difficulties in transcribing the spoken language of deaf children, researchers have concentrated on investigating the linguistic behaviour of deaf children in terms of their skills in reading and writing. Hence, we have an abundance of literature reporting that deaf children fall far behind their hearing counterparts in the language area (Cooper & Rosenstein, 1966), but few studies indicate ways to bridge this gap and even fewer researchers provide reliable instruments for testing the language strengths and weaknesses of the hearing-impaired child.

Among the earliest studies, conducted by Pintner, and Paterson (1916), deaf eighteen year olds performed on an average lower than the average hearing eight year old in the area of reading comprehension. Reamer (1921) tested 2,500 deaf subjects aged eight to over twenty-one
on the Pintner Educational Survey Test which covered the areas of reading vocabulary, grammar, history, geography, and arithmetic, and found that the average deaf student was five years behind his hearing counterpart.

Using the Durrell-Sullivan Reading Test, Pugh (1946) tested 344 deaf students who had been attending school from between seven and thirteen years and reported that the average score for all deaf subjects was below that of sixth grade hearing children. Myklebust (1960) found that the average score of 120 fifteen year old deaf students tested on the Columbia Vocabulary Test was below that of the hearing nine year olds, and that the difference in reading levels between the two groups increased with age. Moores (1967) investigated the use of cloze procedures (filling in words deleted from passages) to differentiate between matched groups of thirty-seven deaf students (average age 16 years 9 months) and thirty-seven hearing students (average 9 years 10 months). The Mean reading level of the deaf group on the Metropolitan Achievement Test was 4.77 compared with 4.84 for the hearing group. However, on the cloze task the performance of the hearing children was superior to that of the deaf on passages set at three different difficulty levels. Further analysis suggested that the lower performance of deaf students resulted both from poorly developed English grammatical skills and from limited vocabulary. The results lead Moores to claim that standardized reading tests tend to give spuriously high estimates of the English skills of deaf students and that the language gap between hearing-impaired and hearing students may be even greater than that reported in the literature.

In research conducted by Di Francesca (1972), 17,000 deaf students across the United States were tested on the appropriate level of the
Stanford Achievement Test. Results indicated the familiar low performance level in the language areas and moreover that deaf students improved on an average of only 0.2 grade levels per year.

With studies consistent in their findings that hearing-impaired children are severely retarded in language achievement on tests designed for hearing children, it is no longer sufficient to simply repeat such research for the sake of documentation. It is time to ask questions about how deaf children develop language, and to further investigate their linguistic problems so that better diagnostic and teaching techniques may be developed which in turn will lead to improved language performance. It was precisely this desire to break through the "language barrier" which had been holding back the deaf for so long, that prompted Quigley and a team of colleagues at the University of Illinois to launch a ten year research program on the syntactic structures of the language of deaf students (Quigley, et al., 1976). This program began in 1968, and although it only investigated syntax, the authors were quick to point out that other areas of language, especially semantics and phonology cannot be ignored when dealing with a native speaker's knowledge of his language. Syntax was chosen by the Illinois team because it is a major language problem with hearing-impaired children and until recently, it has been largely neglected in research (Quigley, et al., 1978). During the ten year period the establishment of grammatical rules, the order of difficulty in acquiring the various syntactic structures and the way deaf children process English sentences were all investigated. Not only did individual studies in this research program identify structures that prove difficult for deaf children (Power, 1971, Quigley and Power, 1972, Power and Quigley, 1973, Quigley, Smith and Wilbur, 1974, Quigley, Montanelli and Wilbur, 1976, Quigley, Wilbur and Montanelli, 1976, Wilbur, Montanelli and Quigley, 1976)
but the order of difficulty was identified and comparisons made with
the way hearing children learn those structures (Quigley, et al., 1976).
The five actual research questions (Quigley, et al., 1977), were as
follows:

1. What is the order of difficulty of various syntactic structures
   for deaf children; is it similar to the order of difficulty for
   hearing children; and is it predictable from theories of trans­
   formational generative grammar?

2. How well established are the syntactic rules of Standard English
   in the language of deaf children at age levels from 10 through
   18 years?

3. Are there developmental stages for these rules in deaf children,
   and, if so, how similar are they to developmental stages for
   hearing children?

4. Do deaf persons acquire the same syntactic rules as hearing
   persons, but at a slower rate, or do they acquire some rules
   that never operate in the grammar of hearing persons?

5. How does deaf children's understanding of various syntactic
   structures compare to the occurrence of those structures in
   reading materials children typically use (p. 73)?

The data collection involved multiple choice questions, picture
sequences, written samples of deaf children's work, moving toys and
figures to represent the required structure and picture identification.
Subjects were forced to use the specific structures being examined by
the techniques mentioned above, and all desired structures were in­
cluded in a test battery which came to be known as the Research Version
of the Test of Syntactic Abilities (TSA).

The original TSA is a battery of 22 tests designed to study deaf
persons' comprehension and production of the specific syntactic structures
judged to be important for the mature use of English. These structures
include; negation, conjunction, determiners, question formation, verb
processes, pronominalization, relativization, complementation and
nominalization. Although the test was relatively simple to administer, the time required for that administration and the complicated scoring procedures rendered the battery inappropriate for general use as a practical test and kept it at the level of a research instrument. However, in that regard it was to provide useful information, and was administered to a large number of deaf students across the United States. Quigley, et al., (1977) describes the population thus:

Subjects for the research were 450 deaf students (25 males and 25 females in each of nine age groups) ranging 10 years, 0 months through 18 years, 11 months of age. They were selected from 10 residential and 6 day programs for deaf students in the United States. Approximately 82% of the sample suffered hearing impairment prior to 12 months of age; 9% between 12 and 23 months; 6% between 24 and 35 months; and data were unavailable for 3%. The mean performance test I.Q. for the group was 104.58 with a standard deviation of 16.53, and the mean hearing threshold level was 94.42 dB (ISO) with a standard deviation of 7.29. This was a stratified random sample of deaf students in the country who were mostly congenitally deaf, free from handicapping conditions other than hearing impairment, and between the ages of 10 and 19 years, thus ensuring generalizability of the results to a large segment of the deaf student population.

Children with normal hearing were also tested to serve as a general comparison group and to aid in the interpretation of test results. This group of 60 children included 10 males and 10 females at 8, 9, and 10 years of age who attended the third, fourth, and fifth grades of a middle-class public school (p. 74).

Table I, adapted from the final report of the Illinois study (Quigley, et al., 1977) provides a summary of the performance of deaf students at different age levels on the various syntactic structures within the research version of the TSA, and compares that performance with that of the hearing children in the study. The results show how well the students handled the series of tasks which were used to elicit specific syntactic structures in a controlled manner and enabled the
# TABLE I

**Summary of Student Performance on Syntactic Structures**

<table>
<thead>
<tr>
<th>Structure</th>
<th>Average across ages</th>
<th>Deaf Students Age 10</th>
<th>Deaf Students Age 18</th>
<th>Increase</th>
<th>Hearing Students Average across ages</th>
</tr>
</thead>
<tbody>
<tr>
<td>Negation</td>
<td></td>
<td></td>
<td></td>
<td></td>
<td></td>
</tr>
<tr>
<td>be</td>
<td>79%</td>
<td>60%</td>
<td>86%</td>
<td>26%</td>
<td>92%</td>
</tr>
<tr>
<td>do</td>
<td>71</td>
<td>53</td>
<td>82</td>
<td>29%</td>
<td>93%</td>
</tr>
<tr>
<td>have</td>
<td>74</td>
<td>57</td>
<td>78</td>
<td>21%</td>
<td>86%</td>
</tr>
<tr>
<td>Modals</td>
<td>78</td>
<td>58</td>
<td>87</td>
<td>29%</td>
<td>90%</td>
</tr>
<tr>
<td>Means</td>
<td>76</td>
<td>57</td>
<td>83</td>
<td>26%</td>
<td>90%</td>
</tr>
<tr>
<td>Conjunction</td>
<td></td>
<td></td>
<td></td>
<td></td>
<td></td>
</tr>
<tr>
<td>Conjunction</td>
<td>72%</td>
<td>56%</td>
<td>86%</td>
<td>30%</td>
<td>92%</td>
</tr>
<tr>
<td>Deletion</td>
<td>74</td>
<td>59</td>
<td>86</td>
<td>27%</td>
<td>94%</td>
</tr>
<tr>
<td>Means</td>
<td>73</td>
<td>57</td>
<td>86</td>
<td>29%</td>
<td>92%</td>
</tr>
<tr>
<td>Question Formation</td>
<td></td>
<td></td>
<td></td>
<td></td>
<td></td>
</tr>
<tr>
<td>wh-Questions:</td>
<td></td>
<td></td>
<td></td>
<td></td>
<td></td>
</tr>
<tr>
<td>Comprehension</td>
<td>66%</td>
<td>44%</td>
<td>80%</td>
<td>36%</td>
<td>98%</td>
</tr>
<tr>
<td>yes/no questions</td>
<td></td>
<td></td>
<td></td>
<td></td>
<td></td>
</tr>
<tr>
<td>Comprehension</td>
<td>74</td>
<td>48</td>
<td>90</td>
<td>42%</td>
<td>99%</td>
</tr>
<tr>
<td>Tag questions</td>
<td>57</td>
<td>46</td>
<td>63</td>
<td>17%</td>
<td>98%</td>
</tr>
<tr>
<td>Means</td>
<td>66</td>
<td>46</td>
<td>78</td>
<td>32%</td>
<td>98%</td>
</tr>
<tr>
<td>Pronominalization</td>
<td></td>
<td></td>
<td></td>
<td></td>
<td></td>
</tr>
<tr>
<td>Personal</td>
<td></td>
<td></td>
<td></td>
<td></td>
<td></td>
</tr>
<tr>
<td>Pronouns</td>
<td>67%</td>
<td>51%</td>
<td>88%</td>
<td>37%</td>
<td>78%</td>
</tr>
<tr>
<td>Backward Pronominalization</td>
<td>70</td>
<td>49</td>
<td>85</td>
<td>36%</td>
<td>94%</td>
</tr>
<tr>
<td>Possessive Adjectives</td>
<td>65</td>
<td>42</td>
<td>82</td>
<td>40%</td>
<td>98%</td>
</tr>
<tr>
<td>Possessive Pronouns</td>
<td>48</td>
<td>34</td>
<td>64</td>
<td>30%</td>
<td>99%</td>
</tr>
<tr>
<td>Reflexivization</td>
<td>50</td>
<td>21</td>
<td>73</td>
<td>52%</td>
<td>80%</td>
</tr>
<tr>
<td>Means</td>
<td>60</td>
<td>39</td>
<td>78</td>
<td>39%</td>
<td>90%</td>
</tr>
<tr>
<td>Verbs</td>
<td></td>
<td></td>
<td></td>
<td></td>
<td></td>
</tr>
<tr>
<td>Verb Auxiliaries</td>
<td>54%</td>
<td>52%</td>
<td>71%</td>
<td>19%</td>
<td>81%</td>
</tr>
<tr>
<td>Tense Sequencing</td>
<td>63</td>
<td>54</td>
<td>72</td>
<td>18%</td>
<td>78%</td>
</tr>
<tr>
<td>Means</td>
<td>58</td>
<td>53</td>
<td>71</td>
<td>18%</td>
<td>79%</td>
</tr>
<tr>
<td>Complementation</td>
<td></td>
<td></td>
<td></td>
<td></td>
<td></td>
</tr>
<tr>
<td>Infinitives and gerunds</td>
<td>55%</td>
<td>50%</td>
<td>63%</td>
<td>13%</td>
<td>88%</td>
</tr>
<tr>
<td>Relativization</td>
<td></td>
<td></td>
<td></td>
<td></td>
<td></td>
</tr>
<tr>
<td>Processing</td>
<td>68%</td>
<td>59%</td>
<td>76%</td>
<td>17%</td>
<td>78%</td>
</tr>
<tr>
<td>Embedding</td>
<td>53</td>
<td>51</td>
<td>59</td>
<td>8%</td>
<td>84%</td>
</tr>
<tr>
<td>Relative Pronoun referents</td>
<td>42</td>
<td>27</td>
<td>56</td>
<td>29%</td>
<td>82%</td>
</tr>
<tr>
<td>Means</td>
<td>54</td>
<td>46</td>
<td>63</td>
<td>18%</td>
<td>82%</td>
</tr>
<tr>
<td>Disjunction and Alternation</td>
<td>36%</td>
<td>22%</td>
<td>59%</td>
<td>37%</td>
<td>84%</td>
</tr>
</tbody>
</table>

Source: Adapted From (Quigley, et al., 1977, p.76)
research team to report the following findings:

(i) differences in the syntactic structures of deaf and hearing students are differences of rate rather than kind.

(ii) most of the syntactic structures were not well established even among the 18 year old deaf students, whereas the hearing students had mastered all but the most difficult structures by 10 years of age.

(iii) there are more similarities to English structure of deaf students' language than differences, though deaf students do have some distinct structures.

(iv) there is a vast difference in the rate of language development between deaf and hearing students.

In order to make the Test of Syntactic Abilities a practical tool of measurement for teachers and clinicians working with deaf children the authors set about revising the test battery. The scoring and interpretation problems associated with the research version of the TSA had to be eliminated. If the revised test was to be truly useful, it had to be easily administered, scored and interpreted by classroom teachers and the item formats chosen for the tests would have to be realistic in their demands of reading and writing from the deaf child. It was decided that the multiple-choice format would best meet these requirements. A detailed content analysis of all items on the research version of the TSA was carried out by a team of linguists and teachers of the deaf. In addition a statistical item analysis was performed and the most discriminating items from the research version of the TSA were selected. Like examples were then constructed until 120 items were available for each of the 20 tests covering the nine major syntactic structures which make up the revised
version of the TSA. All items followed the multiple choice format with four choices per item - one correct and three distractors:—

e.g. □ A. The puppies aren't in the box.
     □ B. Not the puppies are in the box.
     □ C. The puppies are no in the box.
     □ D. The puppies no aren't in the box.

Items on the revised version of the TSA test recognition and comprehension of the nine major syntactic structures of the English language. The structures selected were those judged to be necessary for a mature knowledge and use of the English language and are identical to those mentioned earlier in the discussion on the Research Version of the TSA namely: negation, conjunction, determiners, quesition formation, verb processes, pronominalization, relativization, complementation and nominalization. The vocabulary was very carefully controlled at a first grade reading level with some words at a slightly higher level. The purpose of including both recognition and comprehension items in all tests was to ensure that the student not only recognized a grammatically correct alternative but also understood the meaning of a stimulus sentence. In the recognition item, the student simply had to indicate which alternative he considers to be the correct one:

e.g. □ A. Mary opened an windows.
     □ B. Mary opened the windows.
     □ C. Mary opened a windows.
     □ D. Mary opened a the windows.

In comprehension questions however, the student must understand the meaning of a stimulus sentence or sentences in order to choose the correct alternative from listed. It is argued that due to the rigorous control of
vocabulary and content items the students must comprehend the syntactic structure in order to make a correct response. Three types of comprehension questions are asked. First, the student selects from the four choices the one that best conveys the meaning of one stimulus sentence. Secondly, the student is required to perform the same task for two stimulus sentences, and finally, the student is asked to choose from four alternatives the word or phrase that best fills the blank in a stimulus sentence. Examples from the TSA are as follows:

First Example:

The dog or the cat ate the meat.

☐ A. Either the dog or the cat ate the meat.
☐ B. Neither the dog nor the cat ate the meat.
☐ C. The dog and the cat ate the meat.
☐ D. Both the dog and the cat ate the meat.

Second Example:

The man sat in the chair. He was old.

☐ A. The man did not sit in the chair.
☐ B. The man was young.
☐ C. The man was not young.
☐ D. The man was not old.

Third Example:

The girls are playing and the boys_______toys.

☐ A. make
☐ B. making
☐ C. to make
☐ D. are making

The authors assume that "...a student has acquired a rule system if both his comprehension of syntactic structures and his ability to make
judgements are adequate, if he generalizes to new instances, and if he can detect deviances from correct form" (Quigley, et al., 1978, p. 10).

The revised version of the TSA was pilot tested when nineteen of the tests each containing 120 items were prepared. The twentieth test, Nominalization was not part of the pilot run on the initial standardization procedures but added afterwards. Pilot testing on 150 students enabled the research team to analyze all items and data and select the most appropriate material for the final forms of the tests. In selecting items, care was taken to eliminate those which proved to be too hard or too easy for the study population (difficulty indices between 40-60% were included), and it was determined statistically from the pilot testing that 70 items per test would be required to provide internal reliability coefficients at around the .95 level. Hence the product of all this pilot testing and analysis was 19 tests of 70 multiple choice items assessing recognition and comprehension skills in various linguistic environments.

The revised version of the TSA was then standardized on approximately 450 deaf students meeting the study criteria required for the research version of the test. Normative data are provided in the test manual. (Quigley, et al., 1978). As mentioned previously the Nominalization Test was added after standardization. The authors report evidence of empirical validity with a point biserial correlation (item-total test) greater than .40 for 80% of the items in the battery. High reliability coefficients (KR-20s) are reported for all 19 tests in the standardized battery with fourteen tests showing reliabilities above .95; the lowest reliability (Relative Pronouns and Adverbs) is .93 which "must still be considered adequate for making important decisions concerning individual pupils" (Quigley, et al., 1978, p. 76).
While the revised version of the TSA (later to be called the Diagnostic Battery) provides detailed assessment of English syntax, it is still a lengthy test comprised of twenty subtests (nominalization was added in 1977) each made up of seventy items. Total testing time is over ten hours plus time needed for scoring. The authors recognized the need for an instrument which will provide a relatively quick assessment of a student's general knowledge of syntax and provide a profile of his strengths and weaknesses on individual structures. The TSA Screening Test was constructed to meet that need. This test has two parallel forms (Form 1 and 2) each containing 120 items selected from the Revised form of the TSA. Items were chosen from among the 1400 tasks of the standardized revised form of the TSA (plus the nominalization test) because of their desirability from a linguistic, psychometric, and pedagogic point of view. The method of selecting items was similar to that of determining which items should be included in the final forms of the revised version of the TSA - i.e. those with optimal difficulty levels and highest discrimination indices. The 120 items are taken from the "best" in each test of the revised TSA with one or more from each major item grouping within a test. The addition of the TSA Screening Test to the battery enables teachers and clinicians to obtain relatively quickly and easily a profile showing the performance of an individual on the various syntactic structures regarded as important in mastery of the English language. With the addition of the Screening Test (Forms 1 and 2) to the revised form of the TSA (including the nominalization test), the final test battery was completed, and is today known as the Test of Syntactic Abilities.

The present study is an extension of Quigley's research in that it investigates for the first time student performance on the TSA - Screening
Test. Until now all research and standardization of the TSA material has been restricted to the 19 tests of the revised battery and concerned only profoundly deaf students. Although the authors anticipate that the test will be useful for diagnostic and normative assessment of students with degrees of hearing loss less than profound deafness (Quigley, et al., 1978) little or no research has been carried out in this area. This work investigated the performance of the TSA Screening Test in terms of its validity and reliability, and as a measure of syntactic ability in prelingually hearing-impaired students in different age and hearing loss categories.

The TSA Screening Test was examined for internal consistency, parallel form reliability, and its ability to predict student performance on the syntactic structures measured in the TSA Diagnostic Battery. The use of the test to assess students with varying degrees of hearing loss was examined by measuring its validity and reliability for the study population which comprised prelingually mild to profound hearing-impaired students between the ages of 8 and 19 years inclusive. The general hypotheses that syntactic performance increases with age and decreases with severity of hearing loss were tested by asking research questions concerning the extent to which age over the range of 8-19 years inclusive, and hearing loss ranging from a mild to a profound degree, or the interaction of these variables affect performance on the Screening Test of the TSA.
CHAPTER 3:  THE STUDY

Definition of Terms

Throughout the study various terms will be used as defined below:

Bi-lateral - Hearing loss in both ears.

Conductive Hearing Loss - Result of reduced conduction of sound through the outer and/or middle ear to the inner ear. This type of hearing loss is primarily a medical problem which in the majority of cases, can be cleared by treatment.

Degree of Hearing Loss - Hearing loss will be discussed in terms of average hearing threshold expressed in decibels (dB) and is equal to the arithmetic mean of the pure tone thresholds obtained at 500, 1,000, 2,000 Hz for the better ear using the American National Standards Institute (ANSI) criteria. Hearing loss categories will be grouped as follows:

- Mild-Moderate: less than 59 dB (<59dB)
- Marked-Severe: 60-89 dB
- Profound: greater than 90dB (>90dB)

Hearing-Impairment - The term describes the loss of hearing which may range from a mild through moderate, marked, severe to a profound degree. It incorporates the conditions known as hard of hearing and deafness.

Mixed Hearing Loss - A combined conductive and sensori-neural hearing loss.

Prelingual Hearing-Impairment - A hearing-impairment which exists at the time of birth or before 2 years of age.

Sensori-Neural Hearing Loss - This type of hearing loss is often referred to as nerve deafness. The term implies a hearing-impairment due to abnormality of the sense organ (cochlea), the auditory nerve, or both.
POPULATION

For the purpose of this study the subjects form a British Columbian population which meets the following criteria.

A. Has reached the 8th but not the 20th birthday and was attending a Public School or School for the Deaf in British Columbia on January 1, 1978. Throughout the study the following age groups were used:

- 8-10 years
- 11-13 years
- 14-16 years
- 17+ years

B. Has a bilateral sensori-neural or mixed hearing loss and/or has been fitted with a hearing aid.

C. Has had the hearing loss since birth or prior to two years of age (i.e. prelingually hearing impaired).

D. Is capable of completing a pencil and paper test. *

E. Has been judged by the school personnel as having no disability apart from the hearing loss which would prevent test completion, and in the professional opinion of the teacher has no reason to be excluded from the study.

The study criteria were rigorously applied to all students who were given the Screening and Diagnostic Tests of the TSA as part of a larger study on Selected Characteristics of Hearing-Impaired School-Age Students in British Columbia (Clarke, et al., 1977, Rogers, et al., 1978), being conducted at the University of British Columbia. Many of these

* Whether a student was capable of completing a pencil and paper test was determined by his ability to score above guessing levels on the screening test of the 1973 Stanford-Achievement Test, Special Edition for Hearing-Impaired Students (SAT-HI) administered previously as part of the Demographic Study of Hearing-Impaired Students in British Columbia.
students had to be deleted from the present study either because their hearing-impairment was acquired post lingually (after 2 years of age) or because the age of onset was unknown. In a few other cases subjects were not included because of insufficient or unreliable audiometric data or because they did not complete the test battery. The final study population comprised 233 subjects all of whom were prelingually hearing-impaired and met all the study criteria listed above. Using the demographic data stored on the U.B.C. computer the population description set out in Table II was obtained.

<table>
<thead>
<tr>
<th>Variable</th>
<th>Number of Subjects (Percentages)</th>
</tr>
</thead>
<tbody>
<tr>
<td>Gender</td>
<td>Male 105 (45%)</td>
</tr>
<tr>
<td></td>
<td>Female 128 (55%)</td>
</tr>
<tr>
<td>Communication Method</td>
<td>Total Communication 103 (44%)</td>
</tr>
<tr>
<td></td>
<td>Oral 130 (56%) (Audition, Speech</td>
</tr>
<tr>
<td></td>
<td>(Signs, Fingerspelling Lipreading)</td>
</tr>
<tr>
<td>Use of Personal Hearing Aids</td>
<td>Yes 186 (80%)</td>
</tr>
<tr>
<td></td>
<td>No 47 (20%)</td>
</tr>
<tr>
<td>School Environment</td>
<td>Regular Class in an elementary or secondary school 96 (41%)</td>
</tr>
<tr>
<td></td>
<td>Class for Hearing-Impaired in a regular elementary or secondary school 73 (31%)</td>
</tr>
<tr>
<td></td>
<td>Class for Hearing-Impaired in separate school for the deaf 55 (24%)</td>
</tr>
<tr>
<td></td>
<td>Other special school or class (e.g. class for behaviour disorders, learning assistance) 9 (4%)</td>
</tr>
</tbody>
</table>
The crosstabulation of age and hearing loss for the study population is set out in Table III.

**TABLE III**

Crosstabulation of Age and Hearing Loss for the Study Population

<table>
<thead>
<tr>
<th>Age</th>
<th>Mild-Moderate ≤59 dB</th>
<th>Marked-Severe 60-89 dB</th>
<th>Profound &gt;90 dB</th>
</tr>
</thead>
<tbody>
<tr>
<td>8-10 years</td>
<td>11</td>
<td>16</td>
<td>8</td>
</tr>
<tr>
<td>11-13 years</td>
<td>16</td>
<td>40</td>
<td>43</td>
</tr>
<tr>
<td>14-16 years</td>
<td>15</td>
<td>23</td>
<td>26</td>
</tr>
<tr>
<td>17+</td>
<td>7</td>
<td>10</td>
<td>18</td>
</tr>
</tbody>
</table>
INSTRUMENT

A. The main instrument used in this study is the Screening Test (Forms 1 and 2) of the Test of Syntactic Abilities (TSA) - Experimental Edition, University of Illinois at Urbana-Champaign, 1971.

As discussed in Chapter Two, this test was designed by Quigley and his research team to provide a quick and reliable means of determining a student's knowledge of the following major syntactic structures of Standard English:

- Negation
- Conjunction
- Determiners
- Question Formation
- Verb Processes
- Pronominalization
- Relativization
- Complementation
- Nominalization

Each form of the Screening Test consists of 120 items chosen from among the 1400 items (20 tests x 70 items) of the standardized revised form of the TSA plus the nominalization test (The Diagnostic Battery). Screening Test items were selected because of their desirability from a linguistic, psychometric and pedagogic point of view and only those items with optimal difficulty levels and highest discrimination indices were chosen.

Based on the above criteria Form 1 of the Screening Test was made up of the 120 "best" items in the Diagnostic Battery. Item statistics (Lord and Novick, 1968, Gulliksen, 1950) gathered during the national
standardization of the TSA Revised Battery were used to select items for Form 2 which are psychometrically parallel to those in Form 1; 80% of the item pairs differed in difficulty level by less than .05; 89% of the item pairs differed in point biserial by less .05. Table IV taken from the test manual (Quigley, et al., 1978) illustrates the authors' claim that Forms 1 and 2 of the Screening Test are content parallel with respect to the structure tested and to the sub-category within structure. The table also shows the KR 20 reliability of each total test is .98 and that the items representing each of the nine structures have reliabilities near .85. The authors state that difficulty levels (mean percent correct in the national sample for the TSA Revised Battery) for the 120 item tests are 53% and 54% respectively.

B. In order to examine the content and empirical validity of the TSA Screening Test, the 1976 Experimental Edition of the TSA Diagnostic Battery (TSA Revised Battery plus the Nominalization Test) was used. As the full battery takes about 20 hours to complete, subjects were asked to write only four diagnostic tests which were selected at random using a multiple matrix procedure.

The TSA Diagnostic Battery is made up of twenty diagnostic tests with seventy questions on each. The Test was standardized on 450 prelingually profound deaf students attending day and residential schools for the deaf throughout the United States. The authors report high content and empirical validity and a KR-20 reliability coefficient of .95.

All items of the TSA Screening Test and Diagnostic Battery are made up of multiple choice and right-wrong questions with the vocabulary kept at approximately the grade one level. The questions test student recognition (the ability to recognize though not necessarily comprehend correct
forms when seen), and comprehension (the ability to identify sentences that mean the same). It is assumed that the student knows a structure if he can correctly identify recognition and comprehension items in different syntactic environments.

**TABLE IV**

Linguistic Description, Mean Raw Scores and Reliabilities of Screening Test Forms 1 and 2

<table>
<thead>
<tr>
<th>Structure</th>
<th>Item Numbers in Both Screening Tests</th>
<th>Screening Test Form 1</th>
<th>Screening Test Form 2</th>
</tr>
</thead>
<tbody>
<tr>
<td></td>
<td></td>
<td>Mean Raw Score</td>
<td>Rel.</td>
</tr>
<tr>
<td>Negation</td>
<td>1, 5, 6, 7, 9, 13, 15, 17, 97</td>
<td>6.6</td>
<td>.85</td>
</tr>
<tr>
<td>Conjunction</td>
<td>62, 70, 73, 78, 79, 80, 81, 82, 83, 99, 103</td>
<td>6.8</td>
<td>.84</td>
</tr>
<tr>
<td>Determiners</td>
<td>2, 8, 10, 11, 14, 16, 18, 19, 20, 25, 27, 29, 31, 42</td>
<td>8.3</td>
<td>.85</td>
</tr>
<tr>
<td>Question Formation</td>
<td>3, 22, 28, 30, 40, 47, 90, 91, 92, 93, 94</td>
<td>6.5</td>
<td>.87</td>
</tr>
<tr>
<td>Verb Processes</td>
<td>12, 23, 33, 57, 60, 61, 84, 85, 86, 89</td>
<td>5.2</td>
<td>.86</td>
</tr>
<tr>
<td>Pronominalization</td>
<td>55, 56, 58, 59, 63, 64, 66, 67, 68, 72</td>
<td>5.4</td>
<td>.86</td>
</tr>
<tr>
<td>Relativization</td>
<td>65, 69, 71, 74, 75, 76, 77, 87, 88, 101, 102, 104, 106, 110, 111, 115, 116, 117, 120</td>
<td>8.0</td>
<td>.85</td>
</tr>
<tr>
<td>Complementation</td>
<td>21, 35, 38, 43, 45, 46, 48, 49, 50, 51, 52, 53, 54, 95, 96, 98, 100, 105</td>
<td>8.4</td>
<td>.84</td>
</tr>
<tr>
<td>Nominalization</td>
<td>4, 24, 26, 32, 34, 36, 37, 39, 41, 44, 107, 108, 109, 112, 113, 114, 118, 119</td>
<td>8.4</td>
<td>.84</td>
</tr>
</tbody>
</table>

Total Screening Test (120 items) 63.6 .98 64.9 .98 (53%) (54%)
S.D.=34.2 S.D.=32.4
S.E.= 4.3 S.E.= 4.4

Source: (Quigley et al., 1978, p.14)
For the purposes of this study, the 1971 Experimental Edition of both the TSA Screening Test and the TSA Diagnostic Battery was modified with permission of the authors. Changes were made to the test format in order to avoid unnecessary subject error and to simplify data receipt procedures. It is stressed that these alterations were made to the layout of the tests and do not affect the content of the original material in any way.

All answers were recorded in the test booklets by marking one of the four boxes below each item with an X. The boxes, set horizontally, corresponded to the sentences in the item, and were labelled A.B.C.D. as were the sentences.

  e.g. A. The flower is not yellow.
     B. The flower is no yellow.
     C. The flower not is yellow.
     D. The flower is yellow no.

This procedure differs from the TSA (Revised forms used by Quigley in his standardization and from the published booklets recently released by Dormac Inc. (Quigley, et al., 1978). In the University of Illinois version used for standardizing the TSA (Revised) subjects were asked to mark the right answer on a separate answer sheet, by shading the appropriate box. The published tests also use the "shading" technique but place the boxes vertically beside each sentence on an item.

  e.g.   A. The flower is not yellow.
         B. The flower is no yellow.
         C. The flower not is yellow.
         D. The flower is yellow no.
Other changes involve the layout of instructions. Tests used in this study placed all instructions on separate pages throughout the tests whereas the original tests and the recently published version placed them at the beginning or within the body of the test between items 54 & 55, 77 & 78, and 94 & 95.

PROCEDURE

This study forms part of a larger study on Selected Characteristics of Hearing-Impaired School-Aged Students in British Columbia (Clarke, et al., 1977, Rogers, et al., 1978), being conducted by the University of British Columbia. The research team is currently investigating student attainment and language performance, and it is appropriate that this work be included in its study of syntactic development. Hence the mode of conducting this study is closely related to that of the larger research project.

By way of procedure, the study can be divided into two parts - the TSA Screening Tests and the TSA Diagnostic Tests. Each student was given Forms 1 and 2 of the TSA Screening Test and then four of the 20 TSA Diagnostic Tests which were randomly selected and assigned irrespective of the Screening scores.

Student data that had previously been collected in the demographic study of hearing-impaired students in British Columbia (Clarke, et al., 1977) and stored on the computer at the University of British Columbia were reviewed, and those students who met the present study requirements were identified. This initial group was further checked against the attainment data collected as part 2 of the larger research project and students who failed to score above guessing levels on the screening test
of The 1973 Stanford Achievement Test - Special Edition for Hearing-Impaired Students (SAT-HI) were deleted. (Guessing scores for this test are set from 0-27 on the Primary Screen and 0-22 on the Intermediate Screen). It was assumed that those students who could not reach these minimum levels on the attainment battery would be unable to write the pencil and paper tests required for the present study.

The remaining students, who met the study criteria as previously defined, were grouped according to school districts, and the preliminary subject lists were prepared. The two schools for the deaf in the Province, Jericho Hill School and The Vancouver Oral Centre for Deaf Children, were treated as separate school districts for the purpose of assigning their students to subject lists.

On January 30th 1978, the appropriate list for each district was enclosed with a letter sent to each School District Superintendent and the Principals of the two Schools for the Deaf in British Columbia. The letter (Appendix B), notified the Superintendent or Principal of the study, provided a synopsis of related research on syntactic structures, and asked permission to administer the tests to students in his/her district. It was pointed out that the enclosed list of student names was drawn from data collected during the 1976-77 school year and as such should be regarded as tentative. Districts were invited to add names of new or transfer students and/or to delete those names of students who should not be included in the research. To facilitate test administration, each district was asked to nominate a study co-ordinator, preferably a teacher of the hearing-impaired or a teacher in a related field of special education.
<table>
<thead>
<tr>
<th>School District No.</th>
<th>Name</th>
<th>District Study Co-ordinator (title)</th>
<th>TSA Screens</th>
<th>TSA Diagnostic Tests</th>
</tr>
</thead>
<tbody>
<tr>
<td>1</td>
<td>Fernie</td>
<td>Itinerant Teacher of the H-1</td>
<td>3</td>
<td>3</td>
</tr>
<tr>
<td>2</td>
<td>Cranbrook</td>
<td>Itinerant Teacher of the H-1</td>
<td>4</td>
<td>3</td>
</tr>
<tr>
<td>3</td>
<td>Kimberley</td>
<td>Elementary Supervisor</td>
<td>1</td>
<td>1</td>
</tr>
<tr>
<td>4</td>
<td>Windermere</td>
<td>Itinerant Teacher of the H-1</td>
<td>2</td>
<td>2</td>
</tr>
<tr>
<td>7</td>
<td>Nelson</td>
<td>Itinerant Teacher of the H-1</td>
<td>4</td>
<td>4</td>
</tr>
<tr>
<td>9</td>
<td>Castlegar</td>
<td>Itinerant Teacher of the H-1</td>
<td>2</td>
<td>2</td>
</tr>
<tr>
<td>11</td>
<td>Trail</td>
<td>Itinerant Teacher of the H-1</td>
<td>8</td>
<td>8</td>
</tr>
<tr>
<td>12</td>
<td>Grand Forks</td>
<td>Classroom Teacher</td>
<td>5</td>
<td>5</td>
</tr>
<tr>
<td>15</td>
<td>Penticton</td>
<td>Co-ordinator of Special Educ.</td>
<td>3</td>
<td>3</td>
</tr>
<tr>
<td>17</td>
<td>Princeton</td>
<td>Principal - Elementary</td>
<td>1</td>
<td>0</td>
</tr>
<tr>
<td>18</td>
<td>Golden</td>
<td>Co-ordinator of Special Educ.</td>
<td>1</td>
<td>1</td>
</tr>
<tr>
<td>21</td>
<td>Armstrong</td>
<td>Principal - Elementary</td>
<td>1</td>
<td>1</td>
</tr>
<tr>
<td>22</td>
<td>Vernon</td>
<td>Itinerant Teacher of H-1</td>
<td>7</td>
<td>5</td>
</tr>
<tr>
<td>23</td>
<td>Central Okanagan</td>
<td>Itinerant Teacher of H-1</td>
<td>26</td>
<td>24</td>
</tr>
<tr>
<td>24</td>
<td>Kamloops</td>
<td>Co-ordinator of H-1 Program</td>
<td>22</td>
<td>22</td>
</tr>
<tr>
<td>27</td>
<td>Cariboo-Chilcotin</td>
<td>Itinerant Teacher of H-1</td>
<td>7</td>
<td>7</td>
</tr>
<tr>
<td>28</td>
<td>Quesnel</td>
<td>Speech &amp; Hearing Therapist</td>
<td>7</td>
<td>7</td>
</tr>
<tr>
<td>30</td>
<td>South Cariboo</td>
<td>Learning Assistance Teacher</td>
<td>2</td>
<td>2</td>
</tr>
<tr>
<td>33</td>
<td>Chilliwack</td>
<td>Co-ordinator of Special Educ.</td>
<td>12</td>
<td>12</td>
</tr>
<tr>
<td>34</td>
<td>Abbotsford</td>
<td>Itinerant Teacher of H-1</td>
<td>7</td>
<td>7</td>
</tr>
<tr>
<td>35</td>
<td>Langley</td>
<td>Speech &amp; Hearing Therapist</td>
<td>4</td>
<td>3</td>
</tr>
<tr>
<td>36</td>
<td>Surrey</td>
<td>Teacher of the H-1</td>
<td>17</td>
<td>15</td>
</tr>
<tr>
<td>School District No.</td>
<td>School District</td>
<td>District Study Co-ordinator (title)</td>
<td>TSA Screens</td>
<td>TSA Diagnostic Tests</td>
</tr>
<tr>
<td>---------------------</td>
<td>-----------------</td>
<td>------------------------------------</td>
<td>-------------</td>
<td>----------------------</td>
</tr>
<tr>
<td>38</td>
<td>Richmond</td>
<td>Supervisor of Special Services</td>
<td>7</td>
<td>7</td>
</tr>
<tr>
<td>39</td>
<td>Vancouver</td>
<td>Co-ordinator of Eval. &amp; Research</td>
<td>31</td>
<td>31</td>
</tr>
<tr>
<td>40</td>
<td>New Westminster</td>
<td>Co-ordinator, Special Services</td>
<td>5</td>
<td>5</td>
</tr>
<tr>
<td>41</td>
<td>Burnaby</td>
<td>Teacher of H-I</td>
<td>34</td>
<td>34</td>
</tr>
<tr>
<td>42</td>
<td>Maple Ridge</td>
<td>Itinerant Teacher of H-I</td>
<td>7</td>
<td>7</td>
</tr>
<tr>
<td>43</td>
<td>Coquitlam</td>
<td>Itinerant Teacher of H-I</td>
<td>15</td>
<td>13</td>
</tr>
<tr>
<td>44</td>
<td>North Vancouver</td>
<td>Co-ordinator of Special Educ.</td>
<td>10</td>
<td>9</td>
</tr>
<tr>
<td>45</td>
<td>West Vancouver</td>
<td>Speech &amp; Hearing Therapist</td>
<td>4</td>
<td>4</td>
</tr>
<tr>
<td>46</td>
<td>Sechelt</td>
<td>Teacher of H-I</td>
<td>2</td>
<td>2</td>
</tr>
<tr>
<td>47</td>
<td>Powell River</td>
<td>Teacher of H-I</td>
<td>4</td>
<td>4</td>
</tr>
<tr>
<td>48</td>
<td>Howe Sound</td>
<td>Co-ordinator of Special Services</td>
<td>3</td>
<td>2</td>
</tr>
<tr>
<td>52</td>
<td>Prince Rupert</td>
<td>Itinerant Teacher of the H-I</td>
<td>8</td>
<td>7</td>
</tr>
<tr>
<td>54</td>
<td>Smithers</td>
<td>Speech &amp; Hearing Therapist</td>
<td>3</td>
<td>3</td>
</tr>
<tr>
<td>56</td>
<td>Nechako</td>
<td>Speech &amp; Hearing Therapist</td>
<td>5</td>
<td>5</td>
</tr>
<tr>
<td>57</td>
<td>Prince George</td>
<td>Admin. Asst. It. Teacher H-I</td>
<td>37</td>
<td>37</td>
</tr>
<tr>
<td>59</td>
<td>Peace River South</td>
<td>Teacher of the H-I</td>
<td>5</td>
<td>5</td>
</tr>
<tr>
<td>60</td>
<td>Peace River North</td>
<td>Co-ordinator, Special Educ.</td>
<td>4</td>
<td>4</td>
</tr>
<tr>
<td>61</td>
<td>Greater Victoria</td>
<td>Itinerant Teacher of the H-I</td>
<td>27</td>
<td>24</td>
</tr>
<tr>
<td>62</td>
<td>Sooke</td>
<td>Itinerant Teacher of the H-I</td>
<td>38</td>
<td>8</td>
</tr>
<tr>
<td>63</td>
<td>Saanich</td>
<td>Assistant to District Supt.</td>
<td>1</td>
<td>0</td>
</tr>
<tr>
<td>65</td>
<td>Cowichan</td>
<td>Itinerant Teacher of the H-I</td>
<td>4</td>
<td>4</td>
</tr>
<tr>
<td>66</td>
<td>Lake Cowichan</td>
<td>Teacher of the H-I</td>
<td>1</td>
<td>1</td>
</tr>
<tr>
<td>68</td>
<td>Nanaimo</td>
<td>Itinerant Teacher of the H-I</td>
<td>12</td>
<td>12</td>
</tr>
</tbody>
</table>
Table V lists the number of students in the province who actually attempted the TSA Screening Test and/or Diagnostic Battery as part of the larger U.B.C. study. Obviously all of these results could not be included in the data analysis because of missing information (e.g. lack of demographic data) or inability to complete the pencil and paper tests. All school districts in British Columbia agreed to participate in the study and those not listed on the above table confirmed that they had no hearing-impaired students who met the study criteria.

Once permission to test was received from District Superintendents and Principals of the Schools for the Deaf, and the study population finally
identified, preparation was begun on assembling Test Package One to be sent to the study co-ordinators for the administration of TSA Screening Test Forms 1 and 2.

Steps taken in the development of this package were:

A) The TSA Screening Tests, Form 1 and Form 2 were revised and printed so that all questions could be answered in the test booklet and all examples given on separate pages (p. 28, Instrument Section of this report). Test covers were colour coded with Form 1 receiving a gold cover and Form 2, a blue one.

B) Test order was randomly assigned to subjects and counterbalanced so that Form 1 was administered first equally as often as Form 2.

Method: (i) Subjects were assigned ID numbers.

(ii) Subjects were listed in School Districts and treated in groups of 4.

(iii) Subject one was randomly assigned either Order 1 (Form 1 followed by Form 2) or Order 2 (Form 2 followed by Form 1).

(iv) Subject two was randomly assigned either order.

(v) If subjects one and two were assigned different orders, subject three would be assigned order randomly, but if subjects one and two had the same order, subjects three and four would be counterbalanced with the opposite order.

(vi) Subject four would receive whatever order was necessary to ensure that Order 1 and Order 2 were administered an equal number of times.

C) Instructions for Administering the TSA Screening Tests were printed.
The steps were clearly set out and stressed the importance of test order. (Appendix B)

D) A covering letter was drafted to district study co-ordinators. (Appendix B) This letter outlined the study design, its place in current research on syntactic structures, and its importance to the field of education of the hearing-impaired. Testing dates were suggested with an eight day break between the first and second tests taken, and a list of all materials included in Test Package One was itemized. Final procedures for collecting and returning the Screening Tests in the stamped self-addressed envelopes provided were set out.

On February 20th 1978, Test Package One was mailed to all district study co-ordinators. Instructions and information sheets were colour coded for easy reference (see Table VI)

| TABLE VI |
| Test Package One |

<table>
<thead>
<tr>
<th>Item</th>
<th>Colour Code</th>
</tr>
</thead>
<tbody>
<tr>
<td>TSA Screening Tests</td>
<td></td>
</tr>
<tr>
<td>Form 1</td>
<td>Gold</td>
</tr>
<tr>
<td>Form 2</td>
<td>Blue</td>
</tr>
<tr>
<td>Material Check List</td>
<td>Green</td>
</tr>
<tr>
<td>List of Students with Test Order assigned</td>
<td>White</td>
</tr>
<tr>
<td>A stamped self-addressed envelope</td>
<td></td>
</tr>
</tbody>
</table>

On March 7 and March 16, 1978, the TSA Screening Tests were administered by School personnel under the direction of their district
study co-ordinators. Due to local circumstances the exact dates of testing varied in some districts, but the eight day separation of testing dates was maintained. The conditions of research in one large school district required that the research team of the larger study supervise the testing, and this was done on the dates set out above.

It was requested that all completed tests, student lists, and materials checklists be returned in the envelopes provided by March 20th. From that date the following data receipt procedures were employed for the screening tests:

A) As tests were received, they were recorded on a master list.
B) Returned Screens were prepared for processing.
   i) Check name, page, enter identification number previously assigned in the earlier study (all ID numbers to have 5 digits - e.g. 00001 - 09080)
   ii) Next to ID number (in the 6th and 7th spaces) mark the number of the test (e.g. 01 or 02) on the coding sheets.
   iii) Next to test number, mark (in 8th space) test order. (e.g. 1 or 2)
   iv) Check that test had been completed. Discard those that were incomplete.
   v) Record ID information on test booklets.
   vi) Remove ID page and file.
   vii) Remove example pages and discard.
D) File raw data by ID number in ascending order.
E) Check scoring, marking or coding for errors and correct if necessary.

\[
\text{Error Count} = \frac{\text{Coding Errors}}{\text{Total Codes}} \times \frac{100}{1} \text{ must be less than } 1\% 
\]
During March the following procedures were begun to assemble Test Package Two which concerned the administration of the four tests from the TSA Diagnostic Battery.

A) All TSA Diagnostic Tests were revised and reprinted so that the format would be identical to that of the screens, (i.e. the questions answered in the booklet and examples on separate pages).

**TABLE VII**

*Diagnostic Test - Colour Codes*

<table>
<thead>
<tr>
<th>Test No.</th>
<th>Structure</th>
<th>Colour Code</th>
</tr>
</thead>
<tbody>
<tr>
<td>1</td>
<td>Negation</td>
<td>Light Blue</td>
</tr>
<tr>
<td>2</td>
<td>Conjunction</td>
<td>Orange</td>
</tr>
<tr>
<td>3</td>
<td>Question Formation I</td>
<td>Yellow</td>
</tr>
<tr>
<td>4</td>
<td>Question Formation II</td>
<td>Yellow</td>
</tr>
<tr>
<td>5</td>
<td>Question Formation III</td>
<td>Yellow</td>
</tr>
<tr>
<td>6</td>
<td>Determiners</td>
<td>Buckskin</td>
</tr>
<tr>
<td>7</td>
<td>Pronominalization I</td>
<td>Beige</td>
</tr>
<tr>
<td>8</td>
<td>Pronominalization II</td>
<td>Beige</td>
</tr>
<tr>
<td>9</td>
<td>Pronominalization III</td>
<td>Beige</td>
</tr>
<tr>
<td>10</td>
<td>Pronominalization IV</td>
<td>Beige</td>
</tr>
<tr>
<td>11</td>
<td>Verb Processes I</td>
<td>Green</td>
</tr>
<tr>
<td>12</td>
<td>Verb Processes II</td>
<td>Green</td>
</tr>
<tr>
<td>13</td>
<td>Verb Processes III</td>
<td>Green</td>
</tr>
<tr>
<td>14</td>
<td>Complementation</td>
<td>Tan</td>
</tr>
<tr>
<td>15</td>
<td>Complementation</td>
<td>Tan</td>
</tr>
<tr>
<td>16</td>
<td>Relativization I</td>
<td>Pink</td>
</tr>
</tbody>
</table>
B) Test order was randomly assigned to each student using a multiple matrix procedure. The projected result of the sampling was to have each subject take four of the twenty diagnostic tests of the TSA with each test sampling a different structure and all possible orders sampled.

Method: (i) Tests were ordered according to structures.

- Negation 1
- Conjunction 2,19
- Determiners 6
- Question Formation 3,4,5
- Verb Processes 11,12,13
- Pronominalization 7,8,9,10
- Relativization 16,17,18
- Complementation 14,15
- Nominalization 20

(ii) Each of the 20 diagnostic tests were randomly assigned to one of the five sets so that every set comprised 4 diagnostic tests each measuring a different syntactic structure.

(iii) All possible order variation for each set were listed.
Table VIII illustrates the resulting matrix.

**TABLE VIII**

Multiple Sampling Matrix

<table>
<thead>
<tr>
<th>Set</th>
<th>I</th>
<th>II</th>
<th>III</th>
<th>IV</th>
<th>V</th>
</tr>
</thead>
<tbody>
<tr>
<td>Order</td>
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<td>2</td>
<td>3</td>
<td>4</td>
<td>19</td>
</tr>
<tr>
<td>12</td>
<td>14</td>
<td>15</td>
<td>11</td>
<td>13</td>
<td></td>
</tr>
<tr>
<td>18</td>
<td>17</td>
<td>16</td>
<td>6</td>
<td>20</td>
<td></td>
</tr>
<tr>
<td>Order</td>
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<td>2</td>
<td>16</td>
<td>6</td>
<td>19</td>
</tr>
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<td>12</td>
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<td>11</td>
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<tr>
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<td>8</td>
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<td>5</td>
<td></td>
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<tr>
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<td>2</td>
<td>3</td>
<td>4</td>
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<tr>
<td>Order</td>
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<tr>
<td>12</td>
<td>14</td>
<td>9</td>
<td>11</td>
<td>13</td>
<td></td>
</tr>
</tbody>
</table>

(iv) Given set and order allocation, subjects were randomly assigned first to set and then to order within that set as follows:

a) All subjects were listed by ID numbers in ascending order.
b) Taking 20 subjects at a time and using a table of random numbers, each subject was assigned to one of the five sets. (The first five of the twenty subjects were assigned to the 5 sets, then the next 5 until all subjects had been assigned a set).
c) Again using a set of random numbers, each student (in blocks of 20) was assigned one of the four order variations for each set.

d) Set and Order were marked on master matrix as a check that all variations were utilized.

e) The tests to be administered to each student were identified (i) by set and (ii) by order.

f) The appropriate order was listed on the student lists and each test with the student's name on the top right hand corner was marked.

C) Instructions for Administering the Diagnostic Tests were printed. Again the importance of administering the appropriate tests in the assigned sequence was stressed.

D) Student lists were prepared for each district and all relevant information was recorded on them including test order.

On April 10, 1978, Test Package Two was mailed to all district study co-ordinators. The instructions and information sheets were colour coded for easy reference.

**TABLE IX**

<table>
<thead>
<tr>
<th>Test Package Two</th>
</tr>
</thead>
<tbody>
<tr>
<td><strong>Item</strong></td>
</tr>
<tr>
<td>TSA Diagnostic Tests 1-20</td>
</tr>
<tr>
<td>Instructions for Administering Diagnostic Tests</td>
</tr>
<tr>
<td>List of Students with Test Order</td>
</tr>
<tr>
<td>Stamped self addressed envelopes</td>
</tr>
</tbody>
</table>


On April 25, 28 and May 2 and 5, 1978, the TSA Diagnostic Tests were administered by school personnel.

As with the screen, local circumstances prevented all tests from being administered on the same day throughout the Province. However, in all testing venues, four dates were assigned with at least two days between each test administration. Again the research team of the larger study was required to administer the diagnostic tests in one large school district.

Data receipt procedures similar to those used for the screening tests were employed during the month of June. All coding, scoring and key punching were checked and an error count of less than 1% was recorded for both the Screening and the Diagnostic Tests.

All data from Part A (Screening Tests) and Part B (Diagnostic Tests) were stored on computer file at the University of British Columbia.

Letters of thanks and appreciation were forwarded to the District Superintendents, Principals of Schools for the Deaf, and the Study Coordinators for each district.
CHAPTER 4: RESULTS & DISCUSSION

Analysis of Data: The data were collected and analyzed using the statistical procedures set out in Table X.

**TABLE X**

Summary of Data Analysis

<table>
<thead>
<tr>
<th>Description</th>
<th>Procedure</th>
<th>Output</th>
</tr>
</thead>
<tbody>
<tr>
<td><strong>Test Validity:</strong></td>
<td>Content Analysis</td>
<td>Content Validity</td>
</tr>
<tr>
<td>An investigation of the content and sampling</td>
<td>Logical</td>
<td></td>
</tr>
<tr>
<td>validity of TSA Screens 1 and 2.</td>
<td></td>
<td></td>
</tr>
<tr>
<td><strong>Test Reliability:</strong></td>
<td>Item Analysis-Laboratory of Educational</td>
<td>Item Behaviour</td>
</tr>
<tr>
<td>An investigation of student scores on the nine</td>
<td>Research Test Analysis Package (LERTAP)</td>
<td>Internal Consistency</td>
</tr>
<tr>
<td>structures of the TSA Screening Test (Forms 1</td>
<td>maintained by Educational Research Services</td>
<td>Subject scores for</td>
</tr>
<tr>
<td>and 2), and of the test's performance for the</td>
<td>Centre (ERSC).</td>
<td>each of the nine</td>
</tr>
<tr>
<td>study population.</td>
<td></td>
<td>structures in the TSA</td>
</tr>
<tr>
<td>An investigation of the correlations of Forms 1</td>
<td>Correlational Analysis Statistical Package for</td>
<td>Correlate Forms 1</td>
</tr>
<tr>
<td>and 2 of the TSA Screening Test.</td>
<td>the Social Sciences (SPSS) Version 7.01 (under MTS).</td>
<td>and 2 TSA Screening Test</td>
</tr>
</tbody>
</table>

Note: As high parallel form reliability was demonstrated between Forms 1 and 2 of the TSA Screening Test, further analysis was computed using Form 2 data only, of the TSA Screening Test.
<table>
<thead>
<tr>
<th>Description</th>
<th>Procedure</th>
<th>Output</th>
</tr>
</thead>
<tbody>
<tr>
<td><strong>Effects of Age and Hearing Loss</strong></td>
<td>Analysis of Variance</td>
<td>Performance</td>
</tr>
<tr>
<td>An investigation of whether significant differences occur in the performance of subjects in different age and hearing loss categories.</td>
<td>Experimental Design Approach. MULTIVAR</td>
<td>Statistics by age, and hearing loss and age x hearing loss.</td>
</tr>
<tr>
<td><strong>Test Validity</strong></td>
<td>Correlational Analysis</td>
<td>Empirical Validity of Form 2 of the TSA Screening Test.</td>
</tr>
<tr>
<td>An investigation of how well performance on the 20 TSA Diagnostic Tests can be predicted by subject performance on each of the 9 structures of the TSA Screening Test.</td>
<td>Statistical Package for the Social Sciences (SPSS) Version 7.01 (under MTS)</td>
<td></td>
</tr>
</tbody>
</table>

**CONTENT ANALYSIS**

A test's validity is its ability to measure what it is supposed to measure. The authors of the TSA designed their screening test to provide a relatively quick assessment of a student's general knowledge of syntax and a profile of his strengths and weaknesses on individual structures (Quigley, et al., 1978). When examining the content validity of this test three general questions were investigated:-

(a) Does the TSA Screening Test measure the intended content area?
(b) How well does the above test sample the content it was designed to measure?
(c) Is the test valid for hearing-impaired students in different age and hearing loss categories?
The Test of Syntactic Abilities was designed to measure recognition and comprehension of the major syntactic structures of Standard English. These structures were chosen from the domain of English syntax as described by transformational generative grammar. The syntactic deviancies incorporated into the distractor items of the test are taken directly from the extensive study of deaf children's responses to the research version of the TSA and the written language samples which had been obtained concurrently. Hence the standardized TSA (Diagnostic Tests and Screening Tests) represent a culmination of ten years of research on linguistic structures considered most important for deaf children to learn and the kind of errors they make in attempting to use these structures (Quigley, et al., 1978).

Because deaf children experience considerable difficulty with reading and many do not reach above a grade five level by the end of their school life (Cooper & Rosenstein, 1966), elementary reading levels have been maintained throughout the TSA and the vocabulary has been set at just above a Grade One standard. Items have been carefully screened to avoid biases of a sexist or cultural nature; and in order to make the test acceptable to as many children as possible a further screening took place to remove words, phrases or expressions that may not be familiar to children whose dialects vary from those usually encountered in the United States.

However, despite all such screening the TSA contains three syntactic environments which are colloquial in nature and as such are questionable if not unacceptable in written English. These environments are:-

1) The "got passive" e.g. Tom got kicked by a horse;
ii) Who used as an object e.g. John helped the girl who Jim hit;

iii) Preposition fronted relatives e.g. I met the boy who you wrote a letter to.

Yet, overall, the TSA does measure the domain of English syntax. Its 20 diagnostic tests cover nine of the major syntactic structures of English: negation, conjunction (including disjunction and alternation), determiners, question formation, verb processes, pronominalization, relativization, complementation, and nominalization. While we may agree that this list does not cover all English syntactic structures, it does include most of the structures that frequently occur in standard English, and are important for its comprehension and production.

If we recognize the Diagnostic Battery of the TSA as a valid test of the major syntactic structures of standard English, we might expect good content validity in the screening test; for all items in Forms 1 and 2 were taken directly from the TSA diagnostic tests. As previously mentioned, these items were judged the best in each category from a linguistic, psychometric, and pedagogic point of view.

Table XI illustrates that items from all 20 diagnostic tests were sampled to compile the screening test and Table IV in the previous chapter (page 27), identifies each item in the TSA Screening Test by syntactic structure.


TABLE XI
Frequency of Diagnostic Test Items Sampled in Screening Test

<table>
<thead>
<tr>
<th>Syntactic Structure</th>
<th>Diagnostic Test</th>
<th>Screening Tests 1 or 2</th>
</tr>
</thead>
<tbody>
<tr>
<td>Negation</td>
<td>Negation</td>
<td>9</td>
</tr>
<tr>
<td>Conjunction</td>
<td>Conjunction</td>
<td>7</td>
</tr>
<tr>
<td></td>
<td>Disjunction, Alternation</td>
<td>4</td>
</tr>
<tr>
<td>Determiners</td>
<td>Determiners</td>
<td>14</td>
</tr>
<tr>
<td>Question Formation</td>
<td>Answer Environments</td>
<td>5</td>
</tr>
<tr>
<td></td>
<td>Wh-words</td>
<td>3</td>
</tr>
<tr>
<td></td>
<td>Yes/No Questions</td>
<td>3</td>
</tr>
<tr>
<td>Verb Processes</td>
<td>Verb Sequences</td>
<td>3</td>
</tr>
<tr>
<td></td>
<td>Main Verbs, Linking Verbs &amp; Auxiliaries</td>
<td>3</td>
</tr>
<tr>
<td></td>
<td>Passives</td>
<td>4</td>
</tr>
<tr>
<td>Pronominalization</td>
<td>Forward &amp; Backward</td>
<td>3</td>
</tr>
<tr>
<td></td>
<td>Possessive Adjectives &amp; Adverbs</td>
<td>2</td>
</tr>
<tr>
<td></td>
<td>Reflexives</td>
<td>3</td>
</tr>
<tr>
<td></td>
<td>Possessive Pronouns</td>
<td>2</td>
</tr>
<tr>
<td>Relativization</td>
<td>Comprehension</td>
<td>6</td>
</tr>
<tr>
<td></td>
<td>Relative Pronouns</td>
<td>7</td>
</tr>
<tr>
<td></td>
<td>Embedding</td>
<td>6</td>
</tr>
<tr>
<td>Complementation</td>
<td>Infinitives &amp; Gerunds</td>
<td>8</td>
</tr>
<tr>
<td></td>
<td>That Complements</td>
<td>10</td>
</tr>
<tr>
<td>Nominalization</td>
<td>Nominalization</td>
<td>18</td>
</tr>
</tbody>
</table>

It should be noted that from a logical point of view, Forms 1 & 2 of the Screening Test are parallel in that they both possess the same number of items from each diagnostic test (although there is a slight difference in the syntactic environment of the structures) and item identification by syntactic structure is identical for both forms. In other words Table IV and XI refer to data for Forms 1 or 2 of the Screening Test.

In order to examine how well the test samples the content area it is measuring, each syntactic structure of the TSA and the environments in which it was presented was investigated. A breakdown of the syntactic
environments of both the diagnostic and the screening tests is provided in Tables XII - XX.

**TABLE XII**

**Syntactic Environment, Task and Number of Items in the Diagnostic Tests & Screening Tests for Negation**

<table>
<thead>
<tr>
<th>Syntactic Environment</th>
<th>Number of Items</th>
<th>Task</th>
<th>Diagnostic</th>
<th>Screens</th>
<th>Examples</th>
</tr>
</thead>
<tbody>
<tr>
<td>&quot;Be&quot; verbs</td>
<td></td>
<td>R</td>
<td>11</td>
<td>uncontracted</td>
<td>1</td>
</tr>
<tr>
<td></td>
<td></td>
<td></td>
<td></td>
<td>contracted</td>
<td>3</td>
</tr>
<tr>
<td></td>
<td></td>
<td>C</td>
<td>21</td>
<td>uncontracted</td>
<td>1</td>
</tr>
<tr>
<td>&quot;Do&quot; support</td>
<td></td>
<td>R</td>
<td>6</td>
<td>uncontracted</td>
<td>1</td>
</tr>
<tr>
<td></td>
<td></td>
<td></td>
<td></td>
<td>contracted</td>
<td>1</td>
</tr>
<tr>
<td></td>
<td></td>
<td>C</td>
<td>3</td>
<td>uncontracted</td>
<td>-</td>
</tr>
<tr>
<td>&quot;Have&quot; verbs</td>
<td></td>
<td>R</td>
<td>3</td>
<td>uncontracted</td>
<td>-</td>
</tr>
<tr>
<td></td>
<td></td>
<td></td>
<td></td>
<td>contracted</td>
<td>1</td>
</tr>
<tr>
<td>Modals</td>
<td></td>
<td>R</td>
<td>6</td>
<td>uncontracted</td>
<td>-</td>
</tr>
<tr>
<td></td>
<td></td>
<td></td>
<td></td>
<td>contracted</td>
<td>2</td>
</tr>
<tr>
<td>Total</td>
<td></td>
<td></td>
<td>70</td>
<td></td>
<td>9</td>
</tr>
</tbody>
</table>

**Examples**

- R = Recognition
- C = Comprehension

Note: Throughout the Negation Test, all examples of "Have verbs" are actually using "have" as an auxiliary in the perfect tense. e.g. We have seen the boys. No examples are provided where "have" is used as the main verb - e.g. I have a coat.
### Table XIII

**Syntactic Environment, Task and Number of Items in the Diagnostic Tests & Screening Tests for Conjunction**

<table>
<thead>
<tr>
<th>Syntactic Environment</th>
<th>Task</th>
<th>Diagnostic Test</th>
<th>Screens</th>
<th>Example</th>
</tr>
</thead>
<tbody>
<tr>
<td>Conjunction</td>
<td></td>
<td></td>
<td></td>
<td></td>
</tr>
<tr>
<td>conjoined sentences</td>
<td>R</td>
<td>28</td>
<td>3</td>
<td>3</td>
</tr>
<tr>
<td>conjoined subjects</td>
<td>R</td>
<td>10</td>
<td>1</td>
<td>1</td>
</tr>
<tr>
<td>conjoined objects</td>
<td>R</td>
<td>7</td>
<td>1</td>
<td>1</td>
</tr>
<tr>
<td>conjoined verbs</td>
<td>R</td>
<td>10</td>
<td>1</td>
<td>1</td>
</tr>
<tr>
<td>conjoined verb phrases</td>
<td>C</td>
<td>15</td>
<td>1</td>
<td>1</td>
</tr>
<tr>
<td>Total</td>
<td></td>
<td></td>
<td></td>
<td>140</td>
</tr>
</tbody>
</table>

**Disjunction & Alternation**

(i) **Disjunction**
<table>
<thead>
<tr>
<th>Syntactic Environment</th>
<th>Task</th>
<th>Diagnostic Test</th>
<th>Screens</th>
<th>Example</th>
</tr>
</thead>
<tbody>
<tr>
<td>subject/subject</td>
<td>R</td>
<td>4</td>
<td>-</td>
<td>-</td>
</tr>
<tr>
<td>object/object</td>
<td>R</td>
<td>5</td>
<td>-</td>
<td>-</td>
</tr>
<tr>
<td>object/subject</td>
<td>R</td>
<td>6</td>
<td>1</td>
<td>1</td>
</tr>
<tr>
<td>no common elements</td>
<td>R</td>
<td>5</td>
<td>-</td>
<td>-</td>
</tr>
<tr>
<td>adjectives</td>
<td>R</td>
<td>2</td>
<td>-</td>
<td>-</td>
</tr>
</tbody>
</table>

(ii) **Alternation**
<table>
<thead>
<tr>
<th>Syntactic Environment</th>
<th>Task</th>
<th>Diagnostic Test</th>
<th>Screens</th>
<th>Example</th>
</tr>
</thead>
<tbody>
<tr>
<td>subjects</td>
<td>C</td>
<td>2</td>
<td>-</td>
<td>1</td>
</tr>
<tr>
<td>objects</td>
<td>R</td>
<td>4</td>
<td>-</td>
<td>-</td>
</tr>
<tr>
<td>verb phrases</td>
<td>R</td>
<td>8</td>
<td>-</td>
<td>-</td>
</tr>
<tr>
<td>sentences</td>
<td>C</td>
<td>3</td>
<td>-</td>
<td>-</td>
</tr>
<tr>
<td>adjectives</td>
<td>R</td>
<td>2</td>
<td>-</td>
<td>-</td>
</tr>
<tr>
<td>either/or</td>
<td>R</td>
<td>4</td>
<td>1</td>
<td>1</td>
</tr>
<tr>
<td>neither/nor</td>
<td>C</td>
<td>4</td>
<td>1</td>
<td>1</td>
</tr>
<tr>
<td>R= Recognition</td>
<td></td>
<td></td>
<td></td>
<td></td>
</tr>
<tr>
<td>C= Comprehension</td>
<td></td>
<td></td>
<td></td>
<td></td>
</tr>
</tbody>
</table>
TABLE XIV

Syntactic Environment, Task and Number of Items in the Diagnostic Tests & Screening Tests for Determiners

<table>
<thead>
<tr>
<th>Syntactic Environment</th>
<th>Task</th>
<th>Number of Items</th>
<th>Diagnostic Tests</th>
<th>Screens</th>
<th>Examples</th>
</tr>
</thead>
<tbody>
<tr>
<td>Count Nouns</td>
<td>R</td>
<td>13</td>
<td></td>
<td>3</td>
<td>2</td>
</tr>
<tr>
<td></td>
<td></td>
<td></td>
<td>We fed the cows.</td>
<td></td>
<td></td>
</tr>
<tr>
<td>Mass Nouns</td>
<td>R</td>
<td>12</td>
<td></td>
<td>3</td>
<td>3</td>
</tr>
<tr>
<td></td>
<td></td>
<td></td>
<td>The boys ate the meal.</td>
<td></td>
<td></td>
</tr>
<tr>
<td>Sequencing</td>
<td>R</td>
<td>7</td>
<td></td>
<td>1</td>
<td>1</td>
</tr>
<tr>
<td></td>
<td></td>
<td></td>
<td>I saw a dog. The dog was black.</td>
<td></td>
<td></td>
</tr>
<tr>
<td>Ordering of</td>
<td>R</td>
<td>13</td>
<td></td>
<td>3</td>
<td>4</td>
</tr>
<tr>
<td>adjectives and</td>
<td></td>
<td></td>
<td>John has a new blue car.</td>
<td></td>
<td></td>
</tr>
<tr>
<td>determiners</td>
<td></td>
<td></td>
<td></td>
<td></td>
<td></td>
</tr>
<tr>
<td>Quantitative</td>
<td>R</td>
<td>7</td>
<td></td>
<td>1</td>
<td>1</td>
</tr>
<tr>
<td>uniqueness</td>
<td></td>
<td></td>
<td>The kite was in the sky.</td>
<td></td>
<td></td>
</tr>
<tr>
<td>Omission of</td>
<td>R</td>
<td>7</td>
<td></td>
<td>1</td>
<td>1</td>
</tr>
<tr>
<td>determiners</td>
<td></td>
<td></td>
<td>Mother walked home.</td>
<td></td>
<td></td>
</tr>
<tr>
<td>Predeterminers</td>
<td>R</td>
<td>11</td>
<td></td>
<td>2</td>
<td>2</td>
</tr>
<tr>
<td></td>
<td></td>
<td></td>
<td>Some of the cats were black.</td>
<td></td>
<td></td>
</tr>
</tbody>
</table>

R = Recognition

Note: Although determiners are measured in different syntactic environments, not all determiner types are measured in this test. Out of the 70 test items, 26 determiners are the definite article (the), 25 are non-definite articles (a, an, some), 11 are predeterminers, (some of, one of, three of, four of), and 7 are non-appearing or zero articles (0). Genitives (my, you, his, her, its, our, their) are treated as possessive adjectives throughout the TSA, but there are no items measuring the demonstratives (these, those, this), pre-articles (all, both, just, only, even), or post-determiners, (just, second, few, several, less, least) which form part of the English Determiner System.
## TABLE XV

**Syntactic Environment, Task and Number of Items in the Diagnostic Tests & Screening Tests for Question Formation**

<table>
<thead>
<tr>
<th>Syntactic Environment</th>
<th>Task</th>
<th>Diagnostic Screens</th>
<th>Example</th>
</tr>
</thead>
<tbody>
<tr>
<td><strong>Answer Environments</strong></td>
<td></td>
<td></td>
<td></td>
</tr>
<tr>
<td>Yes/No</td>
<td>R</td>
<td>7</td>
<td>2</td>
</tr>
<tr>
<td></td>
<td></td>
<td></td>
<td><em>2 Is the elephant a big animal?</em></td>
</tr>
<tr>
<td>wh-</td>
<td>R</td>
<td>47</td>
<td>2</td>
</tr>
<tr>
<td></td>
<td></td>
<td></td>
<td><em>2 Which are bigger, cats or kittens?</em></td>
</tr>
<tr>
<td>Tag</td>
<td>R</td>
<td>16</td>
<td>1</td>
</tr>
<tr>
<td></td>
<td></td>
<td></td>
<td><em>1 Bob can't fix the toy, can he?</em></td>
</tr>
<tr>
<td><strong>Wh-words</strong></td>
<td></td>
<td></td>
<td></td>
</tr>
<tr>
<td>who</td>
<td>R</td>
<td>8</td>
<td>1</td>
</tr>
<tr>
<td></td>
<td></td>
<td></td>
<td><em>1 Who found the kite?</em></td>
</tr>
<tr>
<td>when</td>
<td>R</td>
<td>8</td>
<td>1</td>
</tr>
<tr>
<td></td>
<td></td>
<td></td>
<td><em>1 When did Susan walk to the farm?</em></td>
</tr>
<tr>
<td>where</td>
<td>R</td>
<td>10</td>
<td>-</td>
</tr>
<tr>
<td></td>
<td></td>
<td></td>
<td><em>- Where is Joe?</em></td>
</tr>
<tr>
<td>why</td>
<td>R</td>
<td>8</td>
<td>-</td>
</tr>
<tr>
<td></td>
<td></td>
<td></td>
<td><em>- Why was Dad at home?</em></td>
</tr>
<tr>
<td>what</td>
<td>R</td>
<td>8</td>
<td>1</td>
</tr>
<tr>
<td></td>
<td></td>
<td></td>
<td><em>1 What will I feed the kitten?</em></td>
</tr>
<tr>
<td>which</td>
<td>R</td>
<td>18</td>
<td>-</td>
</tr>
<tr>
<td></td>
<td></td>
<td></td>
<td><em>- Which puppy cries all night?</em></td>
</tr>
<tr>
<td>how</td>
<td>R</td>
<td>10</td>
<td>-</td>
</tr>
<tr>
<td></td>
<td></td>
<td></td>
<td><em>- How will they go to the farm?</em></td>
</tr>
<tr>
<td><strong>Yes/No</strong></td>
<td></td>
<td></td>
<td></td>
</tr>
<tr>
<td>Linking - &quot;be&quot;</td>
<td>R</td>
<td>16</td>
<td>-</td>
</tr>
<tr>
<td></td>
<td></td>
<td></td>
<td><em>- Are you taller than Dad?</em></td>
</tr>
<tr>
<td>- &quot;seem, look, like&quot;</td>
<td>R</td>
<td>8</td>
<td>-</td>
</tr>
<tr>
<td></td>
<td></td>
<td></td>
<td><em>- Do you like ice-cream?</em></td>
</tr>
<tr>
<td>Auxiliary - &quot;be&quot;</td>
<td>R</td>
<td>14</td>
<td>-</td>
</tr>
<tr>
<td>- &quot;do&quot;</td>
<td>R</td>
<td>12</td>
<td>1</td>
</tr>
<tr>
<td></td>
<td></td>
<td></td>
<td><em>1 Did Mother make a cake?</em></td>
</tr>
<tr>
<td>- &quot;would, could, should&quot;</td>
<td>R</td>
<td>8</td>
<td>1</td>
</tr>
<tr>
<td></td>
<td></td>
<td></td>
<td><em>1 Could Ann ride the horse?</em></td>
</tr>
<tr>
<td>- &quot;can, will, may&quot;</td>
<td>R</td>
<td>12</td>
<td>1</td>
</tr>
<tr>
<td></td>
<td></td>
<td></td>
<td><em>1 Can you run?</em></td>
</tr>
<tr>
<td><strong>Total</strong></td>
<td></td>
<td>210</td>
<td>11</td>
</tr>
</tbody>
</table>

R = Recognition
### TABLE XVIII

**Syntactic Environment, Task and Number of Items in the Diagnostic Tests & Screening Tests for Verb Processes**

<table>
<thead>
<tr>
<th>Syntactic Environment</th>
<th>Number of Items</th>
<th>Examples</th>
</tr>
</thead>
<tbody>
<tr>
<td><strong>Verb Sequences</strong></td>
<td></td>
<td></td>
</tr>
<tr>
<td>Past-marked on 1st vb.</td>
<td>C 14</td>
<td>1 1</td>
</tr>
<tr>
<td>-marked on 2nd vb.</td>
<td>C 13</td>
<td>- -</td>
</tr>
<tr>
<td><strong>Future</strong></td>
<td></td>
<td></td>
</tr>
<tr>
<td>-marked on 1st vb.</td>
<td>C 12</td>
<td>- -</td>
</tr>
<tr>
<td>-marked on 2nd vb.</td>
<td>C 11</td>
<td>1 1</td>
</tr>
<tr>
<td><strong>Present Progressive</strong></td>
<td></td>
<td></td>
</tr>
<tr>
<td>-marked on 1st vb.</td>
<td>C 9</td>
<td>1 1</td>
</tr>
<tr>
<td>-marked on 2nd vb.</td>
<td>C 11</td>
<td>- -</td>
</tr>
<tr>
<td><strong>Main Verbs, Linking &amp; Auxiliaries</strong></td>
<td></td>
<td></td>
</tr>
<tr>
<td>be verbs</td>
<td>R 8</td>
<td>- -</td>
</tr>
<tr>
<td>have verbs</td>
<td>R 12</td>
<td>- -</td>
</tr>
<tr>
<td><strong>Present Tense Verbs</strong></td>
<td></td>
<td></td>
</tr>
<tr>
<td>present with infin.</td>
<td>R 3</td>
<td>- -</td>
</tr>
<tr>
<td>habitual present</td>
<td>R 6</td>
<td>- -</td>
</tr>
<tr>
<td>present progressive</td>
<td>R 9</td>
<td>1 1</td>
</tr>
<tr>
<td>present perfect</td>
<td>R 14</td>
<td>- -</td>
</tr>
<tr>
<td><strong>Past Tense Verbs</strong></td>
<td>R 8</td>
<td>1 1</td>
</tr>
<tr>
<td><strong>Future Tense Verbs</strong></td>
<td>R 10</td>
<td>1 1</td>
</tr>
<tr>
<td><strong>Passive Voice</strong></td>
<td></td>
<td></td>
</tr>
<tr>
<td>Non reversible passives</td>
<td>R 11</td>
<td>- -</td>
</tr>
<tr>
<td></td>
<td>C 10</td>
<td>- 1</td>
</tr>
<tr>
<td>Reversible passives</td>
<td>R 15</td>
<td>1 -</td>
</tr>
<tr>
<td></td>
<td>C 13</td>
<td>2 2</td>
</tr>
<tr>
<td>Got passive</td>
<td>R 5</td>
<td>- 1</td>
</tr>
<tr>
<td></td>
<td>C 6</td>
<td>1 -</td>
</tr>
<tr>
<td>Agent deleted passive</td>
<td>R 6</td>
<td>- -</td>
</tr>
<tr>
<td></td>
<td>C 4</td>
<td>- -</td>
</tr>
<tr>
<td><strong>Total</strong></td>
<td>210</td>
<td>10 10</td>
</tr>
</tbody>
</table>

*R = Recognition   C = Comprehension*
### TABLE XVII

Syntactic Environment, Task and Number of Items in the Diagnostic Tests & Screening Tests for Pronominalization

<table>
<thead>
<tr>
<th>Syntactic Environment</th>
<th>Number of Items</th>
<th>Example</th>
</tr>
</thead>
<tbody>
<tr>
<td></td>
<td>Task</td>
<td>Diagnostic Screens</td>
</tr>
<tr>
<td>Forward &amp; Backward Pronominalization</td>
<td>Test</td>
<td>1</td>
</tr>
<tr>
<td>Backward Pronominalization</td>
<td></td>
<td></td>
</tr>
<tr>
<td>Subjective Case</td>
<td></td>
<td></td>
</tr>
<tr>
<td>- 3rd p.sing. masc. (he)</td>
<td>R</td>
<td>4</td>
</tr>
<tr>
<td>- 3rd p.sing. fem. (she)</td>
<td>R</td>
<td>4</td>
</tr>
<tr>
<td>- 3rd p.sing. neuter (it)</td>
<td>R</td>
<td>4</td>
</tr>
<tr>
<td>- 3rd p.plural (they)</td>
<td>R</td>
<td>12</td>
</tr>
<tr>
<td>Possessive Adjective Case</td>
<td></td>
<td></td>
</tr>
<tr>
<td>- 3rd p.sing. masc. (his)</td>
<td>R</td>
<td>4</td>
</tr>
<tr>
<td>- 3rd p.sing. fem. (her)</td>
<td>R</td>
<td>4</td>
</tr>
<tr>
<td>- 3rd p.sing. neuter (its)</td>
<td>R</td>
<td>4</td>
</tr>
<tr>
<td>- 3rd p.plural (their)</td>
<td>R</td>
<td>12</td>
</tr>
<tr>
<td>Objective Case</td>
<td></td>
<td></td>
</tr>
<tr>
<td>- 3rd p.sing. masc. (him)</td>
<td>R</td>
<td>3</td>
</tr>
<tr>
<td>- 3rd p.sing. fem. (her)</td>
<td>R</td>
<td>3</td>
</tr>
<tr>
<td>- 3rd p.sing. neuter (it)</td>
<td>R</td>
<td>4</td>
</tr>
<tr>
<td>- 3rd p.plural (them)</td>
<td>R</td>
<td>12</td>
</tr>
</tbody>
</table>

2. Pronominalization - Possessive Adjectives

| - 1st p.sing. (my) | R | 12 | - | - I could not work, my leg was broken. |
| - 2nd p.sing. (your) | R | 9 | - | - |
| - 3rd p.sing. masc. (his) | R | 10 | 1 | 1 |
| - fem. (her) | R | 10 | - | - |
| - neuter (its) | R | 10 | - | - |
| - 1st p.plural (our) | R | 9 | - | - |
| - 3rd p.plural (their) | R | 10 | 1 | 1 |

R = Recognition
TABLE XVII (Cont'd)

Syntactic Environment, Task and Number of Items
in the Diagnostic Tests & Screening Tests for
Pronominalization

<table>
<thead>
<tr>
<th>Syntactic Environment</th>
<th>Number of Items</th>
<th>Example</th>
</tr>
</thead>
<tbody>
<tr>
<td></td>
<td>Diagnostic</td>
<td>Screens</td>
</tr>
<tr>
<td></td>
<td>Task</td>
<td>1</td>
</tr>
</tbody>
</table>

3. Pronominalization -
Reflexives
- 1st p. sing. (myself) R 9 1 1 Do not help. I can wash myself.
- 2nd p. sing. (yourself) R 7 - -
- 3rd p. sing. masc. (himself) R 7 - -
  fem. (herself) R 12 1 1
  neuter (itself) R 11 1 1
- 1st p. plural (ourselves) R 10 - -
- 2nd p. plural (yourselves) R 3 - -
- 3rd p. plural (themselves) R 11 - -

4. Pronominalization -
Possessive Pronouns
- 1st p. sing. (mine) R 12 1 1 They are mine.
- 2nd p. sing. (yours) R 14 - -
- 3rd p. sing. masc. (his) R 11 - -
- 3rd p. sing. fem. (hers) R 11 - -
- 1st p. plural (ours) R 11 1 1
- 3rd p. plural (theirs) R 11 - -

Total 280 10 10

R = Recognition
<table>
<thead>
<tr>
<th>Syntactic Environment</th>
<th>Task</th>
<th>Diagnostic Test</th>
<th>Screens</th>
<th>Examples</th>
</tr>
</thead>
<tbody>
<tr>
<td>1 Relativization-Comprehension</td>
<td></td>
<td></td>
<td></td>
<td></td>
</tr>
<tr>
<td>subject final</td>
<td>C</td>
<td>12</td>
<td>1</td>
<td>1</td>
</tr>
<tr>
<td>subject medial</td>
<td>C</td>
<td>18</td>
<td>2</td>
<td>2</td>
</tr>
<tr>
<td>object final</td>
<td>C</td>
<td>14</td>
<td>1</td>
<td>1</td>
</tr>
<tr>
<td>object medial</td>
<td>C</td>
<td>14</td>
<td>1</td>
<td>1</td>
</tr>
<tr>
<td>prep. fronted</td>
<td>C</td>
<td>12</td>
<td>1</td>
<td>1</td>
</tr>
<tr>
<td>2 Relativization-Related Pronouns &amp; Relative Adverbs</td>
<td></td>
<td></td>
<td></td>
<td></td>
</tr>
<tr>
<td>who - as subject</td>
<td>R</td>
<td>11</td>
<td>1</td>
<td>1</td>
</tr>
<tr>
<td>who - as object</td>
<td>R</td>
<td>6</td>
<td>-</td>
<td>-</td>
</tr>
<tr>
<td>which-as subject</td>
<td>R</td>
<td>13</td>
<td>1</td>
<td>1</td>
</tr>
<tr>
<td>which-as object</td>
<td>R</td>
<td>5</td>
<td>-</td>
<td>-</td>
</tr>
<tr>
<td>whose</td>
<td>R</td>
<td>8</td>
<td>1</td>
<td>1</td>
</tr>
<tr>
<td>that</td>
<td>R</td>
<td>9</td>
<td>1</td>
<td>1</td>
</tr>
<tr>
<td>what</td>
<td>R</td>
<td>5</td>
<td>1</td>
<td>1</td>
</tr>
<tr>
<td>where</td>
<td>R</td>
<td>5</td>
<td>1</td>
<td>1</td>
</tr>
<tr>
<td>when</td>
<td>R</td>
<td>8</td>
<td>1</td>
<td>1</td>
</tr>
<tr>
<td>3 Relativization-Embedding</td>
<td></td>
<td></td>
<td></td>
<td></td>
</tr>
<tr>
<td>subject final</td>
<td>C</td>
<td>6</td>
<td>1</td>
<td>1</td>
</tr>
<tr>
<td>subject medial</td>
<td>C</td>
<td>13</td>
<td>-</td>
<td>-</td>
</tr>
<tr>
<td>prep. fronted</td>
<td>C</td>
<td>17</td>
<td>2</td>
<td>2</td>
</tr>
<tr>
<td>who with pred. adj.</td>
<td>C</td>
<td>24</td>
<td>2</td>
<td>2</td>
</tr>
<tr>
<td>whose</td>
<td>C</td>
<td>10</td>
<td>1</td>
<td>1</td>
</tr>
<tr>
<td>Total</td>
<td></td>
<td>210</td>
<td>19</td>
<td>19</td>
</tr>
</tbody>
</table>
### TABLE XIX

*Syntactic Environment, Task and Number of Items in the Diagnostic Tests & Screening Tests for Complementation*

<table>
<thead>
<tr>
<th>Syntactic Environment</th>
<th>Task</th>
<th>Number of Items</th>
<th>Examples</th>
</tr>
</thead>
<tbody>
<tr>
<td></td>
<td></td>
<td>Diagnostic</td>
<td>Screens</td>
</tr>
<tr>
<td></td>
<td></td>
<td>Test</td>
<td></td>
</tr>
<tr>
<td>Complementation</td>
<td></td>
<td></td>
<td></td>
</tr>
<tr>
<td>Infinitives</td>
<td>R</td>
<td>41</td>
<td>5</td>
</tr>
<tr>
<td></td>
<td></td>
<td></td>
<td></td>
</tr>
<tr>
<td>Gerunds</td>
<td>R</td>
<td>29</td>
<td>3</td>
</tr>
<tr>
<td></td>
<td></td>
<td></td>
<td></td>
</tr>
<tr>
<td>Complementation</td>
<td></td>
<td></td>
<td></td>
</tr>
<tr>
<td>That-complements</td>
<td></td>
<td></td>
<td></td>
</tr>
<tr>
<td>object</td>
<td>R</td>
<td>6</td>
<td>2</td>
</tr>
<tr>
<td></td>
<td></td>
<td></td>
<td></td>
</tr>
<tr>
<td></td>
<td>C</td>
<td>7</td>
<td>2</td>
</tr>
<tr>
<td></td>
<td></td>
<td></td>
<td></td>
</tr>
<tr>
<td>subject</td>
<td>R</td>
<td>10</td>
<td>1</td>
</tr>
<tr>
<td></td>
<td></td>
<td></td>
<td></td>
</tr>
<tr>
<td></td>
<td>C</td>
<td>9</td>
<td>1</td>
</tr>
<tr>
<td></td>
<td></td>
<td></td>
<td></td>
</tr>
<tr>
<td>extraposed</td>
<td>R</td>
<td>12</td>
<td>1</td>
</tr>
<tr>
<td></td>
<td></td>
<td></td>
<td></td>
</tr>
<tr>
<td></td>
<td>C</td>
<td>5</td>
<td>1</td>
</tr>
<tr>
<td>that deleted</td>
<td>R</td>
<td>11</td>
<td>1</td>
</tr>
<tr>
<td></td>
<td></td>
<td></td>
<td></td>
</tr>
<tr>
<td>Total</td>
<td></td>
<td>140</td>
<td>18</td>
</tr>
</tbody>
</table>

R = Recognition  C = Comprehension

### TABLE XX

*Syntactic Environment, Task and Number of Items in the Diagnostic Tests & Screening Tests for Nominalization*

<table>
<thead>
<tr>
<th>Syntactic Environment</th>
<th>Task</th>
<th>Number of Items</th>
<th>Examples</th>
</tr>
</thead>
<tbody>
<tr>
<td></td>
<td></td>
<td>Diagnostic</td>
<td>Screens</td>
</tr>
<tr>
<td></td>
<td></td>
<td>Test</td>
<td></td>
</tr>
<tr>
<td>Subject</td>
<td>R</td>
<td>22</td>
<td>6</td>
</tr>
<tr>
<td></td>
<td></td>
<td></td>
<td></td>
</tr>
<tr>
<td></td>
<td>C</td>
<td>15</td>
<td>4</td>
</tr>
<tr>
<td>Object</td>
<td>R</td>
<td>18</td>
<td>4</td>
</tr>
<tr>
<td></td>
<td></td>
<td></td>
<td></td>
</tr>
<tr>
<td></td>
<td>C</td>
<td>15</td>
<td>4</td>
</tr>
<tr>
<td>Total</td>
<td></td>
<td>70</td>
<td>18</td>
</tr>
</tbody>
</table>

R = Recognition  C = Comprehension
Table XXI provides a summary of how the items on the screening test represent the various syntactic structures of the diagnostic tests. Negation, determiners, relativization, complementation, and nominalization appear to be well represented in terms of number of items and syntactic environments. Conversely, conjunction, question formation, verb processes, and pronominalization have fewer items in the screening test, and those that are included represent only approximately half of the syntactic environments measured in the corresponding diagnostic test. On joint examination of Forms 1 and 2 of the Screening Test it was found that 51% of all nominalization items in the diagnostic battery were included while only 7% of the pronominalization items were measured. Tables XII to XX further point to inconsistencies in sampling items for the Screening Test. Each forms of the Screen contains five items measuring infinitives (e.g., It is fun to build a snowman) and six items measuring the use of nominalization as the subject of a sentence (e.g., The laughter of the girl surprised
the man). Yet there are no items testing the verbs "to be" or "to have" as main verbs (e.g. I am happy, or I have a coat) or verbs which link a subject to a modifier in the predicate (e.g. Are you taller than Dad?).

The authors provide no explanation for the uneven sampling distribution of their screening test. If we were to assume that some positive correlation existed between the frequency a structure occurred in the Screening Test and the importance of that syntactic structure in the use of standard English, we would conclude that the use of nominalization as a subject, nominalization as an object, infinitives, and ordering of adjectives and determiners were more important structures than verb processes, question formation, negation, pronominalization and relativization. A more plausible explanation may be that the structures with greater representation contained more items that met the selection criteria from a linguistic, psychometric and pedagogic point of view. The comparatively large number of items selected from the Nominalization test probably stems from the fact that this test was added to the Diagnostic Battery after standardization had been completed and so data on difficulty levels and discrimination indices were unavailable.

However, despite the anomalies mentioned above, the screening test does sample each of the syntactic structures measured by the Diagnostic Battery. Although every environment within a structure has not been measured by the screening test, the authors have endeavoured to provide a representative sample of each type of environment.

For example, whenever a structure was broken down by gender, person or number, that structure was generally sampled in one of its environments. As a rule, the selection of an item from one syntactic environment for Form 1 of the Screening Test was accompanied by the selection of another item from the same environment for Form 2 of the test.
Although we might prefer an equal number of items in each structure of the Screening Test and a more even distribution of syntactic environments, it must be remembered that the test was designed to be used in conjunction with the Diagnostic Battery and not meant to provide an in-depth assessment of syntactic ability. Hence, as it is a screening test, and as it does sample all the major syntactic structures of English, it is concluded that the sampling is valid for the purpose of the test.

Other aspects of test validity will be addressed later in this report when the questions of how well a student's performance on each structure of the Screening Test will predict his performance on the corresponding structure in the Diagnostic Battery and whether the test is valid for hearing-impaired students in different age and hearing loss categories are asked.

ITEM ANALYSIS

An item analysis was performed for both forms of the TSA Screening Test using the test analysis package LERTAP (Nelson 1974). Inspection of the item difficulty levels for the study population indicated that the proportional mean raw scores of the separate structures in both forms ranged from a high of .798 (80%) in the Negation items in Form 1 to .529 (53%) on the Relativization items in the same form. The mean difficulty level across all individual structures was .628 (63%) on both forms. It is generally agreed that a psychometrically good normative test is one in which most items are answered correctly by approximately 50% of the sample with a mean percent of between 40% and 60% (Quigley et al., 1978). As can be seen in Table XXII most structures came in at the top end of this 40-60% range with items in Negation and Determiners being above the optimal difficulty level on both forms of the Screening Test.
**TABLE XXII**

Means, Standard Deviations and Reliability Coefficients on the TSA Screening Test, Forms 1 & 2

<table>
<thead>
<tr>
<th>Syntactic Structures</th>
<th>No. of Items</th>
<th>Screening Form</th>
<th>Mean Raw (%) N=233</th>
<th>Standard Deviation</th>
<th>Internal Consistency (Hoyt's Anova) N=233</th>
</tr>
</thead>
<tbody>
<tr>
<td>Negation</td>
<td>9</td>
<td>1</td>
<td>7.18 (79.8)</td>
<td>2.64</td>
<td>.89</td>
</tr>
<tr>
<td>Conjunction</td>
<td>11</td>
<td>1</td>
<td>6.73 (61.2)</td>
<td>3.34</td>
<td>.86</td>
</tr>
<tr>
<td>Determiners</td>
<td>14</td>
<td>1</td>
<td>10.42 (75.2)</td>
<td>3.35</td>
<td>.83</td>
</tr>
<tr>
<td>Question Formation</td>
<td>11</td>
<td>1</td>
<td>7.30 (66.4)</td>
<td>3.24</td>
<td>.85</td>
</tr>
<tr>
<td>Verb Processes</td>
<td>10</td>
<td>1</td>
<td>5.85 (58.5)</td>
<td>2.92</td>
<td>.81</td>
</tr>
<tr>
<td>Pronominalization</td>
<td>10</td>
<td>1</td>
<td>6.27 (62.7)</td>
<td>2.49</td>
<td>.72</td>
</tr>
<tr>
<td>Relativization</td>
<td>19</td>
<td>1</td>
<td>10.05 (52.9)</td>
<td>4.90</td>
<td>.87</td>
</tr>
<tr>
<td>Complementation</td>
<td>18</td>
<td>1</td>
<td>11.25 (62.5)</td>
<td>4.70</td>
<td>.87</td>
</tr>
<tr>
<td>Nominalization</td>
<td>18</td>
<td>1</td>
<td>10.31 (57.6)</td>
<td>4.72</td>
<td>.98</td>
</tr>
<tr>
<td>Total Test</td>
<td>120</td>
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<td>28.49</td>
<td>.95*</td>
</tr>
<tr>
<td></td>
<td></td>
<td>2</td>
<td>75.36 (62.8)</td>
<td>29.20</td>
<td>.96*</td>
</tr>
</tbody>
</table>

* Cronbach's Composite Alpha

With two exceptions the internal consistency of each syntactic structure in Forms 1 and 2, computed using Hoyt's analysis of variance (Hoyt 1941) ranged between .82 and .89. The two exceptions were Pronominalization - Form 1 .72 and Pronominalization - Form 2 .77.

Correlations presented in Tables XXIII and XXIV indicate that correlations between structures on both forms were generally above .7
with a range between .599 (Negation with Relativization) and .825 (Verb Processes with Question Formation) on Form 1 and between .639 (Nominalization with Negation) and .841 (Complementation and Question Formation) on Form 2.

Which form of the Screening Test a subject took first appeared to make no difference to the results as indicated by the lack of any significant point-biserial correlations between the external criterion (test order) and the syntactic structures within the test itself.

**TABLE XXIII**

Correlations between Syntactic Structures, Total Scores and Test Order for TSA Screening Test Form 1 \((N=233)\)

<table>
<thead>
<tr>
<th></th>
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</tr>
<tr>
<td>Conj.</td>
<td>0.67</td>
<td>1.00</td>
<td></td>
<td></td>
<td></td>
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<td></td>
<td></td>
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</tr>
<tr>
<td>Det.</td>
<td>0.76</td>
<td>0.77</td>
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</tr>
<tr>
<td>Q.F.</td>
<td>0.76</td>
<td>0.77</td>
<td>0.81</td>
<td>1.00</td>
<td></td>
<td></td>
<td></td>
<td></td>
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</tr>
<tr>
<td>V.P.</td>
<td>0.68</td>
<td>0.74</td>
<td>0.78</td>
<td>0.83</td>
<td>1.00</td>
<td></td>
<td></td>
<td></td>
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</tr>
<tr>
<td>Pron.</td>
<td>0.69</td>
<td>0.68</td>
<td>0.75</td>
<td>0.75</td>
<td>0.74</td>
<td>1.00</td>
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</tr>
<tr>
<td>Rel.</td>
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<td>0.72</td>
<td>0.73</td>
<td>0.77</td>
<td>0.82</td>
<td>0.75</td>
<td>1.00</td>
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</tr>
<tr>
<td>Comp.</td>
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<td>0.71</td>
<td>0.77</td>
<td>0.79</td>
<td>0.76</td>
<td>0.76</td>
<td>0.80</td>
<td>1.00</td>
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</tr>
<tr>
<td>Nom.</td>
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<td>0.69</td>
<td>0.77</td>
<td>0.79</td>
<td>0.78</td>
<td>0.74</td>
<td>0.80</td>
<td>0.78</td>
<td>1.00</td>
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</tr>
<tr>
<td>T.T.</td>
<td>0.80</td>
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<td>0.91</td>
<td>0.90</td>
<td>0.86</td>
<td>0.90</td>
<td>0.90</td>
<td>0.89</td>
<td>1.00</td>
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</tr>
<tr>
<td>T.O.</td>
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<td>0.06</td>
<td>0.02</td>
<td>0.04</td>
<td>0.06</td>
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<td>0.03</td>
<td>0.00</td>
<td>0.04</td>
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</tr>
</tbody>
</table>

T.T. = Total Test  
T.O. = Test Order
TABLE XXIV

Correlations between Syntactic Structures, Total Scores and Test Order for TSA Screening Test Form 2 (N=233)

<table>
<thead>
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<tbody>
<tr>
<td>Neg.</td>
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</tr>
<tr>
<td>Conj.</td>
<td>0.65</td>
<td>1.00</td>
<td></td>
<td></td>
<td></td>
<td></td>
<td></td>
<td></td>
<td></td>
<td></td>
<td></td>
</tr>
<tr>
<td>Det.</td>
<td>0.75</td>
<td>0.72</td>
<td>1.00</td>
<td></td>
<td></td>
<td></td>
<td></td>
<td></td>
<td></td>
<td></td>
<td></td>
</tr>
<tr>
<td>Q.F.</td>
<td>0.80</td>
<td>0.77</td>
<td>0.82</td>
<td>1.00</td>
<td></td>
<td></td>
<td></td>
<td></td>
<td></td>
<td></td>
<td></td>
</tr>
<tr>
<td>V.P.</td>
<td>0.73</td>
<td>0.77</td>
<td>0.82</td>
<td>0.83</td>
<td>1.00</td>
<td></td>
<td></td>
<td></td>
<td></td>
<td></td>
<td></td>
</tr>
<tr>
<td>Pron.</td>
<td>0.71</td>
<td>0.72</td>
<td>0.77</td>
<td>0.76</td>
<td>0.74</td>
<td>1.00</td>
<td></td>
<td></td>
<td></td>
<td></td>
<td></td>
</tr>
<tr>
<td>Rel.</td>
<td>0.65</td>
<td>0.76</td>
<td>0.78</td>
<td>0.78</td>
<td>0.83</td>
<td>0.77</td>
<td>1.00</td>
<td></td>
<td></td>
<td></td>
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</tr>
<tr>
<td>Comp.</td>
<td>0.73</td>
<td>0.74</td>
<td>0.83</td>
<td>0.84</td>
<td>0.84</td>
<td>0.77</td>
<td>0.84</td>
<td>1.00</td>
<td></td>
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<td></td>
</tr>
<tr>
<td>Norn.</td>
<td>0.64</td>
<td>0.69</td>
<td>0.74</td>
<td>0.78</td>
<td>0.79</td>
<td>0.71</td>
<td>0.80</td>
<td>0.79</td>
<td>1.00</td>
<td></td>
<td></td>
</tr>
<tr>
<td>T.T.</td>
<td>0.81</td>
<td>0.85</td>
<td>0.90</td>
<td>0.92</td>
<td>0.92</td>
<td>0.86</td>
<td>0.91</td>
<td>0.93</td>
<td>0.88</td>
<td>1.00</td>
<td></td>
</tr>
<tr>
<td>T.O.</td>
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<td>0.07</td>
<td>0.00</td>
<td>0.03</td>
<td>-0.01</td>
<td>0.00</td>
<td>-0.03</td>
<td>-0.04</td>
<td>0.00</td>
<td>0.00</td>
<td>1.00</td>
</tr>
</tbody>
</table>

T.T. = Total Test
T.O. = Test Order

The test appeared to discriminate the better students from the others. Inspection of the point biserials for each item on both forms of the TSA Screening Test revealed that all items were positively related to the total test score with a correlation (item-total test) greater than .4 for 87% and 89% of items in Forms 1 and 2 respectively.

Throughout the test the distractors each attracted respondents and their correlations (PB-TT) were negative in more than 95% of the items in each form. In six cases an individual distractor attracted a greater response than the correct answer. The type of item where this occurred was identical on both screens, and involved the following syntactic
environments:

i) Backward Pronominalization (Item #72, Forms 1 & 2)
   e.g. When _____ mother brought the eggs, Joe made lunch.
   Subject Response
   A. him  
   B. his  
   C. Joe's  
   D. he  
   (Item #72, Form 1)

ii) That Complement-Subject (Item #51, Forms 1 & 2)
   e.g. The baby was asleep surprised Father.
       For the baby was asleep surprised Father. 
       So the baby was asleep surprised Father.
       That the baby was asleep surprised Father.
   (Item #51, Form 2)

iii) Nominalization-Subject (Item #109, Form 1; Item #113, Form 2)
   e.g. The scream of the cat scared the dog.

      A. The cat scared the dog.  
      B. The scream scared the dog.  
      C. The dog screamed.  
      D. The dog scared the cat.  
      (Item #109, Form 1)

Only one example was observed where a distractor drew more of the better subjects than the correct response. This occurred in Form 1, Item #113 where the point biserial-total test was 0.14 for the distractor B and 0.11 for the correct response D written below.

The growth of the plant excited the children.

   A. The children grew.  
   B. The plant excited the children.  
   C. The children excited the plant.  
   D. The growth excited the children.
   (Syntactic Environment - Nominalization Subject)
PARALLEL FORM RELIABILITY

Correlational analysis was performed for both forms of the TSA Screening Test using the test analysis package SPSS (Nie et al., 1975). Table XXV contains the Pearson Correlation Coefficient Matrix obtained in this analysis and reveals that the two forms are highly correlated with an r of .96 for the total test. With the exception of pronominalization (.77), conjunction (.78) and determiners (.80) all correlations were above .84.

TABLE XXV
Correlations between Forms 1 & 2 of the TSA Screening Test

<table>
<thead>
<tr>
<th></th>
<th></th>
<th></th>
<th></th>
<th></th>
<th></th>
<th></th>
<th></th>
<th></th>
<th></th>
<th></th>
</tr>
</thead>
<tbody>
<tr>
<td>Neg.</td>
<td>.842</td>
<td>.656</td>
<td>.697</td>
<td>.755</td>
<td>.699</td>
<td>.693</td>
<td>.608</td>
<td>.690</td>
<td>.612</td>
<td>.766</td>
</tr>
<tr>
<td>Conj.</td>
<td>.688</td>
<td>.783</td>
<td>.690</td>
<td>.746</td>
<td>.739</td>
<td>.706</td>
<td>.730</td>
<td>.734</td>
<td>.698</td>
<td>.811</td>
</tr>
<tr>
<td>Det.</td>
<td>.770</td>
<td>.706</td>
<td>.805</td>
<td>.820</td>
<td>.773</td>
<td>.754</td>
<td>.739</td>
<td>.783</td>
<td>.760</td>
<td>.860</td>
</tr>
<tr>
<td>Q.F.</td>
<td>.779</td>
<td>.766</td>
<td>.802</td>
<td>.868</td>
<td>.817</td>
<td>.788</td>
<td>.768</td>
<td>.810</td>
<td>.773</td>
<td>.892</td>
</tr>
<tr>
<td>V.P.</td>
<td>.687</td>
<td>.719</td>
<td>.791</td>
<td>.795</td>
<td>.857</td>
<td>.762</td>
<td>.792</td>
<td>.794</td>
<td>.755</td>
<td>.869</td>
</tr>
<tr>
<td>Pron.</td>
<td>.692</td>
<td>.674</td>
<td>.734</td>
<td>.756</td>
<td>.717</td>
<td>.773</td>
<td>.746</td>
<td>.758</td>
<td>.726</td>
<td>.822</td>
</tr>
<tr>
<td>Rel.</td>
<td>.609</td>
<td>.720</td>
<td>.770</td>
<td>.757</td>
<td>.803</td>
<td>.754</td>
<td>.870</td>
<td>.809</td>
<td>.789</td>
<td>.870</td>
</tr>
<tr>
<td>Comp.</td>
<td>.668</td>
<td>.701</td>
<td>.751</td>
<td>.794</td>
<td>.779</td>
<td>.758</td>
<td>.792</td>
<td>.854</td>
<td>.763</td>
<td>.963</td>
</tr>
<tr>
<td>Nom.</td>
<td>.667</td>
<td>.689</td>
<td>.725</td>
<td>.787</td>
<td>.772</td>
<td>.718</td>
<td>.798</td>
<td>.779</td>
<td>.865</td>
<td>.859</td>
</tr>
<tr>
<td>Total</td>
<td>.794</td>
<td>.809</td>
<td>.853</td>
<td>.892</td>
<td>.880</td>
<td>.845</td>
<td>.875</td>
<td>.891</td>
<td>.862</td>
<td>.964</td>
</tr>
</tbody>
</table>

N=233 p < .01 for all correlations

Because Forms 1 and 2 of the Screening Test are so highly correlated, further statistical analysis for this study will be carried out on Form 2 only, and it is assumed that the results would equally apply to either form of the test.
Further item analysis, again using LERTAP (Nelson 1974) was carried out on Form 2 of the TSA Screening Test for the three hearing loss categories (≤59 dB, 60-89 dB, >90 dB). Inspection of the item difficulty levels for each group revealed that those with more hearing found the items generally less difficult than their counterparts with a greater hearing loss. Performance levels for these three hearing loss groups on Form 2 of the Screening Test are illustrated in Table XXVI.

**TABLE XXVI**

Means, Standard Deviations and Reliability Coefficients on the TSA Screening Test Form 2 for Students in the Three Hearing Loss Categories (≤59, 60-89, >90 dB)

<table>
<thead>
<tr>
<th>Syntactic Structure</th>
<th>No. of Items</th>
<th>Hearing Loss Gr.</th>
<th>Mean Raw (%)</th>
<th>Standard Deviation</th>
<th>Internal Consistency (Hoyt's Anova)</th>
</tr>
</thead>
<tbody>
<tr>
<td>Negation</td>
<td>9</td>
<td>≤59 dB (N=49)</td>
<td>7.78 (86.4)</td>
<td>1.76</td>
<td>.74</td>
</tr>
<tr>
<td></td>
<td></td>
<td>60-89 dB (N=89)</td>
<td>7.09 (78.8)</td>
<td>2.44</td>
<td>.84</td>
</tr>
<tr>
<td></td>
<td></td>
<td>&gt;90 dB (N=95)</td>
<td>6.72 (74.7)</td>
<td>2.82</td>
<td>.88</td>
</tr>
<tr>
<td>Conjunction</td>
<td>11</td>
<td>≤59 dB (N=49)</td>
<td>7.63 (69.4)</td>
<td>3.11</td>
<td>.85</td>
</tr>
<tr>
<td></td>
<td></td>
<td>60-89 dB (N=89)</td>
<td>6.76 (61.5)</td>
<td>3.25</td>
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<tr>
<td></td>
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<td>&gt;90 dB (N=95)</td>
<td>6.36 (57.8)</td>
<td>2.92</td>
<td>.78</td>
</tr>
<tr>
<td>Determiners</td>
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<td>11.43 (81.6)</td>
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<tr>
<td></td>
<td></td>
<td>60-89 dB (N=89)</td>
<td>9.96 (71.1)</td>
<td>3.54</td>
<td>.83</td>
</tr>
<tr>
<td></td>
<td></td>
<td>&gt;90 dB (N=95)</td>
<td>9.16 (65.4)</td>
<td>3.75</td>
<td>.84</td>
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<td>Question Formation</td>
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<td>≤59 dB (N=49)</td>
<td>9.18 (83.5)</td>
<td>2.43</td>
<td>.82</td>
</tr>
<tr>
<td></td>
<td></td>
<td>60-89 dB (N=89)</td>
<td>7.42 (67.5)</td>
<td>3.54</td>
<td>.89</td>
</tr>
<tr>
<td></td>
<td></td>
<td>&gt;90 dB (N=95)</td>
<td>6.80 (61.8)</td>
<td>3.44</td>
<td>.86</td>
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<tr>
<td>Syntactic Structure</td>
<td>No. of Items</td>
<td>Hearing Loss Gr.</td>
<td>Mean Raw (%)</td>
<td>Standard Deviation</td>
<td>Internal Consistency (Hoyt's Anova)</td>
</tr>
<tr>
<td>-------------------------</td>
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<td>--------------</td>
<td>--------------------</td>
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<tr>
<td><strong>Verb Processes</strong></td>
<td>10</td>
<td>&lt;59 dB (N=49)</td>
<td>6.92 (69.2)</td>
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<td>.76</td>
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<td></td>
<td>60-89 dB (N=89)</td>
<td>5.51 (55.1)</td>
<td>3.07</td>
<td>.83</td>
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<tr>
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<td>5.18 (51.8)</td>
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<td><strong>Pronominalization</strong></td>
<td>10</td>
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<td></td>
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<td>.78</td>
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<tr>
<td><strong>Relativization</strong></td>
<td>19</td>
<td>&lt;59 dB (N=49)</td>
<td>13.00 (68.4)</td>
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<td>.88</td>
</tr>
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<td></td>
<td></td>
<td>60-89 dB (N=89)</td>
<td>10.66 (56.1)</td>
<td>5.07</td>
<td>.88</td>
</tr>
<tr>
<td></td>
<td></td>
<td>&gt;90 dB (N=95)</td>
<td>9.57 (50.4)</td>
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<td>.82</td>
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<tr>
<td><strong>Complementation</strong></td>
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<td>&lt;59 dB (N=49)</td>
<td>13.71 (76.2)</td>
<td>4.16</td>
<td>.87</td>
</tr>
<tr>
<td></td>
<td></td>
<td>60-89 dB (N=89)</td>
<td>11.29 (62.7)</td>
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<tr>
<td></td>
<td></td>
<td>&gt;90 dB (N=95)</td>
<td>9.87 (54.8)</td>
<td>4.66</td>
<td>.85</td>
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<tr>
<td><strong>Nominalization</strong></td>
<td>18</td>
<td>&lt;59 dB (N=49)</td>
<td>12.63 (70.2)</td>
<td>4.31</td>
<td>.86</td>
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<td></td>
<td></td>
<td>60-89 dB (N=89)</td>
<td>10.00 (55.6)</td>
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<td>.88</td>
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<tr>
<td></td>
<td></td>
<td>&gt;90 dB (N=95)</td>
<td>9.44 (52.4)</td>
<td>4.40</td>
<td>.84</td>
</tr>
<tr>
<td><strong>Total Test</strong></td>
<td>120</td>
<td>&lt;59 dB (N=49)</td>
<td>89.45 (74.5)</td>
<td>25.57</td>
<td>.96*</td>
</tr>
<tr>
<td></td>
<td></td>
<td>60-89 dB (N=89)</td>
<td>74.87 (62.4)</td>
<td>29.34</td>
<td>.96*</td>
</tr>
<tr>
<td></td>
<td></td>
<td>&gt;90 dB (N=95)</td>
<td>68.57 (57.1)</td>
<td>28.53</td>
<td>.96*</td>
</tr>
</tbody>
</table>

* Cronbach's Composite Alpha
The first group (<59 dB) ranged from an item difficulty level of 86.4% in negation to 68.4% in relativization. Such high mean scores and low standard deviations indicate that the test was too easy for these subjects with a mild to moderate hearing loss. The second group (60-89 dB) revealed difficulty levels from 78.8% in negation to 55.1% in verb processes. The mean scores of seven out of the nine syntactic structures were above the optimal difficulty level (40-60%) of a psychometrically good test. Group three, (>90 dB), scored between 74.7% item difficulty level in negation to 50.4% in relativization with scores in six out of the nine syntactic structures falling within optimal difficulty levels.

Inspection of the point biserials and distractor items revealed that 42 (11.6%) distractors drew no subjects in the first group (<59 dB). The scores of this group on three items were particularly interesting. In item #3 (Question Formation) 48 subjects chose the correct response (B) and only 1 out of the 49 subjects selected a distractor item. In item #25 (Determiners), 42 chose the correct response (A) and the remaining subjects (7) chose distractor item B. In item #119 (Nominalization) 45 chose the correct response (A) and 3 chose the distractor item (B). The distractor items generally worked well for the other two groups with only two failing to attract subjects in group two (60-89 dB) and three in group three (>90 dB).

Each hearing loss group revealed items where the distractor drew more of the better subjects than the correct response. In group one (<59 dB) item #51 (Complementation) 46.9% of subjects chose distractor (A) and 34.7% chose the correct item C. The point biserial-total test was 0.23 for the distractor and 0.01 for the correct response. In group two
(60-89 dB), items #83 and 71 are worthy of note. The point biserials-total test for these items were; .20 for the correct response and .24 for distractor item D on item #83 (Conjunction), and .11 for the correct response and .13 for distractor item B on #71 (Relativization). The most significant deviation occurred on item #113 (Nominalization) for the profound hearing loss group (90 dB). In this item the point biserial of the correct response was negatively correlated to the total test scores -0.05, while two distractor items (A & B) were positively correlated .08 and .15 respectively.

ANALYSIS OF VARIANCE

A two way analysis of variance using the computer program MULTIVAR (Finn 1978) was performed to investigate both the unique and joint effects of age (8-10, 11-13, 14-16, 17+ years) and severity of hearing loss (<59, 60-89, >90 dB) upon subject performance in each linguistic structure of form 2 of the TSA Screening Test. Scheffe's multiple comparison procedure was applied wherever rejection of the test of no significant difference among groups occurred at the .01 level.

Since the cell sizes were not equal, the independent variables were ordered for the tests of significance. An experimental design approach (Overall & Spiegall 1969) was adopted in which age and severity of hearing loss entered the analysis at the same level, followed by their interaction. Thus the effects of age and hearing loss were adjusted for the presence of each other while the interaction was adjusted for both main effects.

To control for the probability of a Type I Error, the level of significance adopted was at the .01 level although significant findings at the .05 level are identified in Table XXVII. In computing the significant pairwise differences in age and hearing loss groups, the
following formula was adopted to obtain the limits.

\[
F = \frac{\bar{X}_1 - \bar{X}_2}{M_{SW} \left( \frac{1}{n_1} + \frac{1}{n_2} \right)}
\]

compared to \(2.99\ F_{2, 221} = 2 \times 4.61 = 9.22\)

and \(2.95\ F_{2, 221} = 2 \times 3.00 = 6.00\)

As the Scheffe test of significance is itself conservative, pairwise differences at the .01 and .05 levels are reported in Table XXVIII.

Results of the analysis revealed a significant difference for severity of hearing loss in all structures except negation, conjunction and verb processes. Conjunction was the only structure in which age was significant at the .01 level and no differences were recorded for the interaction age x severity of hearing loss in any structure. Table XXVIII summarises the significant group differences for age and severity of hearing loss.

<table>
<thead>
<tr>
<th>Source of Variability</th>
<th>df</th>
<th>MS</th>
<th>F</th>
</tr>
</thead>
<tbody>
<tr>
<td>(1) Negation</td>
<td></td>
<td></td>
<td></td>
</tr>
<tr>
<td>Age (A)</td>
<td>3</td>
<td>.6519</td>
<td>.9642</td>
</tr>
<tr>
<td>Hearing Loss (AHL)</td>
<td>2</td>
<td>1.9297</td>
<td>2.8564</td>
</tr>
<tr>
<td>A x AHL</td>
<td>6</td>
<td>.1457</td>
<td>.2157</td>
</tr>
<tr>
<td>Within</td>
<td>221</td>
<td>.676</td>
<td></td>
</tr>
<tr>
<td>Total</td>
<td>232</td>
<td></td>
<td></td>
</tr>
<tr>
<td>(2) Conjunction</td>
<td></td>
<td></td>
<td></td>
</tr>
<tr>
<td>Age (A)</td>
<td>3</td>
<td>4.0062</td>
<td>8.0285**</td>
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<td>Hearing Loss (AHL)</td>
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<td>2.1186</td>
<td>4.2457*</td>
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<td>A x AHL</td>
<td>6</td>
<td>0.2667</td>
<td>0.5344</td>
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<tr>
<td>Within</td>
<td>221</td>
<td>0.499</td>
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</tr>
<tr>
<td>Total</td>
<td>232</td>
<td></td>
<td></td>
</tr>
<tr>
<td>(3) Determiners</td>
<td></td>
<td></td>
<td></td>
</tr>
<tr>
<td>Age (A)</td>
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<td>.487</td>
<td>1.02</td>
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<tr>
<td>Hearing Loss</td>
<td>2</td>
<td>3.283</td>
<td>6.88**</td>
</tr>
<tr>
<td>A x AHL</td>
<td>6</td>
<td>.237</td>
<td>.496</td>
</tr>
<tr>
<td>Within</td>
<td>221</td>
<td>.477</td>
<td></td>
</tr>
<tr>
<td>Total</td>
<td>232</td>
<td></td>
<td></td>
</tr>
<tr>
<td>Source of Variability</td>
<td>df</td>
<td>MS</td>
<td>F</td>
</tr>
<tr>
<td>-------------------------------</td>
<td>-----</td>
<td>------</td>
<td>------</td>
</tr>
<tr>
<td><strong>(4) Question Formation</strong></td>
<td></td>
<td></td>
<td></td>
</tr>
<tr>
<td>Age (A)</td>
<td>3</td>
<td>1.453</td>
<td>2.19</td>
</tr>
<tr>
<td>Hearing Loss (AHL)</td>
<td>2</td>
<td>5.811</td>
<td>8.733**</td>
</tr>
<tr>
<td>A x AHL</td>
<td>6</td>
<td>0.512</td>
<td>0.770</td>
</tr>
<tr>
<td>Within</td>
<td>221</td>
<td>.665</td>
<td></td>
</tr>
<tr>
<td>Total</td>
<td>232</td>
<td></td>
<td></td>
</tr>
<tr>
<td><strong>(5) Verb Processes</strong></td>
<td></td>
<td></td>
<td></td>
</tr>
<tr>
<td>Age (A)</td>
<td>3</td>
<td>2.004</td>
<td>3.2762</td>
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<tr>
<td>Hearing Loss (AHL)</td>
<td>2</td>
<td>2.395</td>
<td>3.915*</td>
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<tr>
<td>A x AHL</td>
<td>6</td>
<td>0.409</td>
<td>0.668</td>
</tr>
<tr>
<td>Within</td>
<td>221</td>
<td>.612</td>
<td></td>
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<tr>
<td>Total</td>
<td>232</td>
<td></td>
<td></td>
</tr>
<tr>
<td><strong>(6) Pronominalization</strong></td>
<td></td>
<td></td>
<td></td>
</tr>
<tr>
<td>Age (A)</td>
<td>3</td>
<td>0.913</td>
<td>2.137</td>
</tr>
<tr>
<td>Hearing Loss (AHL)</td>
<td>2</td>
<td>2.744</td>
<td>6.425**</td>
</tr>
<tr>
<td>A x AHL</td>
<td>6</td>
<td>0.533</td>
<td>1.248</td>
</tr>
<tr>
<td>Within</td>
<td>221</td>
<td>.427</td>
<td></td>
</tr>
<tr>
<td>Total</td>
<td>232</td>
<td></td>
<td></td>
</tr>
<tr>
<td><strong>(7) Relativization</strong></td>
<td></td>
<td></td>
<td></td>
</tr>
<tr>
<td>Age (A)</td>
<td>3</td>
<td>1.007</td>
<td>2.609*</td>
</tr>
<tr>
<td>Hearing Loss (AHL)</td>
<td>2</td>
<td>3.058</td>
<td>7.921**</td>
</tr>
<tr>
<td>A x AHL</td>
<td>6</td>
<td>0.287</td>
<td>0.743</td>
</tr>
<tr>
<td>Within</td>
<td>221</td>
<td>.386</td>
<td></td>
</tr>
<tr>
<td>Total</td>
<td>232</td>
<td></td>
<td></td>
</tr>
<tr>
<td><strong>(8) Complementation</strong></td>
<td></td>
<td></td>
<td></td>
</tr>
<tr>
<td>Age (A)</td>
<td>3</td>
<td>0.364</td>
<td>0.907</td>
</tr>
<tr>
<td>Hearing Loss (AHL)</td>
<td>2</td>
<td>4.721</td>
<td>11.760**</td>
</tr>
<tr>
<td>A x AHL</td>
<td>6</td>
<td>0.248</td>
<td>0.618</td>
</tr>
<tr>
<td>Within</td>
<td>221</td>
<td>.401</td>
<td></td>
</tr>
<tr>
<td>Total</td>
<td>232</td>
<td></td>
<td></td>
</tr>
<tr>
<td><strong>(9) Nominalization</strong></td>
<td></td>
<td></td>
<td></td>
</tr>
<tr>
<td>Age (A)</td>
<td>3</td>
<td>0.624</td>
<td>1.659</td>
</tr>
<tr>
<td>Hearing Loss (AHL)</td>
<td>2</td>
<td>3.405</td>
<td>9.05*</td>
</tr>
<tr>
<td>A x AHL</td>
<td>6</td>
<td>0.127</td>
<td>0.337</td>
</tr>
<tr>
<td>Within</td>
<td>221</td>
<td>.376</td>
<td></td>
</tr>
<tr>
<td>Total</td>
<td>232</td>
<td></td>
<td></td>
</tr>
</tbody>
</table>

** p < .01
* p < .05
TABLE XXVI

Summary of Significant Pairwise Differences

Age and Severity of Hearing Loss

<table>
<thead>
<tr>
<th>Factor</th>
<th>Negation</th>
<th>Conjunction</th>
<th>Determiners</th>
<th>Question Formation</th>
<th>Verb Processes</th>
</tr>
</thead>
<tbody>
<tr>
<td>Age</td>
<td>(8-10)&lt;(14-16)</td>
<td>(8-10)&lt;(17+)</td>
<td></td>
<td></td>
<td></td>
</tr>
<tr>
<td>Severity of Hearing Loss</td>
<td>(&lt;59)&gt;(60-89)*</td>
<td>(&lt;59)&gt;(60-89)*</td>
<td>(&lt;59)&gt;(&gt;90)**</td>
<td>(&lt;59)&gt;(&gt;90)**</td>
<td></td>
</tr>
</tbody>
</table>

Note: 1. For any structure (<59) (>90) means that the mean performance for the <59 dB hearing loss group was significantly higher than the mean performance of the >90 dB group.

2. * p < .01
   ** p < .05

CORRELATIONAL ANALYSIS

Empirical or predictive validity of a test refers to the degree to which results on that test accurately predict future behaviour. In the case of the TSA Screening Test, we are interested in how well structure scores on that test relate to the equivalent tests in the diagnostic battery. In other words how well does a subject's score on the negation items in the Screening Test predict his ability to recognize and comprehend negation as measured by the negation test in the diagnostic battery.
As described in Chapter Three all subjects who wrote the Screening Test were given four diagnostic tests. The twenty tests were randomly assigned to one of five sets and then similarly assigned one of four orders (see Table VIII). Subject results on those randomly assigned tests were correlated with results on Form 2 of the Screening Test using the SPSS Statistical Package for the Social Sciences (Nie et al., 1975).

Table XXIX illustrates which diagnostic tests were included in each set, and how many students in each hearing loss group wrote the tests. It should be noted that five students who wrote the screening test did not complete the four diagnostic tests of any set and hence could not be included in this analysis.

**TABLE XXIX**

Diagnostic Tests by Set and Population
Assigned through Multiple Sampling Procedures

<table>
<thead>
<tr>
<th>Set</th>
<th>1</th>
<th>2</th>
<th>3</th>
<th>4</th>
<th>5</th>
</tr>
</thead>
<tbody>
<tr>
<td>Total Population</td>
<td>N = 38</td>
<td>N = 46</td>
<td>N = 41</td>
<td>N = 52</td>
<td>N = 50</td>
</tr>
<tr>
<td>Hearing Loss Group 1 (&lt;59 dB)</td>
<td>N = 6</td>
<td>N = 6</td>
<td>N = 7</td>
<td>N = 14</td>
<td>N = 15</td>
</tr>
<tr>
<td>Hearing Loss Group 2 (60-89 dB)</td>
<td>N = 19</td>
<td>N = 17</td>
<td>N = 18</td>
<td>N = 17</td>
<td>N = 15</td>
</tr>
<tr>
<td>Hearing Loss Group 3 (&gt;90 dB)</td>
<td>N = 13</td>
<td>N = 23</td>
<td>N = 16</td>
<td>N = 21</td>
<td>N = 20</td>
</tr>
</tbody>
</table>

<table>
<thead>
<tr>
<th>Diagnostic Tests (Screen Structures)</th>
<th>1</th>
<th>2</th>
<th>3</th>
<th>4</th>
<th>5</th>
</tr>
</thead>
<tbody>
<tr>
<td>Negation (Neg.)</td>
<td></td>
<td></td>
<td></td>
<td></td>
<td></td>
</tr>
<tr>
<td>Poss. Adj. Reflexives (Pronom.)</td>
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<td></td>
<td></td>
<td></td>
<td></td>
</tr>
<tr>
<td>Main Verbs, That</td>
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<td></td>
<td></td>
<td></td>
<td></td>
</tr>
<tr>
<td>Linking &amp; Aux. (V.P.)</td>
<td></td>
<td></td>
<td></td>
<td></td>
<td></td>
</tr>
<tr>
<td>Embedding (Rel.)</td>
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<td></td>
<td></td>
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<td></td>
</tr>
<tr>
<td>Conjunction (Conj.)</td>
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<td></td>
<td></td>
<td></td>
</tr>
<tr>
<td>Reflexives (Pronom.)</td>
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<td></td>
<td></td>
<td></td>
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<tr>
<td>Complement (Comp.)</td>
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<td></td>
<td></td>
<td></td>
</tr>
<tr>
<td>Relative Pronouns &amp; Adverbs (Rel.)</td>
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<td></td>
<td></td>
<td></td>
<td></td>
</tr>
<tr>
<td>Wh-words (Q.F.)</td>
<td></td>
<td></td>
<td></td>
<td></td>
<td></td>
</tr>
<tr>
<td>Poss. Pronouns (Pronom.)</td>
<td></td>
<td></td>
<td></td>
<td></td>
<td></td>
</tr>
<tr>
<td>Infin. &amp; Gerunds (Comp.)</td>
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<td></td>
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</tr>
<tr>
<td>Compreh'n (Rel.)</td>
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<tr>
<td>V. Seq. in Conj. Struc. (V.P.)</td>
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<td></td>
<td></td>
</tr>
<tr>
<td>Environment (Q.F.)</td>
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<td></td>
<td></td>
<td></td>
<td></td>
</tr>
<tr>
<td>Determiners (Det.)</td>
<td></td>
<td></td>
<td></td>
<td></td>
<td></td>
</tr>
<tr>
<td>Forward &amp; Backward Pronom. (Pronom.)</td>
<td></td>
<td></td>
<td></td>
<td></td>
<td></td>
</tr>
<tr>
<td>Disj. &amp; Altern. (Conj.)</td>
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<td></td>
<td></td>
<td></td>
<td></td>
</tr>
<tr>
<td>Yes/No Questions (Q.F.)</td>
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<td></td>
<td></td>
<td></td>
<td></td>
</tr>
<tr>
<td>Passive Voice (V.P.)</td>
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<td></td>
<td></td>
<td></td>
<td></td>
</tr>
<tr>
<td>Nominalization (Nom.)</td>
<td></td>
<td></td>
<td></td>
<td></td>
<td></td>
</tr>
</tbody>
</table>
Because severity of hearing loss was found to be significant for most syntactic structures in the previous analysis, the scores from the screening test and the diagnostic tests were correlated for the total population and for each of the three hearing loss groups. The small number of subjects in each category indicated in Table XXIX prevented multiple regression analysis from being performed with this population. In fact, numbers in the mild to moderate (≤59 dB) hearing loss group were too small to provide reliable data, and the correlations will not be reported in this text. However, the tables for this group have been included in Appendix C, as they do provide a preliminary look at the performance levels of these subjects. Zero order correlations for the remaining two groups and the total population are provided in the following tables. Caution should be exercised when interpreting the tables for the total population, as these results incorporate those of the mild to moderate hearing loss group.

Correlations for Group 3, the profound (>90 dB) hearing loss group are reported first in Tables XXX, XXXI and XXXII as this group has the largest number of subjects in this analysis. Table XXX reveals that correlations between screening test structures for the profoundly deaf students were all above .61 with a range between .613 (Negation with Relativization) and .824 (Verb Processes with Question Formation). High correlations are to be found also in Table XXXI which reports the correlations of screening test scores with those on the diagnostic tests. In this table, all correlations are above .77 with the exception of screen variable 8 (complementation) and diagnostic test 18 (that complements) which correlated at .686, and screen variable 9 (nominalization) and the nominalization test which correlated at .535. Again with the above two exceptions, the screening test scores correlated particularly highly with diagnostic tests which measured the same syntactic structure.
TABLE XXX

Correlations between Syntactic Structures, Total Scores, and Test Order on the TSA Screening Test Form 2 for the Profound Hearing Loss Group (>90 dB)

<table>
<thead>
<tr>
<th></th>
<th></th>
<th></th>
<th></th>
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<th></th>
</tr>
</thead>
<tbody>
<tr>
<td>n</td>
<td>95</td>
<td>95</td>
<td>95</td>
<td>95</td>
<td>95</td>
<td>95</td>
<td>95</td>
<td>95</td>
<td>95</td>
<td>95</td>
</tr>
<tr>
<td>x</td>
<td>6.72</td>
<td>6.36</td>
<td>9.16</td>
<td>6.80</td>
<td>5.18</td>
<td>5.47</td>
<td>9.57</td>
<td>9.87</td>
<td>9.44</td>
<td>68.57</td>
</tr>
<tr>
<td>(Prop)</td>
<td>(.747)</td>
<td>(.578)</td>
<td>(.654)</td>
<td>(.618)</td>
<td>(.518)</td>
<td>(.547)</td>
<td>(.504)</td>
<td>(.548)</td>
<td>(.524)</td>
<td>(.571)</td>
</tr>
<tr>
<td>SD</td>
<td>2.82</td>
<td>2.92</td>
<td>3.75</td>
<td>3.44</td>
<td>3.14</td>
<td>2.83</td>
<td>4.40</td>
<td>4.66</td>
<td>4.40</td>
<td>28.53</td>
</tr>
</tbody>
</table>

Neg. (.88)
Conj. 0.69 (.78)
Det. 0.69 0.71 (.84)
Q.F. 0.80 0.77 0.79 (.86)
V.P. 0.71 0.79 0.80 0.82 (.85)
Pron. 0.74 0.70 0.77 0.74 0.76 (.78)
Rel. 0.61 0.72 0.75 0.75 0.82 0.75 (.82)
Comp. 0.70 0.72 0.82 0.79 0.80 0.75 0.81 (.85)
Nom. 0.62 0.68 0.74 0.78 0.77 0.69 0.76 0.74 (.84)
T.T. 0.81 0.85 0.90 0.91 0.92 0.86 0.89 0.91 0.87 (.96)*
T.O. -0.03 0.10 0.00 0.08 0.06 -0.05 0.00 0.00 0.02 0.02 1.00

Note: ( ) refers to the internal consistency measures computed using Hoyt's Anova.
( )* refers to the internal consistency measure using Cronbach's Composite Alpha.
### TABLE XXXI

**Correlations between the Syntactic Structures in the TSA Screening Test (Form 2) and the TSA Diagnostic Tests for the Profound Hearing Loss Group (>90 dB)**

| Screen Structures | Diagnostic Tests | 1  | 2  | 3  | 4  | 5  | 6  | 7  | 8  | 9  | 10 | 11 | 12 | 13 | 14 | 15 | 16 | 17 | 18 | 19 | 20 |
|-------------------|-----------------|----|----|----|----|----|----|----|----|----|----|----|----|----|----|----|----|----|----|----|----|----|
|                   |                 | n  |    |    |    |    |    |    |    |    |    |    |    |    |    |    |    |    |    |    |    |    |
|                   |                 | X (p) | 13 | 23 | 20 | 21 | 17 | 21 | 20 | 22 | 13 | 20 | 13 | 23 | 17 | 21 | 16 | 23 | 13 | 24 | 17 | 20 |
|                   |                 | SD (p) | .31 | .23 | .24 | .27 | .23 | .26 | .25 | .29 | .24 | .32 | .29 | .26 | .25 | .28 | .21 | .19 | .30 | .22 | .24 | .25 |
|                   | Neg. | .87 | .78 | .57 | .72 | .74 | .75 | .63 | .76 | .74 | .75 | .59 | .81 | .93* | .78 | .63 | .60 | .45 | .54 | .75 | .46 |
|                   | Conj. | .70 | .84 | .78 | .71 | .71 | .71 | .72 | .68 | .81 | .64 | .69 | .75 | .76 | .86* | .50 | .75 | .78 | .68 | .71 | .54 |
|                   | Det. | .68 | .86 | .61 | .88 | .87 | .90* | .86 | .81 | .69 | .69 | .58 | .84 | .83 | .75 | .72 | .79 | .65 | .70 | .73 | .31 |
|                   | Q.F. | .78 | .84 | .57 | .79 | .82 | .88 | .89 | .82 | .84 | .84 | .61 | .82 | .91* | .83 | .62 | .76 | .71 | .69 | .80 | .54 |
|                   | V.P. | .75 | .83 | .71 | .83 | .86 | .85 | .80 | .82 | .90* | .89 | .77 | .84 | .84 | .59 | .82 | .83 | .61 | .84 | .57 |
|                   | Pron. | .76 | .67 | .70 | .82 | .73 | .89* | .69 | .89* | .89* | .77 | .78 | .79 | .88 | .80 | .77 | .68 | .77 | .68 | .76 | .31 |
|                   | Rel. | .72 | .80 | .79 | .78 | .77 | .80 | .72 | .75 | .95* | .78 | .80 | .85 | .76 | .82 | .81 | .82 | .89 | .70 | .77 | .52 |
|                   | Comp. | .74 | .87 | .75 | .86 | .90* | .87 | .78 | .78 | .88 | .88 | .75 | .85 | .76 | .72 | .67 | .78 | .86 | .70 | .84 | .40 |
|                   | Nom. | .47 | .88* | .48 | .74 | .81 | .82 | .74 | .74 | .74 | .60 | .67 | .85 | .74 | .82 | .55 | .80 | .78 | .66 | .66 | .54 |

* - strongest correlation  □ - Diagnostic Tests directly related to the Screen Structure (areas where the strongest correlations would be anticipated)

**Diagnostic Tests:**

1. Negation
2. Conjunction
3. Disjunction & Alternation
4. Determiners
5. Wh-words
6. Answer
7. Yes/No Questions
8. Verb Sequence in Forward & Backward
9. Main Verbs, Linking
10. Passive Voice
11. Possessive Adjectives & Adverbs
12. Reflexives
13. Possessive Pronouns
14. Forward & Backward
15. Relativization - Gerunds
16. Infinitives & Comprehension
17. Relative Pronouns
18. That-Complements
19. Pronominalization
20. Nominalization
**TABLE XXXII**

Correlations between the TSA Diagnostic Tests for the Profound Hearing Loss Group (>90 dB)

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Where we might expect these higher correlations between the screen variables and the equivalent diagnostic test, often the highest correlations occurred with diagnostic tests designed to measure other structures. For example, negation on the screening test correlated with the negation diagnostic test at .874 but with the possessive pronouns test at .926. It is not possible to say too much about these discrepancies at this time however, as all correlations are so high, and the number of subjects is small for each group in this study. Nevertheless, such overall moderate to strong correlations suggest that a common underlying factor may be present throughout the Test of Syntactic Abilities. If a subject does well on one structure he will probably do well on all structures, but a low performance in one area will generally indicate a low performance overall. Table XXXII reports the correlations between the diagnostic test wherever data were available and again this high correlation pattern can be noted.

Tables XXXIII, XXXIV and XXXV provide similar information as the three previous tables for subjects in the moderate to severe hearing loss category (60-89 dB). Again correlations are moderate to strong within the screening test itself, (Table XXXIII) and between the test and the diagnostic battery (Table XXXIV). Syntactic structures correlate highly with the appropriate diagnostic test though there are many cases when the correlation is strongest between a structure and a diagnostic test which measures a different structure. The structure, Verb Processes, for example, correlates with the diagnostic test measuring the student's ability to comprehend and recognize yes/no question forms at the extremely high level of .929 while it correlates with tests measuring ability to handle verb sequences in conjoined structures; and main verbs, linking verbs and auxiliaries at .726 and .774 respectively. Correlations remain high in Tables XXXV which provides the correlational matrix of the diagnostic tests themselves.
TABLE XXXIII

Correlations between Syntactic Structures, Total Scores and Test Order on the TSA Screening Test Form 2 for the Marked-Severe Hearing Loss Group (60-89 dB)

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Note: ( ) refers to the internal consistency measures computed using Hoyt's Anova.
( )* refers to the internal consistency measure using Cronbach's Composite Alpha.
TABLE XXXIV

Correlations between Syntactic Structures in the Screening Test (Form 2) and the TSA Diagnostic Tests for the Marked-Severe Hearing Loss Group (60-89 dB)

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</tbody>
</table>

* - strongest correlation

|------------------|------------|---------------|---------------------------|---------------|-----------|-----------|-------------------|---------------------------------------|----------------------|-----------------|----------------------------------|-------------|----------------|--------------------------------|--------------------------|----------------|--------------------|----------------|-----------------------|-------------------|
TABLE XXXV

Correlations between the TSA Diagnostic Tests for the Marked-Severe Hearing Loss Group (60-89 dB)

<table>
<thead>
<tr>
<th>Diagnostic Tests</th>
<th>1</th>
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TABLE XXXVI

Correlations between Syntactic Structures in the Screening Test (Form 2) and the TSA Diagnostic Tests for the Total Population

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<td>.42</td>
<td>.53</td>
<td>.68</td>
<td>.65</td>
</tr>
</tbody>
</table>

* - strongest correlation

- Diagnostic Tests directly related to the Screen Structure (areas where the strongest correlations would be anticipated)
TABLE XXXVII
Correlations between the TSA Diagnostic Tests for the Total Population

| Diagnostic Tests |  1  |  2  |  3  |  4  |  5  |  6  |  7  |  8  |  9  | 10  | 11  | 12  | 13  | 14  | 15  | 16  | 17  | 18  | 19  | 20  |
|------------------|-----|-----|-----|-----|-----|-----|-----|-----|-----|-----|-----|-----|-----|-----|-----|-----|-----|-----|-----|
|                  | n   |     |     |     |     |     |     |     |     |     |     |     |     |     |     |     |     |     |     |     |
|                  | X(p)| .72 | .70 | .65 | .68 | .76 | .66 | .67 | .71 | .60 | .57 | .55 | .66 | .77 | .62 | .67 | .53 | .42 | .53 | .68 | .63 |

1.00 1.00 1.00 1.00 1.00 1.00 1.00 1.00 1.00 1.00 1.00 1.00 1.00 1.00 1.00 1.00 1.00 1.00 1.00 1.00
Finally the pattern of high correlations continues in Table XXXVI and XXXVII which provide data on the total population. The matrix for correlations within the screening test itself was reported earlier in Table XXIV, where most correlations were above .7. Tables XXXVI and XXXVII again indicate moderate to strong correlations lending support to the hypothesis that there may be one common factor underlying all tests.

While it is recognized that the numbers in this study are small, the high inter-correlations between structures, screen and diagnostic tests, and the diagnostic tests themselves are consistent and warrant further investigation to determine whether the test of syntactic ability does provide a diagnostic function or whether it merely gives a global indication of whether a particular student is proficient or lacking in the area of syntactic ability. In other words, will the screening test provide a meaningful profile of a student's syntactic ability by pointing out his strengths and weaknesses on the nine structures tested, or will it merely indicate the student's general level of syntactic functioning?

Figures 1, 2 and 3 provide profiles for 5 students in each of the hearing loss categories. Students were randomly selected using a table of random numbers and their scores were changed to standard scores with a mean of 50 and a S.D. of 10.

Indications from these profiles are that for all hearing loss groups, subjects tended to score around the same level across the nine syntactic structures. Such a scoring pattern results in a fairly flat profile with the possibility that fluctuations may be accounted for by factors other than the ability to recognize and comprehend the structure being tested. Examination of the above profiles again poses the question of whether the screening test will provide diagnostic information on a student's ability
to handle particular syntactic structures or merely provide the teacher with an indication of the student's level of syntactic functioning. Further research is needed to explore this question, as the number of subjects in this study does not permit the necessary analysis.

FIGURE 1
Student Profiles (<59 dB)

<table>
<thead>
<tr>
<th>Student</th>
<th>1</th>
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<th>4</th>
<th>5</th>
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<tr>
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<td>Pronominalization</td>
<td></td>
<td></td>
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<tr>
<td>Conjunction</td>
<td>7</td>
<td>Relativization</td>
<td></td>
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</tr>
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<td>Determiners</td>
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<td>Complementation</td>
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<tr>
<td>Question Formation</td>
<td>9</td>
<td>Nominalization</td>
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<tr>
<td>Verb Processes</td>
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</tr>
</tbody>
</table>

Syntactic Structures
FIGURE 2
StudentProfiles (60-89 dB)

<table>
<thead>
<tr>
<th>1</th>
<th>2</th>
<th>3</th>
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<td>Question Formation</td>
<td>Verb Processes</td>
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<tr>
<td>6</td>
<td>7</td>
<td>8</td>
<td>9</td>
<td>10</td>
</tr>
<tr>
<td>Pronominalization</td>
<td>Relativization</td>
<td>Complementation</td>
<td>Nominalization</td>
<td></td>
</tr>
</tbody>
</table>

- 84 -
FIGURE 3

Student Profiles (>90 dB)

1. Negation
2. Conjunction
3. Determiners
4. Question Formation
5. Verb Processes
6. Pronominalization
7. Relativization
8. Complementation
9. Nominalization

Student
1
2
3
4
5

Mean

Syntactic Structures

Standard Scores
SUMMARY AND CONCLUSION

In this research, the Screening Test of the Test Syntactic Abilities (Forms 1 and 2), and four randomly selected tests of the TSA Diagnostic Battery were administered to 233 prelingually hearing-impaired students in British Columbia. Subjects were aged between eight and nineteen years and their severity of hearing loss ranged from a mild to a profound degree.

One part of this study investigated the validity and reliability of the Screening Test, while the other explored the extent to which age and/or severity of hearing loss affected a student's ability to recognize and comprehend the main syntactic structures of standard English.

Both Forms 1 and 2 of the Screening Test were scored and analysed using the test analysis package, LERTAP (Nelson 1974). Results of these analyses showed that measures of internal consistency (Hoyt's Anova) ranged from .82 to .89 for the nine syntactic structures which make up the Screening Test and .95 and .96 (Cronbach's Composite Alpha) for the total test on Forms 1 and 2 respectively. Such high correlations support Quigley's claim that the Screening Test is a highly reliable instrument for measuring syntactic ability.

Examination of the equivalent forms reliability revealed that Forms 1 and 2 of the Screening Test were content parallel with respect to the structure tested and the linguistic environment within that structure. All between form correlations were high and test order was not noted to make any difference to performance levels.

The Screening Test measured all the syntactic structures included in the TSA Diagnostic Battery. These structures were selected because they represented the nine basic syntactic structures of English: viz negation, conjunction (including disjunction and alternation), determiners, question
formation, verb processes, pronominalization, relativization, complementation, and nominalization. While the nine structures were not sampled with the same frequency or in all environments covered in the diagnostic battery, a sufficiently representative sample of the environments was included to provide good content validity for a screening test.

Investigation of the item analysis data revealed a mean item difficulty level of 63% across both screening test forms for the total population, and levels of 75, 63 and 57 percent for the mild-moderate, (≤59 dB), marked-severe, (60-89 dB), and profound (>90 dB) categories respectively. These data show a significant decrease in performance scores as the severity of the hearing loss increases. While the mean item difficulty level for the profound group (57%) compares favourably with Quigley's figure of 54% for a similar American population, the levels of the mild-moderate, and marked-severe categories are higher indicating that the test is easier for subjects with lesser degrees of hearing loss. For all subjects, some structures like negation and determiners were obviously easier than others like verb processes and relativization. However, difficulty levels for subjects with more hearing were consistently below recognized optimal levels, indicating that the test may not be suitable for the hard of hearing or those with less severe hearing losses.

The severity of a subject's hearing loss also had a marked effect on the power of the screening test to discriminate the better students from those who were having difficulty with the material. Although the point-biserials (item-total test) for the three hearing loss categories, were positive in all cases except one, the correlations increased as the hearing loss increased, and the distractor items did not perform nearly as well for the mild-moderate category as they did for those subjects with greater hearing losses. Again this decline in the test's power to discriminate for
subjects with less severe hearing losses leads us to the conclusion that while the screening test has both good content validity and reliability for the profound and probably the severely deaf students, its use with the mild to moderately hearing-impaired students maybe questionable and any results from such testing should be treated cautiously. Moreover, the test was not found to differentiate actual differences in a student's performance among the various syntactic structures for any of the hearing loss groups in the study. Those differences that were demonstrated may have occurred through chance rather than through any differential validity that the test may have, and further research into this area is recommended.

The general hypotheses that age and severity of hearing loss would produce significant differences in the performance levels of students' ability to recognize and comprehend the syntactic structures measured in the TSA were only partially supported by the data in the present study. The results of a two way analysis of variance showed that age was significant at the .01 level for conjunction only, whereas the severity of hearing loss made a significant difference for determiners, question formation, pronominalization, relativization, complementation, and nominalization. These findings indicate that although performance does improve with age, the severity of the hearing loss has a much greater effect on the student's syntactic ability; and that many severe or profoundly deaf students will have difficulty understanding the major syntactic structures of standard English, even by the time they have finished their formal schooling. Moreover, the absence of significant improvement across the age range of the study population lends support to the theory that the ability to learn language may be transitory, reaching its peak in the preschool years and declining thereafter. As reading ability also depends heavily on a good understanding of syntax, this significant decline in performance across
the hearing loss range points to the handicap an auditory impairment at birth or within the first two years of life presents to the child's linguistic development, and stresses the need for early intervention programs for such children.

The TSA Screening Test was designed to measure a student's general level of syntactic ability and to provide reliable information for identifying linguistic structures on which a student is in greatest need of help. In order to do this, the test must adequately predict a student's performance levels on the Diagnostic Battery, and the syntactic structures on the screen should correlate positively with the diagnostic tests which measure the same structure albeit in different environments. Hence, to investigate whether the Screening Test exhibited such empirical validity, four diagnostic tests were administered to each subject and their results were correlated with scores from the screening test. All tests and subjects were randomly assigned using a multiple matrix procedure. The results revealed moderate to strong correlations for all structures between the Screening Test and the diagnostic tests. Not only did the syntactic structures on the screen correlate with their equivalent diagnostic tests, but also with most other tests in the battery. In many instances the highest correlations occurred between a syntactic structure and a supposedly unrelated test, although the expected correlation was high in all cases. These findings suggest a common language factor may be present throughout the Test of Syntactic Abilities. Such a factor would underly all structures within the TSA and while allowing the test to determine a student's general level of syntactic ability, it would limit or prevent it from providing the reliable information needed to indicate strengths and weaknesses across the various structures.

In order to explore the above hypothesis, five students were randomly
selected from each of the hearing loss categories and their scores on the
nine syntactic structures of the screening test were plotted. The resulting
profiles tended to be flat with only minor differences between structures
giving support to the theory that a common underlying factor may be present.
However, definitive data on this question will have to await further research
as numbers in the present study did not permit the required regression and
factor analyses.

Other areas worthy of investigation would include the influence of
communication method or educational setting on a student's ability to recog­
nize and comprehend the main syntactic structures, and the relationship
between a student's reading level and his performance on the TSA.

However, the TSA is more than a research instrument. As well as
providing a much needed test of syntactic abilities it serves as an excel­
lent teacher's guide to the major syntactic structures of English. Teachers
would do well to concentrate on how the student responds to the test items
rather than the actual score obtained. Knowing that a student is weak in
a certain area is one thing, but it is more important to know where he is
having difficulty and what can be done to help him. The distractor items
of the TSA appear to be designed in such a way that careful examiniation
of incorrect responses may not only determine what the student doesn't
know but what rules he is applying and why the mistakes are being made.
Further investigation of how these distractors affect performance may
uncover a great deal of information about the way hearing-impaired students
tackle syntax, and provide teachers with a clearer picture of the problems
their students may be having with the major syntactic structures of English.
Bibliography


Reamer, J.C. Mental and educational measurements of the deaf, Psychology Monogr., 1921, 29, No. 3.


APPENDIX A

TEST OF SYNTACTIC ABILITIES

SCREENING TEST

FORM 1

University of Illinois at Urbana-Champaign

Experimental Edition
NOT FOR PUBLICATION OR REPRODUCTION IN ANY FORM

Special permission granted by Dr. Stephen Quigley for exclusive use in the Demographic Study of Hearing Impaired Students in British Columbia, Canada.

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TEST OF SYNTACTIC ABILITIES

SCREENING TEST
FORM 1

Name: ________________________________

Date of Birth: _________________________

School: ______________________________

School District: _________________________

Date of Test: _________________________
You will read groups of sentences. Only one of the sentences is right. You choose the right sentence.

Example 1. You choose one:

A. The flower is not yellow.
B. The flower is no yellow.
C. The flower not is yellow.
D. The flower is yellow no.

A. is the right sentence: The flower is not yellow.

A is marked with an X like this: X B C D
Example 2. You choose one:

A. The girl help the teacher tomorrow.
B. The girl will helping the teacher tomorrow.
C. The girl will help the teacher tomorrow.
D. The girl helped the teacher tomorrow.

A  B  C  D

C. is the right sentence: The girl will help the teacher tomorrow.

You mark C with an X:  A  B  C  D
Example 3. You choose one:

A. Tom finished to eating.
B. Tom finished eating.
C. Tom finished to ate.
D. Tom finished eat.

A B C D

B. is the right sentence: Tom finished eating.

You mark B with an X:

A B C D

In this book are more sentences.
Read the sentences carefully.
Choose the right sentence.
Mark the right answer with an X in your booklet.
If you do not know, guess.

S T O P
1. A. The puppies aren't in the box.
   B. Not the puppies are in the box.
   C. The puppies are no in the box.
   D. The puppies no aren't in the box.

2. A. We stopped boat.
   B. We stopped an boat.
   C. We stopped the boat.
   D. We stopped a the boat.

3. A. Who gave you a ball?
   B. Gave you a ball who?
   C. Who Jim gave you a ball?
   D. Who you gave a ball?

4. A. The laughter of the girl surprise the man.
   B. The laughter the girl surprised the man.
   C. The laughter to the girl surprised the man.
   D. The laughter of the girl surprised the man.

5. A. Not Mother was at home.
   B. Mother was at home no.
   C. Mother wasn't at home.
   D. Mother was no at home.
6. A. The boys not are feeding the animals.
   B. The boys aren't feeding the animals.
   C. The boys are feeding the animals not.
   D. The boys no are feeding the animals.

7. A. I didn't go.
   B. Not I did go.
   C. I not did go.
   D. I not go.

8. A. Billy colored a picture. An picture was red.
   B. Billy colored a picture. A picture was red.
   C. Billy colored a picture. The picture was red.
   D. Billy colored a picture. Picture was red.

9. A. Baby kittens can't see.
   B. Baby kittens not see.
   C. Baby kittens not can see.
   D. Baby kittens can no see.

10. A. We fed an cows.
    B. We fed the cows.
    C. We fed a cows.
    D. We fed the a cows.
11. A. The kite was in sky.
   B. The kite was in the sky.
   C. The kite was in a the sky.
   D. The kite was in a sky.

12. A. I will finished the work after lunch.
   B. I finishes the work after lunch.
   C. I will finishing the work after lunch.
   D. I will finish the work after lunch.

13. A. The girls not walk in the rain.
   B. The girls would walk in the rain no.
   C. The girls wouldn't walk in the rain.
   D. The girls not would walk in the rain.

14. A. Tom saw a big black dog.
   B. Tom saw an big black dog.
   C. Tom saw big a black dog.
   D. Tom saw a big black dogs.

15. A. Not the dog has seen the food.
   B. The dog not has seen the food.
   C. The dog hasn't seen the food.
   D. The dog did has not seen the food.
16. A. A big car went up the hill.  
B. Big a car went up the hill.  
C. An big car went up the hill.  
D. A big cars went up the hill.

17. A. The grass does look no green.  
B. The grass does not look green.  
C. Not the grass does look green.  
D. The grass not look green.

18. A. The dog has a black tail.  
B. The dog has black a tail.  
C. The dog has a black tails.  
D. The dog has an black tail.

19. A. Father was going a home.  
B. Father was going an home.  
C. Father was going home.  
D. Father was going the home.

20. A. The boys ate a the meat.  
B. The boys ate the meat.  
C. The boys ate the an meat.  
D. The boys ate a meat.
21. A. David watched the elephant eat.
   B. David watched the elephant to eat.
   C. David watched the elephant ate.
   D. David watched the elephant to eating.

22. A. Did Mother make a cake?
   B. Do Mother make a cake?
   C. Mother make a cake?
   D. Did Mother can make a cake?

23. A. The boy to school last Monday.
   B. The boy walks to school last Monday.
   C. The boy is walked to school last Monday.
   D. The boy walked to school last Monday.

24. A. Mary heard to the roar of the lion.
   B. Mary hearing the roar of the lion.
   C. Mary heard the roar of the lion.
   D. Mary heard the roar the lion.

25. A. I ate orange.
   B. I ate a orange.
   C. I ate an orange.
   D. I ate an the orange.
26. A. The crash of the train scare the people.
   B. The crash to the train scared the people.
   C. The crash the train scared the people.
   D. The crash of the train scared the people.

27. A. The girls some of brought flowers.
   B. Some of the girls brought flowers.
   C. Some the girls brought flowers.
   D. Some of the girl brought flowers.

28. A. When you plant the flowers?
   B. Did you plant the flowers when?
   C. When you planted the flowers?
   D. When did you plant the flowers?

29. A. The children have some of money.
   B. The children have an money.
   C. The children have some money.
   D. The children have a money.

30. A. What did John see?
   B. What did John saw?
   C. What John see?
   D. What John did see?
31. A. Cathy wanted some of help.
B. Cathy wanted some a help.
C. Cathy wanted an help.
D. Cathy wanted some help.

32. A. Anne knew the driver the car.
B. Anne knew the driver of the car.
C. Anne knew to the driver of the car.
D. Anne knowing the driver of the car.

33. A. The girls coloring pictures.
B. The girls are color pictures.
C. The girls are colored pictures.
D. The girls are coloring pictures.

34. A. The growth to the girl surprised her mother.
B. The growth of the girl surprised her mother.
C. The growth of the girl surprise her mother.
D. The growth the girl surprised her mother.

35. A. John knew for the lady loved ice cream.
B. John knew to the lady loved ice cream.
C. John knew that the lady loved ice cream.
D. John knowing that the lady loved ice cream.
36. A. The crying of the kitten was sad.
   B. The crying the kitten was sad.
   C. The crying to the kitten was sad.
   D. The crying of the kitten sad.

37. A. Bill heard to the screaming of the girl.
   B. Bill hearing the screaming of the girl.
   C. Bill heard the screaming the girl.
   D. Bill heard the screaming of the girl.

38. A. Mother knows for Anne opened the window.
   B. Mother knows to Anne opened the window.
   C. Mother knows that Anne opened the window.
   D. Mother knowing that Anne opened the window.

39. A. The building of the house slow.
   B. The building of the house was slow.
   C. The building to the house was slow.
   D. The building the house was slow.

40. A. Could Anne ride the horse?
   B. Could Anne rode the horse?
   C. Did Anne could ride the horse?
   D. Am Anne could ride the horse?
41. A. John watched the fixing of the car.
   B. John watched the fixing the car.
   C. John watching the fixing of the car.
   D. John watched to the fixing of the car.
   
42. A. Five the children went home.
   B. The children five of went home.
   C. Five of children went home.
   D. Five of the children went home.

43. A. Father knew for Bob caught a fish.
   B. Father knew to Bob caught a fish.
   C. Father knew Bob caught a fish.
   D. Father knowing that Bob caught a fish.

44. A. The selling the car was difficult.
   B. The selling to the car was difficult.
   C. The selling of the car difficult.
   D. The selling of the car was difficult.

45. A. It was sad that the cows were hungry.
   B. The cows were hungry was sad.
   C. That was sad the cows were hungry.
   D. The cows were hungry was sad.
46. A. The children ran home to eat.
   B. The children ran home eat.
   C. The children ran home to ate.
   D. The children ran home to eating.

47. A. Can you can run?
   B. Can you run?
   C. Do you can run?
   D. Are you can run?

48. A. The man saw Tom to walked.
   B. The man saw Tom to walk.
   C. The man saw Tom walking.
   D. The man saw Tom to walking.

49. A. I showed the little boy how to jump.
   B. I showed the little boy how jumping.
   C. I showed the little boy how to jumped.
   D. I showed the little boy how to jumping.

50. A. The boys are good at to reading.
   B. The boys are good at to read.
   C. The boys are good at reading.
   D. The boys are good at read.
51. A. The girl dropped the ball surprised the boy.
   B. So the girl dropped the ball surprised the boy.
   C. For the girl dropped the ball surprised the boy.
   D. That the girl dropped the ball surprised the boy.

52. A. It is fun to helped.
   B. It is fun to help.
   C. It is fun help.
   D. It is fun to helping.

53. A. Dad went shopping.
   B. Dad went to shopped.
   C. Dad went shop.
   D. Dad went to shopping.

54. A. Dad forgot make the fire.
   B. Dad forgot to made the fire.
   C. Dad forgot to make the fire.
   D. Dad forgot to making the fire.
Be careful. These are different kinds of sentences.
You choose the right word to make a good sentence.

Example: Tom brought the flowers to Anne. They are ______.

You choose one:

A. their
B. our
C. hers
D. mine

C. is the right word: Tom brought the flowers to Anne. They are hers.

[C] is marked with an X like this: A B X D
55. Because _____ wanted to help, the children washed the windows.
   A. they
   B. the children
   C. their
   D. them

56. Bill said, "She made the cake by _____." 
   A. himself
   B. sheself
   C. her
   D. herself

57. The kitten is playing and the mother cat _____.
   A. sleep
   B. is sleeping
   C. sleeping
   D. was sleep

58. Father bought the puppies for me. The animals are _____.
   A. theirs
   B. yours
   C. hers
   D. mine
59. Mother made the dresses for us. They are ______.
   A. ours
   B. their
   C. your
   D. mine

   [A] [B] [C] [D]

60. Next Saturday you ______ the fire and the boys will cook dinner.
   A. will made
   B. will make
   C. will making
   D. make

   [A] [B] [C] [D]

61. We cooked lunch and Susan ______ the dishes.
   A. washing
   B. are wash
   C. wash
   D. washed

   [A] [B] [C] [D]

62. We fed the baby ______ she cried.
   A. but
   B. with
   C. either
   D. or

   [A] [B] [C] [D]
63. Bob said, "I will cut the meat by ______."  
   A. myself  
   B. himself  
   C. yourself  
   D. meself  

64. Father made a fire. The dog burned ______.  
   A. it  
   B. itself  
   C. themselves  
   D. him  

65. We knew the children ______ bought the flowers.  
   A. when  
   B. where  
   C. whose  
   D. who  

66. The girls pushed Bill. They hurt ______ arm.  
   A. him  
   B. his  
   C. her  
   D. their
67. We moved to a farm. The children liked _____ new friends.
   A. their  B. it  C. theirs  D. yours
   [A] [B] [C] [D]

68. Since the boys were sick, Susan took food to _____.
   A. her  B. the boys  C. themselves  D. them
   [A] [B] [C] [D]

69. You found _____ Dad wanted.
   A. what  B. where  C. when  D. which
   [A] [B] [C] [D]

70. I will _____ walk or ride the bicycle.
   A. both  B. neither  C. but  D. either
   [A] [B] [C] [D]
71. I wanted the puppy _____ had a white tail.
   A. whose  
   B. where  
   C. that  
   D. when       

72. When _____ mother brought the eggs, Joe made lunch.
   A. him  
   B. his  
   C. Joe's  
   D. he       

73. _____ David nor Susan ate supper.
   A. Either  
   B. But  
   C. Both  
   D. Neither       

74. Tom knew _____ the boy lived.
   A. what  
   B. whose  
   C. where  
   D. which       

75. Susan rode the horse ____ jumped the fence.
   A. whose
   B. when
   C. where
   D. which

76. ____ Dad came home Mary took the car.
   A. When
   B. Whose
   C. Who
   D. Where

77. You saw a bunny ____ tail was black.
   A. where
   B. that
   C. who
   D. whose
Be careful. These are different kinds of sentences.
You choose another right way of saying the sentences.

Example: The girls made lunch. The boys washed the dishes.
You choose one:

A. The girls made lunch and the boys washed the dishes.
B. The girls made lunch the boys washed the dishes.
C. The girls and boys made lunch.
D. The girls made lunch and washed the dishes.

A. is the right sentence: The girls made lunch and the boys washed the dishes.

A is marked with an X like this: 

A   B   C   D
78. Tom opened the window. Mother called the boys.
   A. Tom opened the window Mother called the boys.
   B. Tom opened the window and the boys.
   C. Tom opened the window and Mother called the boys.
   D. Tom and Mother called the boys.

79. Mother went to the farm. Dad went to the farm.
   A. Mother went to the farm and Dad.
   B. Mother and Dad went to the farm.
   C. Mother went to the farm Dad went to the farm.
   D. Mother Dad went to the farm.

80. Tom bought a hat. Tom bought a coat.
   A. Tom bought a hat bought a coat.
   B. Tom bought a hat Tom bought a coat.
   C. Tom bought a hat a coat.
   D. Tom bought a hat and a coat.

81. We worked in school. We played in school.
   A. We worked in school we played in school.
   B. We worked and played in school.
   C. We worked we played in school.
   D. We worked in school played in school.
82. The girls bought an old car. The boys washed the car.
A. The girls bought an old car the boys washed the car.
B. The girls bought an old car and the boys washed the car.
C. The girls bought washed the car.
D. The girls bought an old car and the boys washed.

A B C D

83. Dad kissed the baby. The baby laughed.
A. Dad kissed the baby the baby laughed.
B. Dad kissed the baby and the baby laughed.
C. Dad kissed the baby laughed.
D. Dad kissed the baby and laughed.

A B C D

84. The ball hit Mary.
A. Mary hit by the ball.
B. Mary hit the ball.
C. Mary was hit by the ball.
D. Mary was hit the ball.

A B C D

85. The horses got fed by the girls.
A. The horses fed the girls.
B. The girls fed the horses.
C. The horses fed by the girls.
D. The girls got fed by the horses.

A B C D
86. The man was watched by a policeman.
   A. The man was watch by a policeman.
   B. A policeman was watched by the man.
   C. The man watched a policeman.
   D. A policeman watched the man.

   A   B   C   D

87. Bob talked with the girl. The girl's horse jumped the fence.
   A. Bob talked with the girl horse jumped the fence.
   B. Bob talked with the girl's horse jumped the fence.
   C. Bob talked with the girl whose horse jumped the fence.
   D. Bob talked with the girl who her horse jumped the fence.

   A   B   C   D

88. Mary saw the boys. The boys made a bird house.
   A. Mary saw who made a bird house the boys.
   B. Mary saw the boys made a bird house.
   C. Mary saw who the boys made a bird house.
   D. Mary saw the boys who made a bird house.

   A   B   C   D

89. The truck was pulled by a car.
   A. The truck pulled a car.
   B. A car pulled the truck.
   C. The truck was pulled a car.
   D. A car was pulled by the truck.

   A   B   C   D
Be careful. These are different kinds of sentences.
You choose the right answer.

Example: What did the boys play?
You choose one:

A. yesterday  
B. football  
C. played  
D. a ball

B. is the right word: football.

B is marked with an X like this:
90. Do birds make nests?

A. eggs
B. in trees
C. Birds make nests.
D. Yes, they do.

91. Is the elephant a big animal?

A. in the zoo
B. big animal
C. The elephant is big.
D. yes

92. How far can Bill hit the ball?

A. not very far
B. He hit the ball.
C. a baseball
D. Yes, he can hit it.

93. What does the word "little" mean?

A. little child
B. not big
C. The baby is.
D. small dog
94. Anne likes ice cream, doesn't she?

A. doesn't like
B. pink ice cream
C. Yes, she does.
D. doesn't
Be careful. These are different kinds of sentences.
You decide what the sentences tell us.

Example: The boy who talked to Dad rode the black horse.
What does the sentence tell us?
You choose one:

A. Dad rode the black horse.
B. The boy talked to Dad.
C. The boy talked to the black horse.
D. Dad talked to the black horse.

B. is the right sentence: The boy talked to Dad.

B is marked with an X like this:

A  B  C  D
95. The boy knows that the woman loves children.
   A. The boy loves the woman.
   B. The woman loves children.
   C. The boy knows children.
   D. The boy loves children.
   A  B  C  D

96. It scared Linda that the dogs hurt the boy.
   A. The dogs hurt the boy.
   B. Linda scared the dogs.
   C. The boy scared Linda.
   D. Linda hurt the boy.
   A  B  C  D

97. Father planted the flowers. His hands were not clean.
   A. Father did not plant the flowers.
   B. His hands were dirty.
   C. His hands were not dirty.
   D. His hands were clean.
   A  B  C  D

98. The man learned a box fell on the girl.
   A. The man learned the girl.
   B. The girl fell on a box.
   C. The man learned a box.
   D. A box fell on the girl.
   A  B  C  D
99. John listened to the teacher and finished the work.
   A. John finished the work.
   B. John and the teacher finished the work.
   C. The teacher listened to John.
   D. The teacher finished the work.
   \[ \text{A} \quad \text{B} \quad \text{C} \quad \text{D} \]

100. The teacher learned that Tom chased Sally.
   A. The teacher chased Sally.
   B. Tom chased Sally.
   C. The teacher learned Tom.
   D. Sally chased Tom.
   \[ \text{A} \quad \text{B} \quad \text{C} \quad \text{D} \]

101. We watched the girls who played baseball.
   A. We played baseball.
   B. The girls watched baseball.
   C. We played with the girls.
   D. The girls played baseball.
   \[ \text{A} \quad \text{B} \quad \text{C} \quad \text{D} \]

102. You called the women who Mother knew.
   A. You knew the women.
   B. Mother called the women.
   C. The women called Mother.
   D. Mother knew the women.
   \[ \text{A} \quad \text{B} \quad \text{C} \quad \text{D} \]
103. Jim lost the book or Tom took it.
   A. Either Jim lost the book or Tom took it.
   B. Jim did not lose the book but Tom took it.
   C. Tom took the book and Jim did not lose it.
   D. Jim lost the book and Tom did not take it.

104. I found the boy Dad gave the money to.
   A. I found the money.
   B. The boy gave the money.
   C. Dad gave the money.
   D. I found Dad.

105. That the elephant ate the flowers surprised Father.
   A. The elephant ate the flowers.
   B. The elephant ate Father.
   C. Father surprised the elephant.
   D. The flowers surprised Father.

106. The boys who worked with Dad liked airplanes.
   A. Dad worked with airplanes.
   B. The boys liked Dad.
   C. Dad liked airplanes.
   D. The boys worked with Dad.
107. The crying of the girl surprised the teacher.
   A. The teacher cried.
   B. The teacher surprised the girl.
   C. The crying surprised the teacher.
   D. The girl surprised the teacher.

108. Bob watched the running of the boy.
   A. Bob watched the boy's running.
   B. The boy watched Bob.
   C. The running watched Bob.
   D. The running watched the boy.

109. The scream of the cat scared the dog.
   A. The cat scared the dog.
   B. The scream scared the dog.
   C. The dog screamed.
   D. The dog scared the cat.

110. The men who the policeman chased had a blue car.
    A. The men chased the policeman.
    B. The men had a blue car.
    C. The policeman had a blue car.
    D. The men chased a blue car.
111. The girls, who were beautiful, bought new dresses.
   A. The beautiful girls bought new dresses.
   B. The beautiful girls were bought new dresses.
   C. The girls were beautiful bought new dresses.
   D. The girls who the girls were beautiful bought new dresses.

112. The girl heard the ringing of the bell.
   A. The ringing heard the bell.
   B. The ringing heard the girl.
   C. The girl heard the bell's ringing.
   D. The bell heard the girl.

113. The growth of the plant excited the children.
   A. The children grew.
   B. The plant excited the children.
   C. The children excited the plant.
   D. The growth excited the children.

114. The teacher heard the laughter of the student.
   A. The teacher laughed.
   B. The laughter heard the teacher.
   C. The teacher heard the student's laughter.
   D. The student heard the teacher.
115. I watched the children who were sick.
   A. I watched the children sick.
   B. I watched the children were sick.
   C. I watched the children who the children were sick.
   D. I watched the sick children.

116. The little girls who ate with Cathy loved ice cream.
   A. Cathy ate ice cream.
   B. The little girls loved Cathy.
   C. Cathy loved ice cream.
   D. The little girls ate with Cathy.

117. Anne waited for the girl. Bill gave the bicycle to the girl.
   A. Anne waited for the girl who Bill gave the bicycle to the girl.
   B. Anne waited for who Bill gave the bicycle to the girl.
   C. Anne waited for the girl who Bill gave the bicycle to.
   D. Anne waited for the girl who Bill gave the bicycle to her.

118. The crash of the car scared Bill.
   A. Bill scared the car.
   B. The crash scared Bill.
   C. Bill crashed the car.
   D. The car scared Bill.
119. Bob knew the driver of the car.
   A. The driver knew Bob.
   B. Bob drove the car.
   C. Bob knew the car's driver.
   D. The car knew Bob.

120. You waited for the boys. You sent a letter to the boys.
   A. You waited for the boys to whom you sent a letter to them.
   B. You waited for the boys to whom you sent a letter.
   C. You waited for whom you sent a letter to the boys.
   D. You waited for the boys to whom you sent a letter to the boys.
TEST OF SYNTACTIC ABILITIES

SCREENING TEST

FORM 2

University of Illinois at Urbana-Champaign

Experimental Edition
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TEST OF SYNTACTIC ABILITIES

SCREENING TEST
FORM 2

Name:

Date of Birth:

School:

School District:

Date of Test:
You will read groups of sentences. Only one of the sentences is right. You choose the right sentence.

Example 1. You choose one:

A. One the girls found a baby bird.
B. One of the girls found a baby bird.
C. The girls one of found a baby bird.
D. One of girls found a baby bird.

B. is the right sentence: One of the girls found a baby bird.

is marked with an \(\times\) like this:
Example 2. You choose one:

A. Mary likes for to read.
B. Mary likes to reading.
C. Mary likes read.
D. Mary likes to read.

D. is the right sentence: Mary likes to read.

You mark D with an X:
Example 3. You choose one:

A. Jim have a new car.
B. Jim has a new car.
C. Jim a new car.
D. Jim is a new car.

B. is the right sentence: Jim has a new car.

You mark B with an X:

In this book are more sentences.
Read the sentences carefully.
Choose the right sentence.
Mark the right answer with an X in your booklet.
If you do not know, guess.

STOP
1. A. The kittens weren't in the box.
   B. The kittens not were in the box.
   C. The kittens weren't not in the box.
   D. Not the kittens were in the box.

2. A. The cat had an kittens.
   B. The cat had a kittens.
   C. The cat had some kittens.
   D. The cat had the a kittens.

3. A. Who the boy found the kite?
   B. Who found the kite?
   C. Who he found the kite?
   D. Found who the kite?

4. A. The scream of the lion scared the children.
   B. The scream the lion scared the children.
   C. The scream to the lion scared the children.
   D. The scream of the lion scare the children.

5. A. Not the elephant is a small animal.
   B. The elephant is not a small animal.
   C. The elephant is a small animal no.
   D. The elephant not is a small animal.
6. A. Mary was making not the dress.
   B. Mary not was making the dress.
   C. Mary wasn't making the dress.
   D. Mary did was not making the dress.

7. A. We don't walk to school.
   B. We not walk to school.
   C. We not do walk to school.
   D. We do no walk to school.

8. A. Mother made a cake. An the cake was white.
   B. Mother made a cake. A cake was white.
   C. Mother made a cake. A the cake was white.
   D. Mother made a cake. The cake was white.

9. A. The little boy no can not write.
   B. Not the little boy can write.
   C. The little boy not can write.
   D. The little boy can not write.

10. A. The little girls played.
    B. Little the girls played.
    C. A little girls played.
    D. The some little girls played.
11. A. Mother looked at a the moon.
   B. Mother looked at moon.
   C. Mother looked at a moon.
   D. Mother looked at the moon.

12. A. The baby will sit at the table next Sunday.
   B. The baby at the table next Sunday.
   C. The baby sit at the table next Sunday.
   D. The baby will sat at the table next Sunday.

13. A. The boy would not read the story.
   B. The boy not read the story.
   C. The boy no would read the story.
   D. The boy would no read the story.

14. A. John has an new blue car.
   B. John has car a new blue.
   C. John has a new blue car.
   D. John has new a blue car.

15. A. The girls did had not found the puppy.
   B. Not the girls had found the puppy.
   C. The girls not had found the puppy.
   D. The girls hadn't found the puppy.
16. A. Mother has a big black pans.
   B. Mother has an big black pan.
   C. Mother has big a black pan.
   D. Mother has a big black pan.

17. A. You seem tired not.
   B. You not seem tired.
   C. You do not seem tired.
   D. You seem no tired.

18. A. The man has an brown coat.
   B. The man has a brown coat.
   C. The man has a brown coats.
   D. The man has brown a coat.

19. A. Mother walked a home.
   B. Mother walked home.
   C. Mother walked the home.
   D. Mother walked an home.

20. A. The dog has some of food.
   B. The dog has an food.
   C. The dog has a food.
   D. The dog has some food.
21. A. Tom watched the men to work.
   B. Tom watched the men work.
   C. Tom watched the men to working.
   D. Tom watched the men worked.

22. A. You do the problems?
   B. Did you do the problems?
   C. You done the problems?
   D. Did do you the problems?

23. A. I in the park last Sunday.
   B. I sit in the park last Sunday.
   C. I am sat in the park last Sunday.
   D. I sat in the park last Sunday.

24. A. The boy heard to the laughter of the girl.
   B. The boy hearing the laughter of the girl.
   C. The boy heard the laughter of the girl.
   D. The boy heard the laughter the girl.

25. A. John found the kittens.
   B. John found a kittens.
   C. John found a the kittens.
   D. John found an kittens.
26. A. The work of the men surprise the woman.
   B. The work to the men surprised the woman.
   C. The work the men surprised the woman.
   D. The work of the men surprised the woman.

27. A. Some of the cats were black.
   B. Some of the cat were black.
   C. Cats the some of were black.
   D. Some the cats were black.

28. A. When did Susan walk to the farm?
   B. Susan walk to the farm when?
   C. When to the farm did Susan walk?
   D. When Susan walked to the farm?

29. A. Bob found a water.
   B. Bob found some water.
   C. Bob found some of water.
   D. Bob found some a water.

30. A. What will I feed the kitten?
   B. What will I feed the kitten milk?
   C. What will I fed the kitten?
   D. What the kitten will I feed?
31. A. Mother made some a bread.
   B. Mother made a bread.
   C. Mother made some bread.
   D. Mother made an bread.  

32. A. John saw the start the race.
   B. John saw the start of the race.
   C. John saw to the start of the race.
   D. John seeing the start of the race.

33. A. The woman is cooking dinner.
   B. The woman cook dinner.
   C. The woman is cooked dinner.
   D. The woman has cooking dinner.

34. A. The growth to the tomatoes surprised the farmer.
   B. The growth of the tomatoes surprised the farmer.
   C. The growth of the tomatoes surprise the farmer.
   D. The growth the tomatoes surprised the farmer.

35. A. Susan heard to Jim helped the lady.
   B. Susan hearing that Jim helped the lady.
   C. Susan heard that Jim helped the lady.
   D. Susan heard for Jim helped the lady.
36. A. The chasing of the dog was funny.
   B. The chasing the dog was funny.
   C. The chasing to the dog was funny.
   D. The chasing of the dog funny.

37. A. Mary enjoyed to the swimming of the girls.
   B. Mary enjoying the swimming of the girls.
   C. Mary enjoyed the swimming the girls.
   D. Mary enjoyed the swimming of the girls.

38. A. The man said to David won the game.
   B. The man said that David won the game.
   C. The man saying that David won the game.
   D. The man said for David won the game.

39. A. The beginning of the race exciting.
   B. The beginning of the race was exciting.
   C. The beginning to the race was exciting.
   D. The beginning the race was exciting.

40. A. Should you should go to bed?
   B. Did you should go to bed?
   C. Should you went to bed?
   D. Should you go to bed?
41. A. Bill enjoyed the showing of the animals.
   B. Bill enjoyed the showing the animals.
   C. Bill enjoying the showing of the animals.
   D. Bill enjoyed to the showing of the animals.

42. A. The cows some of were sick.
   B. Some of the cows were sick.
   C. Some the cows were sick.
   D. Some of the cow were sick.

43. A. The boys knew for the dog was lost.
   B. The boys knew to the dog was lost.
   C. The boys knew the dog was lost.
   D. The boys knowing that the dog was lost.

44. A. The finishing the work was easy.
   B. The finishing to the work was easy.
   C. The finishing of the work easy.
   D. The finishing of the work was easy.

45. A. It was sad that the animals were lost.
   B. The animals was sad were lost.
   C. That was sad the animals were lost.
   D. The animals were lost was sad.
46. A. The teacher told me where to sit.
    B. The teacher told me where sitting.
    C. The teacher told me where sit.
    D. The teacher told me where to sitting.

47. A. Will Mary go?
    B. Is Mary will go?
    C. Will Mary went?
    D. Will Mary will go?

48. A. I saw Dad to came.
    B. I saw Dad to coming.
    C. I saw Dad to come.
    D. I saw Dad coming.

49. A. I ran to the park to played.
    B. I ran to the park for to play.
    C. I ran to the park to play.
    D. I ran to the park to playing.

50. A. The man was good at to spell.
    B. The man was good at spelling.
    C. The man was good at spell.
    D. The man was good at to spelling.
51. A. The baby was asleep surprised Father.
   B. For the baby was asleep surprised Father.
   C. So the baby was asleep surprised Father.
   D. That the baby was asleep surprised Father.

52. A. Mary loves fly to the airplane.
   B. Mary loves to flying the airplane.
   C. Mary loves to fly the airplane.
   D. Mary loves to flew the airplane.

53. A. The girls went to fished.
   B. The girls went fish.
   C. The girls went for to fish.
   D. The girls went fishing.

54. A. Mother wanted Anne to picking the flowers.
   B. Mother wanted Anne to pick the flowers.
   C. Mother wanted Anne pick the flowers.
   D. Mother wanted Anne to picked the flowers.
Be careful. These are different kinds of sentences. You choose the right word to make a good sentence.

Example:

Dad's shirt is red. _____ is blue.

You choose one:

A. Yours
B. Your
C. Our
D. Ours

A. is the right word: **Yours**

A is marked with an \(\times\) like this: \(\times\) B C D
55. While ______ waited, the boys told stories.
   A. their
   B. them
   C. they
   D. the boys

56. Dad said, "She made the bird house by ______."
   A. himself
   B. sheself
   C. her
   D. herself

57. Bob is flying a kite and Anne ______ a toy airplane.
   A. fly
   B. was fly
   C. is flying
   D. flies

58. Mother cooked the eggs for me.
    They are ______.
   A. mine
   B. her
   C. theirs
   D. ours
59. Dad planted the seeds for us.
   The flowers are ______.
   A. him
   B. her
   C. ours
   D. us

60. Dad ______ the cake and Bill will buy the ice cream.
   A. buy
   B. will buying
   C. will buy
   D. will buys

61. Jim worked and Bill ______.
   A. play
   B. playing
   C. played
   D. are play

62. Cathy called the horses ______ they ran away.
   A. with
   B. but
   C. either
   D. or
63. The glasses were broken. I cut ______.
   A. it
   B. themselves
   C. myself
   D. me

64. The girls went to school. The puppy played by ______.
   A. it
   B. yourself
   C. themselves
   D. itself

65. You thanked the teachers ______ helped Tom.
   A. who
   B. when
   C. what
   D. where

66. The little boy was lost.
   The girls told ______ mother.
   A. him
   B. her
   C. his
   D. them
67. Susan and Tom made the ice cream.

_____ friends made the cake.
A. Theirs
B. Her
C. Him
D. Their

68. When the girls came home, Bill came to see _____.
A. themselves
B. the girls
C. him
D. them

69. I liked _____ Mother cooked.
A. which
B. what
C. who
D. whose

70. _____ Mother or Anne made the dress.
A. Both
B. With
C. Neither
D. Either
71. You kept the kittens _____ had black feet.
   A. that
   B. whose
   C. when
   D. where

72. After _____ mother cooked lunch, Anne washed the pans.
   A. she
   B. Anne's
   C. her
   D. hers

73. _____ John nor Mary came to the party.
   A. Neither
   B. Either
   C. Both
   D. But

74. We saw _____ Cathy put the kite.
   A. that
   B. where
   C. which
   D. what
75. The children found the ball ______ went into the lake.
   A. which
   B. when
   C. what
   D. whose

76. The girls made dinner ______ Dad came home.
   A. which
   B. when
   C. that
   D. whose

77. We helped the girl ______ leg was broken.
   A. that
   B. who
   C. whose
   D. what
Be careful. These are different kinds of sentences.
You choose another right way of saying the sentences.

Example:

The bus stopped. Bill went to school.

You choose one:

A. The bus stopped Bill went to school.
B. The bus stopped and Bill went to school.
C. The bus and Bill went to school.
D. The bus stopped and went to school.

B. is the right sentence: The bus stopped and Bill went to school.

[ B ] is marked with an X like this:

[ A ] X [ C ] [ D ]
78. Dad opened the door. Mother saw a man.
   A. Dad opened the door Mother saw a man.
   B. Dad opened the door saw a man.
   C. Dad opened the door and Mother saw a man.
   D. Dad opened the door and man.

79. The man walked into the house. The woman walked into the house.
   A. The man and woman walked into the house.
   B. The man walked into the house and the woman walked.
   C. The man walked into the house the woman walked into the house.
   D. The man woman walked into the house.

80. The boys made a table. The boys made chairs.
   A. The boys made a table made chairs.
   B. The boys made a table chairs.
   C. The boys made a table the boys made chairs.
   D. The boys made a table and chairs.

81. Bob opened the door. Bob closed the door.
   A. Bob opened closed the door.
   B. Bob opened the door Bob closed the door.
   C. Bob opened and closed the door.
   D. Bob opened Bob closed the door.
82. The girls fed the pets. The boys washed the pets.
   A. The girls fed the pets and the boys washed them.
   B. The girls fed and washed the pets.
   C. The girls fed the boys washed the pets.
   D. The girls fed the pets the boys washed them.
      A  B  C  D

83. I hit the boy. The boy cried.
   A. I hit the boy the boy cried.
   B. I hit the boy cried.
   C. I hit the boy and the boy cried.
   D. I hit the boy and cried.
      A  B  C  D

84. A horse kicked Anne.
   A. Anne got kicked a horse.
   B. Anne kicked by a horse.
   C. Anne got kick by a horse.
   D. Anne got kicked by a horse.
      A  B  C  D

85. Susan was thrown by a horse.
   A. A horse threw Susan.
   B. Susan was throw by a horse.
   C. A horse was thrown by Susan.
   D. Susan thrown by a horse.
      A  B  C  D
86. The cows were chased by a dog.
   A. The cows chased a dog.
   B. A dog was chased by the cows.
   C. The cows were chased a dog.
   D. A dog chased the cows.

87. We talked with the girl. The girl's dog chased cars.
   A. We talked with the girl's dog chased cars.
   B. We talked with the girl who her dog chased cars.
   C. We talked with the girl whose dog chased cars.
   D. We talked with the girl dog chased cars.

88. The puppies played with the girl. The girl wore a red dress.
   A. The puppies played with the girl who wore a red dress.
   B. The puppies played with who wore a red dress the girl.
   C. The puppies played with who the girl wore a red dress.
   D. The puppies played with the girl who the girl wore a red dress.

89. The train was hit by a car.
   A. A car was hit by the train.
   B. The train was hit a car.
   C. A car hit the train.
   D. The train hit a car.
Be careful. These are different kinds of sentences.
You choose the right answer.

Example:
What color is the grass?
You choose one:

A. green  B. color  C. trees  D. grass

A. is the right word: green

A is marked with an X like this:  X  B  C  D
90. Should she go with Mother?
   A. Yes, she should.
   B. Mother should go.
   C. if she is good
   D. Yes, she did.

   A  B  C  D

91. Could Bill keep the pet?
   A. Yes, he did.
   B. Yes, he could.
   C. He will buy the pet.
   D. Bill keep the pet.

   A  B  C  D

92. How long did the boys play ball?
   A. The boys played football.
   B. all day
   C. football
   D. with a bat

   A  B  C  D

93. Which are bigger, cats or kittens?
   A. cats
   B. baby
   C. Cats are small.
   D. They are bigger.

   A  B  C  D
94. Bob can't fix the toy, can he?
   A. can't fix
   B. can
   C. No, he can't.
   D. a toy truck

   A   B   C   D
Be careful. These are different kinds of sentences.
You decide what the sentences tell us.

Example:
Dad liked the girl who thanked Joe.

What does the sentence tell us?
You choose one:

A. Joe thanked the girl.
B. Dad thanked Joe.
C. The girl thanked Joe.
D. Dad liked Joe.

C. is the right sentence: The girl thanked Joe.

C is marked with an X like this: A B X D
95. Bill knew that the children liked cats.
   A. The cats liked children.
   B. Bill liked cats.
   C. The children liked cats.
   D. Bill knew the cats.

96. It surprised the girls that the cats were chasing the dogs.
   A. The girls were chasing the dogs.
   B. The dogs surprised the girls.
   C. The cats were chasing the dogs.
   D. The dogs were chasing the cats.

97. Cathy loves the doll. It is not new.
   A. The doll is not old.
   B. The doll is old.
   C. The doll is new.
   D. Cathy does not love the doll.

98. John knew the car hit the policeman.
   A. The policeman hit John.
   B. John knew the car.
   C. The car hit the policeman.
   D. John hit the policeman.
99. Bill thanked the teacher and went home.
   A. Bill went home.
   B. The teacher went home.
   C. The teacher thanked Bill.
   D. Bill and the teacher went home.

100. The girl knew that the boy burned the cake.
   A. The boy burned the cake.
   B. The girl knew the cake.
   C. The boy knew the girl.
   D. The girl burned the cake.

101. Tom liked the man who started the boat.
   A. Tom started the boat.
   B. Tom liked the boat.
   C. The man liked the boat.
   D. The man started the boat.

102. You saw the girls who Jim liked.
   A. Jim saw the girls.
   B. You saw Jim.
   C. Jim liked the girls.
   D. You liked the girls.
103. Anne or Mother made the dress.
   A. Anne and Mother made the dress.
   B. Either Anne or Mother made the dress.
   C. Both Anne and Mother made the dress.
   D. Neither Anne nor Mother made the dress.

104. Bill held the baby who Cathy gave the toy to.
   A. Bill held Cathy.
   B. Bill held the toy.
   C. The baby gave the toy.
   D. Cathy gave the toy to the baby.

105. That Billy was chasing birds surprised Mary.
   A. Billy was chasing birds.
   B. Mary was chasing birds.
   C. Mary surprised Billy.
   D. The birds surprised Mary.

106. The boys who made the fire for Mother brought the lunch.
   A. The boys made the lunch.
   B. Mother made the lunch.
   C. Mother brought the lunch.
   D. The boys made the fire.
107. The selling of the dog disappointed David.
   A. David sold the dog.
   B. David disappointed the dog.
   C. The selling disappointed David.
   D. The dog disappointed David.

108. Susan enjoyed the running of the animal.
   A. Susan enjoyed the animal's running.
   B. The animal enjoyed Susan.
   C. The running enjoyed Susan.
   D. The running enjoyed the animal.

109. The crash of the boats scared the children.
   A. The boats scared the children.
   B. The crash scared the children.
   C. The children crashed.
   D. The children scared the boat.

110. The boy who Mary watched threw the ball.
   A. Mary watched the ball.
   B. The boy threw the ball.
   C. Mary threw the ball.
   D. The boy watched Mary.
111. The babies, who were tired, slept on the bed.
A. The tired babies were slept on the bed.
B. The tired babies slept on the bed.
C. The babies were tired slept on the bed.
D. The babies who the babies were tired slept on the bed.

A B C D

112. The boy heard the screaming of the woman.
A. The boy heard the woman's screaming.
B. The woman heard the boy.
C. The screaming heard the woman.
D. The screaming heard the boy.

A B C D

113. The work of the girl surprised Father.
A. Father worked.
B. The girl surprised Father.
C. Father surprised the girl.
D. The work surprised Father.

A B C D

114. Anne watched the marriage of her friend.
A. Anne married.
B. The marriage watched Anne.
C. Anne watched her friend's marriage.
D. Her friend watched Anne.

A B C D
115. We picked the boys who were little.
   A. We picked the boys little.
   B. We picked the boys were little.
   C. We picked the boys who the boys were little.
   D. We picked the little boys.
      A  B  C  D

116. The man who bought the cow from Father wore a brown coat.
   A. Father wore a brown coat.
   B. The man bought a brown coat.
   C. Father bought a brown coat.
   D. The man bought the cow.
      A  B  C  D

117. The boys knew the man. The teacher gave the money to the man.
   A. The boys knew the man who the teacher gave the money to.
   B. The boys knew the man who the teacher gave the money to the man.
   C. The boys knew the man who the teacher gave the money to him.
   D. The boys knew who the teacher gave the money to the man.
      A  B  C  D

118. The discussion of the party disappointed Susan.
   A. Susan disappointed the party.
   B. The discussion disappointed Susan.
   C. Susan discussed the party.
   D. The party disappointed Susan.
      A  B  C  D
119. John watched the growth of the plant.
   A. The growth knew John.
   B. John grew the plant.
   C. John watched the plant's growth.
   D. The plant watched John.

120. I saw the children. The man talked to the children.
   A. I saw the children to whom the man talked.
   B. I saw the children to whom the man talked to them.
   C. I saw whom the man talked to the children.
   D. I saw the children to whom the man talked to the children.
Demographic Study of Hearing Impaired Children in British Columbia

To District Superintendents and Superintendents of School Principals: Jericho Hill School for the Deaf
Vancouver Oral Centre

Dear Sir/Madam:

Phase I of the Demographic Study of Hearing-Impaired Students in British Columbia has been completed. The report is presently being printed by the Ministry of Education and will be circulated throughout the Province in the very near future. The attainment data for phase II have been collected; the analysis and report will be completed by the end of March. Individual test results requested by teachers will be sent at that time.

In phase III, recently funded by the Ministry of Education, we are investigating syntactic developments in the language of hearing-impaired students in the province. Once again we trust we can count on your continued support in order to collect these data.

A clear understanding of the language of hearing-impaired children, along with reliable methods for its improvement, can be possible only with a detailed study of its syntactic structure. The most recent attempts toward this goal have been made by a research team under the direction of Dr. Stephen Quigley at the Institute for Child Behavior, University of Illinois.

Tests of Syntactic Ability were constructed by the Illinois team using a transformational generative grammar framework. Our research project has permission to use Quigley's test instruments and we hope to obtain data from all students in B.C. who have a sensori-neural hearing loss and/or have been fitted with a hearing aid and who are capable of completing a pencil and paper test.

Last year, as part of phase II, we used the Stanford Achievement Test for the Hearing Impaired to collect attainment data on students throughout the province. Based on the results of these tests we are able to determine which students in your district may qualify for this current research. These names are listed on the attached sheet. In asking your permission to test these students we have to point out that our records are a year old. We would be pleased to learn of any transfers or of other hearing-impaired students whom you feel may qualify for the study. Please add names where necessary to the attached list of pupils and return
DEMOPGRAPHIC STUDY OF HEARING IMPAIRED STUDENTS IN BRITISH COLUMBIA

To All Coordinators of Phase III - Testing of Syntactic Abilities.

Dear

We are pleased to learn that you have been nominated by your superintendent to act as coordinator for this part of the study and we know we can count on your support to collect test results.

The Test of Syntactic Abilities we are examining was constructed for use with hearing impaired students after years of research by Dr. Stephen Quigley and his associates at the Institute for Child Behavior, University of Illinois. The full battery consists of 20 domain tests, each designed to measure a particular facet of syntactic ability. Recently, two forms of a Screening Test have been added to the battery. We will be the first to use these Screening Test forms. We are hopeful that we may gain not only data on the development of syntactic abilities but also more insight into methods of diagnosis, remediation and curriculum development in the area of language.

We feel it is not practical to administer the complete battery of 20 domain tests and the two forms of the Screening Test to all students. Therefore, we have developed a design which will enable us to determine the diagnostic validity of the Screen Tests while keeping the administration time to a minimum. Our design calls for each student to be tested with:

a) Two forms of the Screening Test.

b) Four of the 20 domain tests. These will be preselected, irrespective of the Screening scores, for each student using a modified matrix sampling technique. Details will follow in a further mailing.

In this mailing we have enclosed two forms of the Screening Test (Form 1 - Gold; and Form 2 - Blue) for each student whose name has been returned by your district. These students will have a sensory-neural loss and/or have been fitted with a hearing aid and should be able to read and be capable of completing a pencil and paper test. In addition we have enclosed a Materials Check List (Green), List of Students (White), Instructions for Administering the Screening Tests (Pink), and a stamped self-addressed envelope. Would you please begin with the Materials Check-list and determine if all of the materials have been properly sent to you?
INSTRUCTIONS FOR ADMINISTERING
THE
SCREENING TESTS

Introduction

Thank you in advance for your cooperation in administering the Test of Syntactic Abilities and the accompanying forms of the Screening Tests. These tests were developed by Dr. Stephen Quigley and his associates at the Institute for Child Behavior, University of Illinois. They have been designed to describe the level of attainment along various dimensions of syntactic ability.

The test administration will take place in two major stages. In the first stage, both forms of the Screening Test will be administered. In the second stage, to be conducted in April, domain tests selected from the full Test of Syntactic Abilities will be included. We will provide further details describing the second stage toward the end of March.

Your district coordinator has provided you with the materials necessary to administer the two forms of the Screening Tests. Please follow the instructions which are presented below. By doing so, we will be better able to determine the validity of the Screening Tests, which are being used for the first time.

To assure anonymity of your students, only province-wide results will be published and shared with all participants. Again, thank you for your invaluable assistance.

Step 1. Read all the instructions before the students begin their tests.

Step 2. You will note that there are two forms of the Screening Test - Form 1 (Gold), and Form 2 (Blue). The order of testing each student has been specified for you -- some of your students have been assigned Form 1 first, Form 2 second, while others have been assigned Form 2 followed by Form 1. Please be sure to keep the order assigned to each student. (If you are not sure of the order for each student, please check with your district coordinator for this study).

Step 3. Set your testing dates eight days apart. We suggest MARCH 7 and MARCH 16.

Step 4. Become familiar with both forms of the Screening Test. You will find examples on the 2nd, 3rd, and 4th pages, and on pages numbered 12, 19, 23, and 26. The examples are the same in both forms of the Screening Test. The test itself begins on the first numbered page.

Step 5. Method of Communication. The same method of communication which is ordinarily used in the classroom should be used in the administration of the Screening Tests. In communicating the directions and assisting students to complete the examples, feel free to demonstrate, explain, re-phrase...
and in general do whatever is necessary to ensure that the students understand what is expected of them on the test.

It is expected that each form will take approximately one hour to complete. However there is no time limit -- let each student take as much time as he/she needs.

**Step 6.** On the day of the testing, give to each student his/her form for that day.

Then have the students turn to the first page and ask them to print their name, date of birth, school, school district, and the date.

**Step 7.** After the students have provided the identification data, ask them to turn to the next page. Work through Example 1 with them.

Turn the page and ask the students to complete Example 2. Check to see that each student has correctly completed the second example.

Complete Example 3 in the same way.

**Step 8.** When you feel that the students understand what is to be done, ask them to turn to "Page 1" and begin the test.

**Step 9.** Watch the students to be sure that when they reach pages 12, 19, 23, and 26 they understand the examples. Some individual assistance with these examples may be required; please provide this assistance as necessary.

**Step 10.** Collect the test booklet after the student has completed his/her test. Be sure that the student feels he/she is finished.

**Step 11.** Repeat Steps 6 to 10 on the second testing date.

**Step 12.** Return the completed Screening Tests and all materials to your District Coordinator after the second testing day.

THANK YOU FOR YOUR COOPERATION AND ASSISTANCE
INSTRUCTIONS FOR ADMINISTERING
THE
DOMAIN TESTS

Thank you for your help and cooperation in administering the Screens of the Test of Syntactic Abilities. Data from these tests are currently being processed and fed into the computer at UBC.

The final stage is now ready to commence. Four domain tests from Quigley's full test battery have been randomly selected for each student.

Your district co-ordinator has provided you with the materials necessary to administer these tests. Please follow the instructions which are presented below. By doing so we will be further able to determine the validity of the Screening Test.

To assure anonymity of the students, only province-wide results will be published and shared with all participants. Again we thank you for your invaluable assistance.

Step 1. Please read all the instructions before the students begin their tests.

Step 2. You will note that there are four test booklets for each student. Each booklet has been randomly assigned and bears the student's name on the top right hand corner. The colour of the cover relates to groups of syntactic structures and each student should have four different colours. It is most important that each student completes his four assigned tests in the order specified (if you are not sure of the order in which tests are to be administered, please check with the study co-ordinator in your district).

Step 3. Set your testing dates at least two days apart. We suggest April 25, 28, May 2 and 5.

Please note: Should a student be absent or unable to take the tests on the suggested or scheduled dates, please administer at your earliest convenience.

Step 5. **Method of Communication.** The same method of communication which is ordinarily used in the classroom should be used in the administration of the Domain Tests. In communicating the directions and assisting students to complete the examples, feel free to demonstrate, explain, re-phrase and in general do whatever is necessary to ensure that the students understand what is expected of them on the test.

It is expected that each form will take approximately one hour to complete. However there is no time limit -- let each student take as much time as he/she needs.

Do not hesitate to allow a break during testing should this be necessary. Please note that the Domain Tests consist of 70 items as compared to 120 on the screens.

Step 6. On the day of the testing, give to each student the assigned form for that day.

Then have the students turn to the first page and ask them to print their name, date of birth, school, school district, and the date of test.

Step 7. Please check that the students have provided the identification data, and then ask them to turn to the next page. Work through Example 1 with them.

Turn the page and ask the students to complete Example 2. Check to see that each student has correctly completed the second example. Complete Example 3 in the same way.

Step 8. When you feel that the students understand what is to be done, ask them to turn to "Page 1" and begin the test.

Step 9. Collect the test booklet after the student has completed his/her test. Be sure that the student feels he/she is finished. Check that the student has completed each page.

Step 10. Repeat Steps 6 to 9 on each testing date.

Step 11. Return all completed Tests to your District Co-ordinator after the fourth testing day.

THANK YOU FOR YOUR COOPERATION AND ASSISTANCE
In our attempt to investigate the syntactic abilities for all hearing impaired students in British Columbia we have made great inroads into your busy schedules and those of all personnel in the school district who assisted you in collecting these data. Would you please accept the sincere thanks of the research team at U.B.C. and convey a warm message of gratitude to each of the persons concerned?

It is our sincere hope that the analysis of the results may lead to the introduction of learning sequences based on these Syntactic Ability Tests into the language programming for hearing impaired students. Please know that if there is any improvement in our future language curriculum then the credit belongs mainly to the field personnel who worked so diligently collecting the data for us.

Yours sincerely,

B.R. Clarke, Ph.D.
Professor of Special Education
Correlations between Syntactic Structures, Total Scores and Test Order on the TSA Screening Test Form 2 for the Mild-Moderate Hearing Loss Group ($<59$ dB)

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| Neg. | (.74) |
| Conj. | 0.63 | (.85) |
| Det. | 0.75 | 0.72 | (.82) |
| Q.F. | 0.77 | 0.78 | 0.80 | (.82) |
| V.P. | 0.79 | 0.80 | 0.83 | 0.84 | (.76) |
| Pron. | 0.71 | 0.78 | 0.76 | 0.82 | 0.76 | (.76) |
| Rel. | 0.69 | 0.82 | 0.80 | 0.81 | 0.84 | 0.79 | (.88) |
| Comp. | 0.73 | 0.81 | 0.83 | 0.87 | 0.88 | 0.85 | 0.86 | (.87) |
| Nom. | 0.73 | 0.68 | 0.72 | 0.79 | 0.86 | 0.73 | 0.82 | 0.80 | (.86) |
| T.T. | 0.82 | 0.87 | 0.89 | 0.92 | 0.94 | 0.88 | 0.94 | 0.95 | 0.89 | (.96)* |
| T.O. | 0.26 | 0.09 | 0.07 | 0.13 | 0.12 | 0.18 | 0.06 | 0.09 | 0.08 | 0.12 | 1.00 |

Note: ( ) refers to the internal consistency measures computed using Hoyt's Anova.

( )* refers to the internal consistency measure using Cronbach's Composite Alpha.
APPENDIX C

Correlations between Syntactic Structures in the Screening Test (Form 2) and the TSA Diagnostic Tests for the Mild-Moderate Hearing Loss Group (<59 dB)

<table>
<thead>
<tr>
<th>Diagnostic Tests</th>
<th>1</th>
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* - strongest correlation

- Diagnostic Tests directly related to the Screen Structure (areas where the strongest correlations would be anticipated)

Diagnostic Test:-
1 Negation
2 Conjunction
3 Disjunction & Alternation
4 Determiners
5 Wh-words
6 Answer
7 Yes/No Questions
8 Verb Sequences in Conjoined Structures
9 Main Verbs, Linking
10 Passive Voice
11 Possessive Adjectives & Adverbs
12 Reflexives
13 Possessive Pronouns
14 Forward & Backward Pronominalization
15 Relativization - Comprehension
16 Relative Pronouns
17 Relativization - Embedding
18 That - Complements
19 Infinitives & Gerunds
### APPENDIX C

**Correlations between the TSA Diagnostic Tests for the Mild-Moderate Hearing Loss Group (<59 dB)**

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8  .95  .97  1.00
9  .95  .86  .77  1.00
10 -0.39 -0.19  1.00
11 .95  .58  1.00
12 .95  .94  .97  .95  1.00
13 .94  .94  .95  1.00
14 .94  .94  .58  1.00
15 .97  .34  .38  .97  1.00
16 .19  .97  .99  1.00
17 .99  .99  .99  1.00
18 .99  .94  .42  .89  1.00
19 .94  .94  .94  1.00
20 .90  .87  .86  1.00
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