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The Nebraska Neuropsychological Evaluation as a Predictor of Learning Disabilities

Georgia A. Carpenter

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The Nebraska Neuropsychological Evaluation
as a predictor of
learning disabilities

by

Georgia A. Carpenter

Presented to the Faculty of
Western Conservative Baptist Seminary
in partial fulfillment
of the requirements for the degree of
Doctor of Philosophy
in Psychology

Portland, Oregon

May 20, 1986

MURDOCK LEARNING RESOURCE CTR
GEORGE FOX COLLEGE
NEWBERG, OREGON 97132

APPROVAL

The Nebraska Neuropsychological Evaluation

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learning disabilities

by

Georgia A. Carpenter

Signatures:

Paul Espindstrom

Committee Chairman

James Green

Academic Dean

D. Carl Loney

Members

12/10/86

Date

Gale H. Reid

Date 12/1/86

Abstract

The purpose of this study is to determine if children aged 7 to 10 with previously identified learning disabilities can be differentiated from comparably aged non-learning disabled children by means of the Nebraska Neuropsychological Evaluation (NENE). Sixty children in greater Portland, Oregon, were administered the NENE. Thirty of these children were previously identified as learning disabled, and 30 were not. Discriminant analysis was run on the subtests five separate times with varying stratified random samples from the total sample. The NENE was found to discriminate with between 60% and 80% accuracy. It also discriminated using the traditional method of interpreting standardized Lurian batteries. In the future this battery could facilitate the identification of children with learning disabilities and point toward specific remedial techniques.

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CHAPTER 1

Introduction

During recent years, both parents and educators have felt a growing concern for children with learning disabilities. According to Golden and Anderson (1979), as society becomes more complex and education more essential for daily living, the effects of learning disabilities are more visible. Therefore, the need to understand and deal with the problems of learning disabled children is greater than ever before.

Public Law 94-142 requires that all handicapped children have the right to a free, appropriate public education. A handicap is defined as any impairment that causes the child to need special education and related services, and includes specific learning disabilities (U.S. Office of Education, 1977a).

The federal definition continued by stating that a child has a specific learning disability if:

1. The child does not achieve commensurate with his or her age and ability levels in one or more of seven specific areas when provided with

learning experiences appropriate for the child's age and ability levels.

2. The team finds that a child has a severe discrepancy between achievement and intellectual ability in one or more of the following areas:

- a. Oral expression
- b. Listening comprehension
- c. Written expression
- d. Basic reading skill
- e. Reading comprehension
- f. Mathematics calculation
- g. Mathematics reasoning (U.S. Office of Education, 1977b).

However, each state and district has its own definition of a severe discrepancy (G. Wilkening, personal communication, May 5, 1985). The literature on the etiology of learning disabilities indicated a number of theories (Golden & Anderson, 1979), making an exact definition difficult and compounding the problem of identification. This lack of a clear definition contributes to the already difficult task of identifying children with learning disabilities.

Nevertheless, there is a tentative general agreement, which is discussed in the next section, that

learning disabilities are in some way related to neurological damage. Both medical and psychological examinations corroborate this belief. The public educational system now requires that neuropsychological damage be assessed during an evaluation of any learning disabled child (Tupper, 1983). Some practitioners, such as McCarthy and McCarthy (1969), stated that identifying learning disabilities is simply reduced to eliminating those whose behavioral problems can be explained by anything other than cerebral dysfunction. Others, such as Rourke (1976), claimed that learning disabilities are attributable to neurological damage and have spent much energy in comprehensive assessment demonstrating this.

The Nebraska Neuropsychological Evaluation (NENE) (Golden, 1985a) is a neurodiagnostic test based on the work of A. R. Luria and on three previously published batteries: The Luria Nebraska Neuropsychological Battery, Forms I and II, and the Luria Nebraska Neuropsychological Battery, Children's Revision (Golden, 1981b). The purpose of this study on the NENE is to answer the question: Do one or more scales of the NENE discriminate between learning disabled and non-learning disabled children aged 7 to 10? A number of

benefits could be derived if, in fact, any scale or combination of scales does prove to discriminate between these groups. Some of these benefits are:

1. The NENE might be used as a diagnostic battery within the school districts.

2. The evaluation could identify those with learning disabilities and assist in specific remediation planning for children displaying behavioral problems or difficulty with their school work.

3. Clinicians performing psychoeducational evaluations as part of their private practice could use the battery to identify learning disabilities in their clients.

A description and discussion of the NENE is presented later in this chapter. Also discussed in this chapter are an overview of the causes of learning disabilities; the functional correlates of learning disabilities; types and identification of learning disabilities; the theoretical perspectives of Luria and other theorists; and the development, criticisms, reliability and validity of the Luria Nebraska Neuropsychological Battery.

Learning Disabilities

Causes of Learning Disabilities

The term learning disability refers to a wide variety of conditions in which a person of normal intelligence fails to perform at an expected level in an academic area. The motivation and basis of this study, the Christian world view, holds certain beliefs about the causes of learning disabilities. Evangelical Christians believe that God is sovereign over all creation and human life. This sovereignty extends to a human life that is marked by disability. In fact, Exodus 4:11 (Holy Bible) indicates that God created physically disabled individuals.

It is impossible for finite man to fully comprehend God's infinite ways, and thus to understand why He created children with learning disabilities. It is generally acknowledged by Christians, however, that all life was created for God's glory. Human beings are challenged to accept that disabled children are not simply errors in God's creative work, and to search for the benefits to be gained from working with them. Among these benefits are patience and acceptance, and welcoming the opportunity to work with and give to other human beings.

It is important to remember that, although learning disabilities may be linked to many other factors, the underlying truth is that God, in His wisdom, chose to create them.

A learning disability is often defined specifically as a disorder intrinsic to the individual and presumed to be due to central nervous system dysfunction (Hammill, Leigh, McNutt, & Larson, 1981). This definition supports the current trend toward including neuropsychological assessment in the evaluation of learning disabled children in the educational setting (Tupper, 1983).

Golden and Anderson (1979) cited several beliefs regarding the etiology of learning disabilities. These are: mislearnings or learned inappropriate behaviors, attention problems, ophthalmological problems, genetic factors, emotional disturbances, perceptual problems, perceptual-motor integration, and brain dysfunction. Of these, the belief that brain dysfunction is the primary cause of learning disabilities, is predominant. It is also the oldest and most misunderstood.

History shows that the belief in brain dysfunction as a cause of learning disabilities is an ancient one. In 500 B.C., the early Egyptians recognized the

relationship between the brain and learning.

Pythagoras and Hippocrates both identified the brain as the seat of the intellect. Much later, in 1896, Morgan said that brain injured adults' inability to read was similar to children's inability to read (Heilman & Valenstein, 1979).

Since the brain-behavior relationship has been acknowledged for over two thousand years, one wonders why controversy and misunderstandings regarding the etiology of learning disabilities still exist. Golden and Anderson (1979) addressed several possible reasons. The first is the undeveloped state of the field of neuropsychology, and the second is the difficulty of actually diagnosing brain damage. Both will be briefly discussed.

1. The undeveloped state of neuropsychology.

The lack of agreement among neuropsychologists has contributed to misunderstandings about behavior in general and learning disabilities in particular. In the field of neuropsychology, three specific theories have dominated: (a) localization; (b) equipotentialty; and (c) the functional system.

Localizationists claim that each area of the brain controls a specific skill. Consequently, an injury to

one part of the brain causes one specific problem, and an injury to another part would cause another specific problem. Unfortunately for the localizationists, however, this theory has failed to predict deficits shown by patients with documented lesions (Golden & Anderson, 1979).

Equipotentialists claimed that all higher cognitive skills are dependent upon the whole brain. Their main concern when evaluating an injury was the actual percentage of brain tissue damaged. This theory led to demonstrably false conclusions: (a) All brain-injured children are neurologically alike, and, therefore can be treated with a single program; and (b) All brain-injured children are behaviorally alike. To the equipotentialists, a child who did not have the specific problems of poor attention span, hyperactivity, and emotional disturbance was not brain-damaged (Golden & Anderson, 1979).

The functional system is the most recent theory of the three. This theory was proposed by A. R. Luria (1966) and is the basis of the NENE. It will be discussed in the section on the theoretical perspective of Luria.

2. The difficulty of diagnosing brain damage.

The second reason for misunderstandings regarding the etiology of learning disabilities is the difficulty of diagnosis. Traditionally, this process has been based on a medical examination. With medical techniques, however, it is difficult and often impossible to detect either subtle neurological problems or chronic limited injury. The primary purpose of the medical evaluation has been to find and treat current or possibly life threatening problems. Therefore, although physicians may be able to recognize learning disabilities, they are more often unaware of their presence.

Although the assumption that learning disabilities and brain injury are related is not well understood and is often difficult to substantiate, it has at least four advantages (Golden & Anderson, 1979):

1. It recognizes that learning does take place in the brain.

2. It includes the possibility that a single deficit can be identified as the cause of many characteristics of learning disabled children. An isolated injury can produce patterns of deficits which, while appearing to be unrelated, have a common

etiology. Understanding these patterns would aid remedial planning.

3. It permits therapists to define the problem more specifically. Properly diagnosed brain injuries offer greater rehabilitation possibilities.

4. It makes the syndrome understandable to parents and educators.

Substantiation for the theory that learning disabilities are rooted in brain damage comes from the fields of both medicine and psychology (Golden & Anderson, 1979). Medical evidence falls into the broad categories of technical evidence, (computerized axial tomography, electroencephalographic research, position emission tomography, and nuclear magnetic resonance); the physical neurological exam; and genetic research. Psychological evidence has generally been based on the levels of performance in specific tests; right and left body-side performance; pathognomic signs which are rarely present in normals but are frequently seen in brain-damaged populations; and pattern analysis.

Functional Correlates of Learning Disabilities

Brain dysfunction, thought to be identified with learning disabilities, is identified in one of two

ways: either through neurological hard signs or neurological soft signs.

Neurological hard signs most typically seen by a physician are conclusive signs of brain tissue damage. Examples are brain tumor, bleeding, or penetrating injury. They are diagnosed through behavioral signs such as paralysis, or through modern technology such as computerized axial tomography, positron emission tomography, or nuclear magnetic resonance (Gaddes, 1980).

Brain damage or dysfunction may also be inferred, in the absence of hard signs, from soft signs. Gaddes (1980) categorized neurological soft signs into several groups: developmental delay; language retardation; motor clumsiness; perceptual deficits; right-left problems; hyperactivity; poor body image; poor eye-hand coordination; and abnormal electroencephalogram patterns. He explained that a child must have at least three soft signs to be considered possibly neurologically dysfunctional.

The standard neuropsychological tests are a way of evaluating many of these soft signs. In Luria's individualized evaluations, he dealt with all but the abnormal electroencephalogram patterns (Christensen,

1975). When Golden began standardizing Luria's methods, he continued to investigate all but the electroencephalogram patterns, developmental delay, and hyperactivity (Golden, Hammeke, & Purisch, 1980). Through adequate behavioral observations and historical data, an experienced neuropsychologist can evaluate these as well.

Types of Learning Disabilities

If it were possible to reduce all learning disabilities to a neurological cause, a great deal of confusion would still remain regarding their classification (Johnson and Morasky, 1980). Individuals working with learning disabled children realize that they differ behaviorally from one another, so much so that it becomes obvious there must be different types of learning disabilities.

Most learning disability specialists have devised outlines or lists of categories that encompass all learning disabilities. Fortunately or unfortunately these outlines and lists vary a great deal from person to person, and from expert to expert. Johnson and Morasky (1980) noted that the variety of opinions shows the extent to which the field is being studied. They reasoned that because so many people are studying

classification systems eventually some common denominators will emerge.

To some extent, they already have. Myers and Hammill (1969) categorized learning disabled children into six major areas of disability:

1. Motor activity: This included hyperactivity, hypoactivity, lack of coordination, and perseverative behaviors.

2. Emotionality: This included dependency, frustration, impulse delay, and misinterpretation of reality.

3. Perception: This included problems with reception, interpretation, identification, and discrimination.

4. Symbolization: This included the integration of perception and memory, auditory and visual reception, and vocal and motor expression.

5. Attention: This included too little and excessive attention.

6. Memory: This included the assimilation, storage, and recall of items.

Although they developed it almost 20 years ago, their list is remarkably current and seems to encompass most of the characteristics listed by other specialists

(Johnson & Morasky, 1980). Though every learning disabled child will not necessarily have all of these characteristics, he or she is likely to have one or more of them.

Identification of Learning Disabilities

An important aspect of typing and classifying children with learning disabilities lies in their identification. Although a medical examination is important in the total evaluation of a child suspected of being learning disabled, the diagnostic conclusions should not be considered final. Nor, except in cases of acute injury, should they be considered definitive. Medical doctors are generally unfamiliar with the specific methods used to diagnose learning disabilities. Since neither their education nor experience provide background in this area, they are unable to administer or interpret the psychological tests.

One alternative diagnostic method is the psychological test. The problem with this method, however, is that a child's performance on many of these tests is dependent upon a variety of factors, including emotional problems, inability to establish rapport with the examiner, peripheral motor deficits, cultural

problems, language problems, and motivational problems (Golden & Anderson, 1979).

A second alternative is the neuropsychological test. Examples of this type of test are the Halstead-Reitan Neuropsychological Battery, the Luria Nebraska Neuropsychological Battery, and now the NENE. These batteries are designed in such a way that they overcome many of the factors which influence standard psychological tests.

A variety of reasons exist for properly identifying children with learning disabilities. Tupper (1983) pointed out the most obvious one: It is required by law. Public Law 94-142 now states that some type of neuropsychological assessment procedure must be included in educational programming for disabled children.

As was pointed out by Hynd and Obrzut (1981), educators have a great deal to gain from the application of neuropsychological knowledge. They need to understand and measure children's disabilities in relation to their learning capabilities. Inadequate neuropsychological evaluation increases the risk of improper diagnosis of children with learning disabilities and misunderstanding of their learning

capabilities. Groves (1985) discussed the fact that a child's cognitive and adaptive abilities may exceed his or her intelligence as measured by standard tests. The child may actually be diagnosed as mentally retarded and receive highly inappropriate education and training.

According to Golden (1981a), it is widely believed that learning disabled children can greatly benefit from remediation programs based on information received during a neuropsychological evaluation. And, indeed, studies have shown that proper training and education of learning disabled children is very effective (Minskoff, 1975). An example of this is the success of the Battin Clinic in Houston, Texas, where children diagnosed as learning disabled are taught for 6 months (Bradley, Battin, & Sutter, 1979). During this time, their individualized programs aim at remediating target areas identified by neuropsychological tests. At the end of the 6 months, Wechsler scales, tests of psycholinguistic abilities, behavioral scales, and academic grades all show significant improvement. Control groups who receive no treatment during this time are unimproved in these areas.

G. Wilkening (personal communication, May 5, 1985) described four specific instances when school-aged children should receive neuropsychological evaluation: (a) when a child has a previously diagnosed learning disability but training and remediation are not effective; (b) when a child has a medically diagnosed brain injury; (c) when a child is displaying problem behaviors in the classroom and/or receiving below average grades and needs long-term educational plans; and (d) when a child has a medical disorder that may be associated with a learning disability.

Neuropsychological Theories

While neuropsychology as a science is relatively young it nevertheless has a long history, dating from somewhere between the 17th and 25th centuries. It has been marked by theories moving into and out of popularity, and is still somewhat unsettled. Many leaders in the field strongly disagree with one another both theoretically and practically.

Modern neuropsychology is built on two primary theories: (a) A. R. Luria's functional system, and (b) the one primarily associated with Ralph Reitan. Other theorists, less well-known, do not associate

themselves with either Reitan or Luria. Muriel Lezak is an example of this group.

These individuals have had a major impact on the present field of neuropsychology. Their individual differences and specific beliefs are discussed in the sections dealing with the Theoretical Perspective of Luria, and Other Evaluative Theories.

The Theoretical Perspective of Luria

The primary theory upon which the NENE is based was developed and expanded by A. R. Luria. Because of this, his theoretical perspective will be discussed in greater detail than that of the other leading theorists.

Luria was a Russian psychologist trained in psychoanalysis and neurology. Although he spent his entire life in the Soviet Union, he has become an internationally recognized authority in the world of experimental and clinical neuropsychology. He and his colleagues spent nearly 35 years researching methods of neuropsychological evaluation and developing his proposed theories (Kolb & Wishaw, 1985). His many theoretical contributions have expanded the base of knowledge. Lezak (1983) called him a brilliant theoretician and clinician. According to her, his

contributions of qualitative behavioral descriptions capture the common patterns of neurological disturbance and exemplify the uniqueness of each individual patient. Through his major writing, Higher Cortical Functions in Man (1966) and The Working Brain (1973), Luria contributed to modern neuropsychology both clinically and theoretically. In 1980, the members of the National Academy of Neuropsychologists voted him the fourth most important individual to contribute significantly to the field of neuropsychology since 1940 (Hartlage & Telzrow, 1980).

One of Luria's important contributions is the concept that the brain is divided into three principle units (Golden, Hammeke, & Purisch, 1979; Luria, 1973). These three units are responsible for (a) arousal, (b) sensory input and integration, and (c) behavioral planning and execution. Within each of these units, certain areas are responsible for specific functions. Within the unit responsible for sensory input and integration, for example, is an area that exclusively handles auditory input, another which handles visual input, and another which handles the integration of auditory and visual input.

According to Golden, Ariel, et al. (1982), the most important of Luria's contributions is the concept of the functional system, which leads quite naturally to the philosophy of syndrome analysis. This concept blends the localizationist and equipotentialist viewpoints.

The functional system theory holds that local cortical areas mediate specific skills. These skills, however, are so specific and exact that performing even a simple behavior requires the cooperation of several skills and, therefore, several cortical sites. The functional system includes all of the brain areas responsible for a particular process. Each of the cortical areas involved contributes a separate skill, none of which is sufficient by itself to allow the individual to perform a behavior. Together, with each contributing a part, they combine to perform an activity, and support the concept of a functional system.

According to Luria (1966; 1973), each area of the brain is part of more than one functional system. An injury to any area will affect all of the functional systems in which that area is involved. An exception to this is that an injury within a particular

system would not show up immediately if another functional system were available to do the same activity. Both systems may underlie the same behavior. An example of this is the performance of simple arithmetic. This task may be accomplished by either rote memory or analysis, two processes involving two separate functional systems. If one is damaged, the other is immediately available to take over and a behavioral deficit may not be readily noticeable (Luria, 1966; 1973).

Syndrome analysis, arising from the theory of the functional system, is the process of analyzing the basic neuropsychological skills that comprise the failing systems. Neuropsychologists have studied these systems and are, to varying degrees, familiar with which particular areas are involved with the skills. Those skills consistently involved in failed tasks can be identified, and the damage to the related brain area can be hypothesized. This is similar to the statistical concept of factor analysis in that both seek the unifying thread underlying a group of tasks or facts (Luria, 1966; 1973).

Luria was not a proponent of standardized methods of neuropsychological testing. His theory dictated

that the evaluator interact with the patient on a one-to-one basis to isolate each specific area where a functional system had been interrupted. Luria himself was a master at observing the subtle dysfunctions in behavior, thereby evaluating both the interrupted and the intact systems. Based on the patterns of performance he discovered, the deficit as well as its severity and type were identified (Luria, 1966; 1973).

Other Evaluative Theories

A review of the literature reveals many broad-based neuropsychological tests intended as screening instruments to signal the need for a thorough evaluation (Dodrill, 1978; Harley, Leuthold, Matthews & Bergs, 1980; Kaufman & Kaufman, 1983; Klesges & Fisher, 1983; Koppitz, 1963; Lowe et al., 1984; Puente, 1984; Snow, Hynd, Hartlage, & Grant, 1983; Terman & Merrill, 1973; Wechsler, 1974). Other than Luria's, however, only two theories dominate the area of neuropsychological evaluation: that of W. Halstead and R. M. Reitan, and that of M. D. Lezak. They shall be considered individually. This is done primarily to insure that the reader has a broader view of the current status of neuropsychological theory.

In 1935, Ward Halstead opened his neuropsychology laboratory, dedicated to increasing the understanding of the relationship between brain functioning and human abilities. He worked first through observational studies and then attempted to formally measure the behaviors noted in the subjects. The theory he developed led him, along with his first graduate student, Ralph Reitan, to compile a group of tests that together measured a much broader range of skills than had previously been included in traditional methods (Boll, 1981).

A difficulty encountered in the development of a neuropsychological test battery is that of identifying brain-related variables contrasted with behaviors dependent upon other influences. The problem is to identify which aspects of the test results relate specifically to the physiological condition of the brain. Halstead and Reitan chose to deal with this problem through the following 3-step process: (a) administer a comprehensive battery of tests to the patient without previous information regarding his neurological status; (b) make a written prediction of the patient's neurological status based solely on the neuropsychological test results; and (c) compare the

neurological diagnosis with the neuropsychological test results (Reitan & Wolfson, 1985).

Using this process, Halstead and Reitan learned that certain variables add little to neurological conclusions, and that other combinations of test results aid significantly in identifying brain dysfunction. They found some tests useful in lateralizing and localizing lesions, and others in differentiating chronic from acute damage (Reitan & Wolfson, 1985).

The initial Halstead Battery consisted of five tests: the Category Test, the Tactual Performance Test, the Rhythm Test, the Speech Sounds Perception Test, and the Finger Oscillation Test. Other tests added later by Reitan are the Trail-Making Test, a modified Aphasia Screening Test, a Wechsler test, a sensory examination, a measure of grip strength, and the MMPI (Lezak, 1983). Together, these tests are the Halstead-Reitan Battery. An experienced examiner can complete the battery in approximately six to eight hours.

Four specific strategies are recommended for interpreting test data obtained on the Halstead-Reitan Neuropsychological Battery (Boll, 1981):

1. To examine the subject's performance on each individual test. Although this gives some useful information, it does not supply much regarding brain function.

2. To compare levels of performance between the tests. This helps identify the dysfunctional areas within the brain.

3. To identify specific behavioral deficits that are known to occur in impaired individuals. It is important to keep in mind, however, that the absence of these signs is not necessarily proof of a lack of impairment.

4. To compare the sensory-perceptual, sensory, and motor performances of the same type of tasks on the two sides of the body.

When Reitan himself applied these methods on an individual basis, he found he was able to differentiate those patients with brain damage from those without.

The limitations of the Halstead-Reitan Neuropsychological Battery are: (a) it requires much equipment and many tests; (b) it takes a relatively long time to administer and interpret; and (c) it is not appropriate for patients with sensory or motor handicaps. However, the battery does give a reliable

psychological means of identifying patients with brain dysfunction. According to Lezak (1983), its greatest contribution to neuropsychology will not be its questionable diagnostic efficiency but the fact that it has served to make psychologists as a whole aware of the need to test many different areas when dealing with possible neurological problems.

The second theory is put forth by Muriel Lezak, a neuropsychologist who holds what she calls "ready-made batteries" in rather low esteem. In her opinion, the only benefits of these tests are that they point to the need for neuropsychological training; they are reliable for gross screening of patients; and they are beneficial in research programs which need standardized methods. She states, however, that when a patient receives a complete prepared battery, he or she is tested more than is necessary on a general level, but not on a specific enough level to answer the referral questions. She sees these batteries as simply providing a starting place for the inexperienced neuropsychologist (Lezak, 1983).

According to Lezak (1983), the neuropsychological evaluation should be tailored to meet the subject's needs, abilities, and limitations. This can be done in

either of two ways: (a) the examiner can select tests that are appropriate for the patient and the diagnostic needs; or (b) the examiner can alter the method of presentation, carefully adapting the specific tests to the patient's condition.

Although she speaks quite strongly against prepared batteries, Lezak has compiled a set of tests which she calls her "basic battery" (Lezak, 1983). They are a Wechsler test, the Symbolized Digit Modalities Test, the Rey Auditory-Verbal Learning Test, a paragraph learning test, Serial Sevens, Draw-a-House or Bicycle, the Complex Figure Test, the Purdue Pegboard Test or Finger Tapping Test, the Wisconsin Card Sorting Test, the Trail-Making Test, a Self-Administered Battery (a collection of intellectual and personality tests), a calculations test, Raven's Progressive Matrices, the Hooper Visual Organization Test, a vocabulary and comprehension test, and a personal history inventory. When these tests are completed, the examiner evaluates them and may choose to administer others picked specifically to address areas in which the subject shows a deficit. This battery takes approximately nine hours.

Although this basic battery appears to be a thorough neuropsychological evaluation and has shown itself to be successful for both Lezak and others whom she has individually trained, it clearly has several weaknesses. Golden (personal communication, August 1985) has explained that any accuracy on the part of the battery results from the interpretative skill of the individual rather than the completeness and accuracy of the battery. S. Franzen (personal communication, December 1985) addressed this problem, stating that frequently the referring professional, lacking knowledge in the field of neuropsychology, must rely on the report that is returned to him. The professional will have more confidence in that report not only if the evaluator is skilled but also if the evaluative methods are empirically shown to be standardized, valid, and reliable.

The Luria Nebraska Battery

Development

This section begins a discussion of the Luria Nebraska Neuropsychological Battery, since it is upon this that the NENE is founded. Two neuropsychological batteries based in Luria's theories have been

developed: (a) the Luria Nebraska Neuropsychological Battery, Forms I and II, and (b) the Luria Nebraska Neuropsychological Battery, Children's Revision. The NENE, the topic of this study, is an outgrowth and expansion of these batteries. Therefore, the Luria Nebraska Neuropsychological Battery will be considered in some detail.

In order to thoroughly understand his methods and theories Anne-Lise Christensen went to the Soviet Union and spent time studying directly with Luria. In 1975, she published his testing procedures as a comprehensive individualized battery. Without her work, the task of developing a standardized test of Luria's methods would likely have been impossible (Golden, Purisch, & Hammeke, 1985).

Christensen's collection of Luria's material is organized into ten sections according to functions. They are: motor functions, acousto-motor organization, higher cutaneous and kinesthetic functions, higher visual functions, receptive speech, expressive speech, writing, reading, arithmetic, memory, and intellectual process. The many techniques included in her battery reflect the range of methods Luria incorporated into his neuropsychological investigation. Indeed,

Christensen's work is significant in that it has made Luria's material accessible to those who wish to utilize his methods (Lezak, 1983).

The diagnostic battery presented by Christensen has four practical advantages (Golden et al., 1979; Kolb & Wishaw, 1985).

1. The battery gives a thorough breakdown of behavior and a specific analysis of the deficits. Therefore, it lends itself to diagnosis and rehabilitation planning.

2. The battery leads logically to interpretation because of its theoretical base.

3. The battery is a practical test in that it takes less than 2.5 hours, requires minimal materials, and can easily be administered at a bedside.

4. The battery covers all areas necessary for a total neuropsychological exam: motor, sensory, verbal, spatial, mathematical, memory, and intellectual skills (Benton, 1975).

Despite these advantages, Luria's method of testing has been much criticized. A primary reason for the criticism has been a lack of standardization. Luria believed that the true value of his tests would be lessened if they were administered in a standardized

format (Luria, 1966). He evaluated each test individually, considered the history and functioning of the particular patient, and modified the battery as he administered it in order to meet and measure an individual's deficits. Even in the battery described by Christensen, the instructions for administration are at times vague (Golden et al., 1979). Scoring is based upon personal assessment, experience, and knowledge rather than on any quantifiable material.

Another criticism of Luria's tests is the lack of systematic validation (Golden et al., 1979; Golden et al., 1985; Kolb & Wishaw, 1985). Reitan (1976) stated that Luria's reports are basically his own evaluation of the cases, based on his own observations and conclusions. Since Christensen's manual gives no validation studies, the reader is required to accept on faith that the tests actually do what Luria claims.

Golden originally designed the Luria Nebraska Neuropsychological Battery to vindicate Luria's theories and to make the procedure more widely available (Golden et al., 1985). The battery is an objectively scored, standardized version of Luria's procedures.

The standardization makes it possible to replicate and validate the test results and to collect data on different types of disorders. While retaining the qualitative nature and thoroughness of Luria's tests, quantitative information is introduced and specific clinical scales make it possible to establish a firmer interpretation of the battery (Golden et al., 1979).

It was regarding the qualitative-quantitative scoring union that the developers of the Luria Nebraska Neuropsychological Battery differed most strongly from the strict Luria proponents. Although they recognized the value of the qualitative information, they also accepted the fact that psychology is a science, and, as such, rests upon the use of standardized, quantitative, repeatable, and verifiable data (Golden, Ariel, et al., 1982).

A major benefit of using a combination of quantitative and qualitative scoring is that it encourages the exploration of specific deficits as well as empirical verification of theoretical beliefs. The Luria Nebraska Neuropsychological Battery was not the first neuropsychological test to attempt this. The Halstead-Reitan Neuropsychological Battery was also based on the assumption that patients with particular

lesions would produce specific patterns of results. The Luria Nebraska Neuropsychological Battery was actually developed in an attempt to apply the Halstead-Reitan methodology to Luria's testing procedures (Golden, 1981a).

Another area which the Luria Nebraska Neuropsychological Battery attempted to standardize was that of interpretation. The makers of the test recommended that this be addressed from three separate angles (Golden, Ariel, et al., 1982): (a) syndrome analysis, which was Luria technique for interpretation and which has already been discussed; (b) pattern analysis, which is possible only because validation studies found that specific lesions tend to produce specific patterns of test results; and (c) qualitative analysis of performance on the items, a technique followed by Luria himself, that deals with how an item is performed as well as whether or not it was done correctly.

The authors of the battery offered five specific steps for a standardized interpretation (Golden et al., 1985): (a) examination of the clinical scales; (b) examination of the localization scales; (c) examination of the factor scales; (d) examination of the item

patterns across the scales; and (e) examination of the qualitative aspects of the performance.

Much has been written regarding the specific development of the Luria Nebraska Neuropsychological Battery, the item placement within the test, the test construction, and factor analysis. These will not be addressed at this time since they are not applicable to this particular study.

Criticisms

The Luria Nebraska Neuropsychological Battery has been and remains a very controversial evaluative tool. Because of this, much has been written regarding its specific weaknesses. Some of the criticisms have been valid, and some have not. Following is a review of the main areas which have been criticized and, when they are available, the responses of the proponents of the battery. It is important to remember that these are criticisms of the Luria Nebraska Neuropsychological Battery, not the NENE. No studies have yet been done critiquing the NENE. In fact, some of the motivation behind the new battery was to meet the valid criticisms of the Luria Nebraska Neuropsychological Battery.

Adams (1980) critiqued the Luria Nebraska Neuropsychological Battery and noted 6 specific areas

that he felt were problematic: (a) the scoring of the drawing items was too subjective; (b) the scoring was adjusted to the independent variable of the group membership of the subject; (c) the 3-point system decreased objectivity and quantification; (d) too much variance existed in the educational level of the subjects in the validation studies; (e) not enough information was given regarding the specific studies done; and (f) the results of the studies, overall, looked too good, which made them suspect and susceptible to misinterpretation.

Golden (1980) replied to each of these criticisms. His response to the criticism that the scoring of the drawing items was too subjective was that the specific guidelines given in the manual make this an objectively scored area with 95% reliability. The scoring criteria are similar to other tests with drawing items that have long been accepted as objectively scored. He stated that the criticism that the scoring was adjusted to the group membership of the subject is simply untrue; the variance of the education of the samples is, in fact, an asset rather than a liability. His response to the criticism that the 3-point scoring system decreases objectivity and

quantification was to cite preliminary studies (Golden, Hammeke, Purisch, 1977 cited by Hammeke, 1978) that showed the accuracy and acceptability of this method.

Two of Adams' critiques, however, Golden acknowledged as appropriate: not enough information regarding the validation studies has been made public, and the preliminary results of the battery do indeed look too good to be true. However, he stated, they are true.

Spiers (1981) criticized the content of the Luria Nebraska Neuropsychological Battery, stating that (a) it redundantly assessed simple neuropsychological functions and (b) it lacked the flexibility of Luria's original battery. Webster, Dostrow, and Scott (1984) responded to these criticisms by stating that careful examination of the individual items within the battery shows that tasks which seem to assess similar functions actually differ in complexity so that, for the different populations addressed, the items are not redundant. In other words, if the apparently redundant items are given to a subject with an impairment in that area, the examiner is actually mapping out the parameters of the deficit. They also stated, regarding the question of flexibility, that Luria (1966) himself

followed a two-phase method of assessment: initial screening, and testing-the-limits. The testing-the-limits phase was indeed flexible and it is not that phase which the Luria Nebraska Neuropsychological Battery is intended to duplicate or standardize. The initial screening phase, however, may have been more fixed than the critics of the Luria Nebraska Neuropsychological Battery are willing to accept.

Maruish (1985) discussed other criticisms aimed at the Luria Nebraska Neuropsychological Battery. He concurred with Spiers's (1981) complaint that there was an inadequate measure of memory. This was also acknowledged by Golden, Ariel et al. (1982) when they included items assessing this area in Form II of the battery.

Maruish (1985) did not, however, agree with Spiers's (1982) complaint that there are methodological problems in the original and cross-validation studies. Spiers complained that there was a lack of adequate control of the characteristics of the subjects used in the studies. Although Maruish acknowledges that this may have been the case in some instances, cross-validation and other studies have generally supported the conclusions drawn from the major investigations.

Another major complaint regarding the Luria Nebraska Neuropsychological Battery is that language skills contaminate the performance on many nonlanguage items (Crosson & Warren, 1982; Spiers, 1981, 1982). Although not specifically responded to by Luria proponents, this was evidently a valid criticism. The NENE has extensive measures within it to avoid this type of contamination.

Stambrook (1983) comprehensively reviewed the perceived weaknesses in the Luria Nebraska Neuropsychological Battery. Some of these have been addressed above. Following is a brief review of other criticisms noted by Stambrook.

The instructions for the items in the Luria Nebraska Neuropsychological Battery are a blend of standardization and permission for the evaluator to improvise. Stambrook stated that it is impossible to know how the standardized instructions are flexible and how this flexibility affects performance. According to Golden (personal communication, May 4, 1985), however, the items are evaluating very specific skills. An item in the motor scale, for instance, is meant to measure the motor skills, not the verbal skills, of the subject. The method of explaining the item to the

subject, therefore, is secondary. If neurological deficits make performance impossible, the method of explanation will not make it possible. If the subject were prevented from properly doing the item not by inability but by a lack of understanding resulting from poor verbal skills, he or she would be inappropriately penalized. This is the reason for the flexibility in instruction as well as the justification of why it would not affect the scoring.

Stambrook (1983) also listed criticisms of scorer reliability, stating that inadequate information is given in the administrative manual. This appears to be a characteristic weakness of the Luria Nebraska Neuropsychological Battery. Although the validation and reliability studies may be well done, they are often poorly reported.

Anastasi (1982) stated that test-retest correlations decrease as the interval of time increases. Stambrook (1983), however, quoted Golden, Hammeke, and Purisch (1980) as saying that with the Luria Nebraska Neuropsychological Battery, the interval has a negligible influence. In this case, the functions being evaluated are unlearned skills based on the neuropsychological status of the patient. Unless

there were a change in that status, the test results should not be affected by time.

The split-half studies done by Golden, Fross, and Graber (1981) resulted in a correlation of .92, indicating that the scales are quite homogeneous. However, the manual (Golden et al., 1980) stated that they are heterogeneous in regard to functions. Stambrook explained this by stating that the items dealing with a particular skill are placed in consecutive order within the battery. Additionally, Anastasi (1982) stated that in cases where there is consecutiveness, split halves that do not rely on any particular planned split should be used.

Stambrook (1983) also reviewed the criticisms regarding the validity of the Luria Nebraska Neuropsychological Battery. The primary problems he found regarding content validity have been previously discussed in this section. Criterion-related, or diagnostic validity studies were mainly criticized for the lack of pertinent information included in the reports. As has been stated, this appears to be a primary weakness of those doing current research on the Luria Nebraska Neuropsychological Battery, and one which they are attempting to rectify (Golden, 1980).

A method of assessing how well a new test actually measures what it claims to measure is to correlate it with other, proven, tests. A high correlation suggests that the new test has construct validity (Anastasi, 1982). Many studies of this type have been done. Stambrook (1983) stated, however, that most of these studies actually tap intellectual skills and are highly contaminated by verbal abilities. He concluded his evaluation of the Luria Nebraska Neuropsychological Battery weaknesses by calling for additional research. This is, in fact, a continuing goal of the developers of the battery, and an ongoing process.

Reliability and Validity

Numerous studies have been made of the Luria Nebraska Neuropsychological Battery. In general, the literature supports the idea that it is a reliable and valid assessment tool. This support is relevant to the NENE because it is drawn, to a large extent, from the Luria Nebraska Neuropsychological Battery. Many of the validity and reliability studies on the Luria Nebraska Neuropsychological Battery may also apply to the NENE.

Studies have demonstrated the ability of the Luria Nebraska Neuropsychological Battery to discriminate brain damage from various types of control groups

(Bach, Harowski, Kirby, Peterson, & Schulein, 1981; Golden et al., 1981; Johnson, Moses, & Bryant, 1984; Kane, Parsons, & Goldstein, 1985; McKay et al., 1985; Purisch, Golden, & Hammeke, 1978; Snow & Hynd, 1985).

Studies also show that the battery can identify areas of specific lesions (Lewis et al, 1979; Moses, 1984).

Furthermore, the fact that the battery correlates well with other previously accepted evaluations such as the Halstead-Reitan Neuropsychological Battery, Wechsler scales, and medical techniques has been well documented (Berg et al., 1984; Dorman, Laatsch & Hurley, 1984; Johnson et al., 1984; Kane, Sweet, Golden, Parsons, & Moses, 1981; Klesges & Fisher, 1983; McKay & Ramsey, 1983; Moses, 1983; Moses & Johnson, 1984; Picker & Schlottman, 1982; Ryan, 1982; Snow et al., 1983; Tramontana, Klee & Boyd, 1984; Tramontana, Sherrets, & Wolf, 1983).

Several of these correlational studies were done specifically on children and will be reviewed individually. Tramontana, Sherrets and Wolf (1983) compared the Luria Nebraska and the Halstead-Reitan batteries on 9-to-15-year-old psychiatric patients with no known neurological dysfunction. Twenty-two children

were chosen with no attempt to randomize or equalize the sex ratio. Over two-thirds of the subjects were currently being treated with psychotropic medications. Although none had been diagnosed as learning disabled or mentally retarded, IQs ranged from 70 to 130 ($M=93.86$; $SD=16.65$). Each subject received the Halstead-Reitan Neuropsychological Battery for Older Children and the Luria Nebraska Neuropsychological Battery - Children's Revision. Overall, the two batteries had a correlation of .92. At that time, there were only 11 scales on the Luria Nebraska because the Left Hemisphere, Right Hemisphere, and Pathognomic scales had just been introduced and were not available. This high correlation was a positive finding for the Luria Nebraska Battery and lends evidence of concurrent validity.

Berg et al. (1984) conducted a study of 30 subjects, aged 9 to 19. All of the subjects were diagnosed as having chronic epilepsy and were taking medication for seizure control. Each was given the age-appropriate Halstead-Reitan and Luria Nebraska Neuropsychological Batteries. The purpose of the study was to determine the degree of agreement between the two batteries in identifying cerebral dysfunction. The

children's versions of the two batteries were found to be in complete agreement 91% of the time. The adult batteries agreed only 67% of the time. In those instances where the adult version of the Luria Nebraska was compared with the Halstead-Reitan children's battery because of the differing age ranges covered by each, agreement was again seen to be 91%. This study lends further support to the idea that the Halstead-Reitan and Luria Nebraska Neuropsychological Batteries are essentially equal in terms of diagnostic accuracy.

The final study comparing test results of non-learning disabled children was given to 59 children, aged 7 to 15, who were hospitalized for psychiatric disturbances (Tramontana et al., 1984). Each subject was given the Wechsler Intelligence Scale for Children - Revised, 17 were given the Halstead-Reitan, 20 were given the Luria Nebraska, and 22 were given both the Luria Nebraska and Halstead-Reitan. The intent of this study was to examine general patterns of correspondence with intelligence for both neuropsychological batteries. It was found that the Wechsler correlated significantly with measures of overall performance on both batteries, and that variability among the Wechsler subtests was associated with poorer performance on

both neuropsychological batteries. The Halstead-Reitan seemed to rely more upon performance IQ, and the Luria Nebraska appeared to be equally dependent on factors associated with both verbal and performance IQs.

McCue, Shelly, Goldstein, and Katz-Garris (1984) conducted a study of 25 learning disabled adults, administering the Luria Nebraska Neuropsychological Battery, the Wechsler Adult Intelligence Scale - Revised, the Wide Range Achievement Test, and a reading comprehension test. Examination of the Luria scales indicated impairment of complex language-related skills and normal performance on scales measuring basic language skills. The Reading, Writing, and Arithmetic scales correlated with achievement test scores in the .8 range. The conclusion at which they arrived was that adult learning-disabled subjects show deficit patterns similar to the patterns of learning disabled children.

As stated, the primary reason for attending to these reports in this study is that much of the NENE is drawn from the Luria Nebraska Neuropsychological Battery, Forms I, II, or the Children's Form. Although it is unwise to apply the results of these studies

directly to the NENE they do give indications of this newer battery's validity and reliability.

The Nebraska Neuropsychological Evaluation

The NENE is an individually administered neuropsychological battery developed by Golden in 1985. As described by Karras (1985), it consists of 37 subtests that correspond to Luria's theory of brain function. This new battery, upon which this study is based, will be discussed in this section.

The NENE is in experimental form and represents an expansion of the three existing Luria Nebraska Neuropsychological Batteries. It is designed to assess a broader range of skills than that covered by the previous versions. The expanded floor and ceiling for each area are intended to allow the examiner to evaluate both children and adults.

Specific ways in which the NENE differs from the three forms of the Luria Nebraska Neuropsychological Battery are:

1. Thirty-seven subtests are included rather than the original 12. These subtests measure more exact functions.

2. Several areas of evaluation have been added that were not previously addressed. Among them are a stroop test, nonverbal sound interpretation, and a trail-making test, speeded repetition, and reading comprehension.

3. Option cards have been added, enabling individuals with verbal difficulties to answer the questions.

The NENE was designed to have the same general uses and purposes as the previous Luria Nebraska Batteries but to function more comprehensively. According to Golden (personal communication, May 1985), the evaluation has five basic uses: (a) to identify brain damage in subjects with symptoms of unknown or uncertain etiology; (b) to assess the nature and extent of neuropsychological deficits in individuals with known lesions; (c) to assist in evaluating the effects of specific rehabilitative measures; (d) to examine the behavioral and psychological effects of certain types of brain damage; and (e) to help test theoretical propositions regarding brain-behavior relationships (see Appendix A).

A brief description of each of the subtests will be presented.

1. Bilateral Motor Coordination (S1): A 7-item scale that assesses the ability of the subject to organize, coordinate, control, and carry out motor acts with the upper and lower extremities.

2. Right Side Motor Movement (S2): A 2-item scale that measures the subject's ability to organize, control, and carry out motor acts with the upper right extremities.

3. Left Side Motor Movement (S3): A 2-item scale that measures the subject's ability to organize, control, and carry out motor acts with the upper left extremities.

4. Purposeful Motor Movement (S4): A 53-item scale that evaluates the subject's ability to understand from either instruction or imitation, to organize, control, and carry out purposeful motor acts with the upper extremities and oral area.

5. Oral/Motor Movement (S5): A 5-item scale that assesses the subject's ability to do both simple and complex oral movements.

6. Drawing (S6): A 13-item scale that evaluates the subject's ability to draw geometrical figures or lines from verbal directions and to copy them from a model.

7. Non-Verbal Auditory Processing (S7): A 74-item scale that measures the formation and coordination of motor acts based on nonverbal properties of auditory input, tones, and patterns.

8. Non-Verbal Sound Interpretation (S8): A 23 item scale that measures the subject's ability to correctly interpret the meaning and location of nonverbal sounds in space.

9. Right Tactile Discrimination (S9): A 26-item scale that evaluates the subject's ability to process tactile stimulation on the right side of the body.

10. Left Tactile Discrimination (S10): A 26-item scale that evaluates the subject's ability to process tactile stimulation on the left side of the body.

11. Right Complex Tactile Pattern Recognition (S11): An 11-item scale that measures the subject's ability to recognize symbols traced on the skin of the right upper extremity (right-sided graphesthesia).

12. Left Complex Tactile Pattern Recognition (S12): An 11-item scale that measures the subject's ability to recognize symbols traced on the skin of the left upper extremity (left-sided graphesthesia).

13. Double Tactile Stimulation (S13): A 10-item scale that provides a measure of 2-point discrimination both unilaterally and bilaterally.

14. Visual Identification (S14): A 54-item scale that measures basic visual analysis, in which the subject recognizes familiar objects both with and without figure-ground interference.

15. Visual Spatial Analysis (S15): A 50-item scale specifically designed to tap visual spatial skills and which require active visual processing and visual imagery.

16. Visual Intellectual Analysis (S16): A 16-item scale that measures the subject's visual analytic and synthesizing skills. (It is predicted that this will be one of the subscales to differentiate the two groups.)

17. Connecting the Circles (S17): A 2-item scale that measures the subject's visual conceptual and visual motor tracking skills. (It is predicted that this will be one of the subscales to differentiate the two groups.)

18. Phonemic Discrimination (S18): A 36-item scale that measures the subject's sound discrimination and phonemic hearing.

19. Auditory Comprehension (S19): An 81-item scale that measures the subject's ability to comprehend simple words.

20. Complex Auditory Comprehension (S20): A 36-item scale that assesses the subject's comprehension of sentences which vary from simple to complex and the subject's understanding of relationships and logical-grammatical structures. (It is predicted that this will be one of the subscales to differentiate the two groups).

21. Repetition (S21): A 50-item scale that measures the subject's auditory analysis, memory, and articulation.

22. Expressive Naming (S22): A 23-item scale that evaluates the subject's nominative and word-finding skills.

23. Speeded Repetition (S23): An 8-item scale that evaluates the subject's ability to accurately and quickly repeat simple sentences and words.

24. Patterned Expressive Speech (S24): A 5-item scale that measures the subject's fluency and spontaneity of automatic and habitual series.

25. Generation of Complex Expression (S25): A 21-item scale that measures the subject's ability to successfully generate extemporaneous verbal material.

26. Motor Writing (S26): A 55-item scale that evaluates the subject's ability to copy both simple and complex writing and to produce spontaneously written material.

27. Spelling (S27): A 20-item scale that evaluates the subject's ability to spell correctly either in writing or verbally.

28. Reading Recognition (S28): A 91-item scale that evaluates the subject's ability to visually process written material, phonetic synthesis, perception and analysis of letters, and reading of words, phrases, sentences, and paragraphs.

29. Reading Comprehension (S29): A 12-item scale that measures the subject's ability to read a complex sentence and evidence an understanding of its meaning.

30. Arithmetic (S30): A 126-item scale that evaluates the subject's ability to recognize and comprehend the relative value of numbers and their concepts and to perform arithmetic operations of increasing complexity.

31. Non-Verbal Memory (S31): A 27-item scale that measures the subject's visual nonverbal memory both with and without interference.

32. Verbal Memory (S32): A 30-item scale that measures the subject's verbal memory under varying circumstances with different types of interference and the subject's ability to associate a verbal stimulus with a picture.

33. Stroop (S33): A 3-item scale that measures the degree to which a subject can shift his perceptual set to conform to changing demands.

34. Intellectual Analysis and Integration (S34): A 22-item scale that evaluates the subject's ability to analyze a subject, identify its essential elements, and synthesize them into a meaningful whole. This is done through visual and verbal material in several different ways. (It is predicted that this will be one of the subscales to differentiate the two groups.)

35. General Intelligence and Orientation (S35): A 24-item scale plus information from a demographic data sheet previously filled out by the subject. This measures the subject's ability to systematically analyze verbal material, compare and differentiate

ideas or concepts, and to inhibit all mental digressions while performing a mental operation.

36. Analogies and Comparisons (S36): A 25-item scale that evaluates the subject's ability to deal in logical abstract relationships, analogies, and opposites. (It is predicted that this will be one of the subscales to differentiate the two groups.)

37. Visual Analysis (S37): A 15-item scale that measures the subject's ability to analyze complex visual material.

Format

The NENE is presented in a decision-tree format. This was done specifically to conform more to Luria's belief that flexibility is required to assess adequately an individual's strengths and weaknesses. This format is a response to a specific criticism that The Luria Nebraska Neuropsychological Battery lacked the flexibility proposed by Luria (Christensen, 1975). Although Golden (1980) responded to that criticism, Webster, Dostrow, and Scott (1984) decided that the format of the Luria Nebraska Neuropsychological Battery could be improved. They therefore regrouped the Luria Nebraska items by presentation modality, response modality, and presumed processing activity. This

resulted in 48 groupings that were ranked internally from the most complex to the progressively simpler.

A comparison of this 48-group decision-tree format with the actual Luria Nebraska Neuropsychological Battery showed 91% agreement of the number of scales over the critical level, or the level 10 T-Scores above the accepted area for a non-brain damaged person of comparable educational background and age. The 2-scale elevation rule (Golden, 1980) states that when more than two scales are elevated over the critical level, there is a significant chance of neurological deficits. When Webster, Dostrow, and Scott (1984) applied this rule, the result was 100% agreement between the two Luria batteries.

Although the Webster, Dostrow, and Scott (1984) study showed a high correspondence between the two batteries, the patient population used was small and only two comparison groups were using brain damaged and normals. Therefore, Johnson and Moses (1984) attempted to replicate the study using a sample of 441 patients from 3 diagnostic groups (brain damaged, alcohol dependent, and schizophrenic). Their results were in close agreement with the previous study. Correlations were all above .90 and were significant beyond .001.

The results of these studies definitely recommend the decision-tree method for the Luria Nebraska Neuropsychological Battery.

Sweet, Osmon, Rossensky, and Tovan (1985) conducted a similar study. Their findings supported the assertion that a decision-tree format of the Luria Nebraska Neuropsychological Battery can be used and produce the same profiles. These results extended to the localization and factor scales as well.

Based partially upon the studies done by Webster, Dostrow, and Scott (1984), Johnson and Moses (1984), and Sweet, Osmon, Rosensky, and Tovan (1984), the NENE was written with a modified decision-tree format. The purpose of this new format is two-fold (C. Golden, personal communication, August, 1985):

1. A developmental approach combining the adult and children's forms will allow a thorough assessment of weaknesses and strengths in one battery.

2. Combining similar items into one item with different difficulty levels will establish floor and ceiling levels and thereby reduce administration time.

Reliability and Validity

To the present time, no validity or reliability studies have been completed on the NENE. The current

doctoral study is an attempt to begin establishing concurrent validity of the test. Information regarding the validity and reliability of Forms I and II of the Luria Nebraska Neuropsychological Battery has been previously addressed under the heading "Luria Nebraska Neuropsychological Battery, Reliability and Validity."

Summary

Recently, educational institutions have put an increased emphasis on learning disabilities. Some confusion exists regarding the exact definition of learning disabilities, and, therefore, the causes of learning disabilities.

The most generally accepted theory is that learning disabilities have some type of neurological component. This theory has roots dating as far back as 500 B.C. and has evolved through a long, often confusing, history.

Two theories have generally dominated the field. Localizationists have claimed that each area of the brain controls a skill specific to it alone. Equipotentialists claimed that the whole brain is responsible for its total functioning. Through the

centuries, each theory has experienced both popularity and neglect.

A third theory, more recently proposed by Luria, is that of the functional system. Simply stated, this is the belief that very specific skills controlled by particular brain areas combine and develop into more complex skills and behaviors. In that the specific skills are location-specific, the localizationists have been correct. In that these skills come together from several cortical and subcortical areas to facilitate a more complex behavior, the equipotentialists have been correct. The theory of functional systems is the basis for the Luria Nebraska Neuropsychological Batteries and the NENE.

Luria himself was very talented in the art of neuropsychological evaluation. He developed a battery of items which were individually administered and subjectively scored. The Luria Nebraska Neuropsychological Batteries and the NENE are attempts to standardize and quantify Luria's theories and tests as well as the methods of interpretation.

Although the Luria Nebraska Batteries are relatively new evaluations, they have clearly had a generous amount of criticisms leveled at them; some

valid and some not. One justified criticism that comes from several sources is that insufficient information is given regarding the validation and reliability studies. This insufficiency causes much confusion as to whether the tests are truly valid and reliable. This problem is seen less frequently as more studies are done and reported in a more systematic fashion.

Another valid criticism has been that the batteries had inadequate measures of memory. This problem was dealt with to some extent in Form II of the battery but seems to be ignored again in the NENE, which in its very formative stage was referred to as Form III.

The third valid criticism of the Luria Nebraska Batteries is that language skills contaminate the performance of many nonlanguage items. The NENE is attempting to respond to that need by the use of option cards.

The studies that have been done on the Luria Nebraska Batteries have shown, on the whole, that the batteries are reliable and valid methods of investigating neuropsychological dysfunctions.

Two other widely accepted methods of neuropsychological evaluation are the Halstead-Reitan

Neuropsychological Battery and Muriel Lezak's nonbattery battery. Both of these require many more hours to administer and score than do the Luria Nebraska Neuropsychological Batteries; both are more costly; and both are more cumbersome. Virtually all the studies of concurrent validity indicate that the Luria Nebraska Neuropsychological Battery is equally as effective as these methods in the diagnosis of neuropsychological deficits.

The purpose of this doctoral study is to determine whether or not the NENE can discriminate between learning disabled and non-learning disabled students. If this determination is made, the test could be used as a diagnostic device and as an aid to remedial planning. As an evaluative tool, the NENE can also contribute to a more exact definition of learning disabilities.

The review of the literature indicated that adults with learning disabilities have neuropsychological patterns that are very similar to those of learning disabled children. It is possible that they, too, could benefit from a test which could accurately identify and diagnose their neuropsychological problems. Just as with children, remediation would be

much more possible with an adequate understanding of the problem.

Another benefit of the Luria batteries over other evaluative methods is the fact that the batteries are systematic. They permit the evaluator to methodically examine many behaviors and thus to become aware of the subtle deficits that could be caused in several systems by a dysfunction in one particular cortical area.

Hypotheses

1. The NENE will discriminate between a group of heterogeneous learning disabled children aged 7 to 10 and a group of similarly aged non-learning disabled children chosen by their teachers to be performing academically at an average level.

2. The subtests that discriminate between learning disabled and non-learning disabled children will be Subtests 16 (Visual Intellectual Analysis), 17 (Connect the Circles), 20 (Complex Auditory Comprehension), 34 (Intellectual Analysis and Integration), and 36 (Analogies and Comparisons). The abilities required to perform these subtests are represented in Myers and Hammill (1969) as areas of dysfunction in learning disabled children. Table 1

indicates these five subtests and the particular areas of dysfunction (Myers and Hammill, 1969) they measure. A review of the Luria Nebraska Neuropsychological Batteries, upon which the Nebraska Neuropsychological Evaluation is based, makes possible a determination of the main areas of dysfunction measured by the subtests.

Table 1

Nebraska Neuropsychological Evaluation Subtests
Hypothesized to Discriminate Learning Disabled from Non-
Learning Disabled Children, and the Areas of
Dysfunction Measured by Each

	Subtests				
	16	17	20	34	36
<u>Perception</u>	X	X	X	X	X
<u>Symbolization</u>	X	X	X	X	X
<u>Motor Activity</u>		X			
<u>Attention</u>		X	X	X	
<u>Memory</u>		X		X	X
<u>Emotionality</u>				X	

CHAPTER 2

Introduction

This chapter presents the methodology of the study in three sections: (a) a description of subjects; (b) a summary of the procedures used to carry out the study; and (c) a discussion of the statistical design.

Subjects

The subjects were children 7 to 10 years of age who were currently attending a private school in the greater Portland, Oregon, area, and who had been previously diagnosed as learning disabled. Descriptive statistics are presented in Appendix B.

The 7 to 10 age group was chosen for two reasons. First it is felt by most specialists in education and child psychology that identification and remediation should begin at an early age. It was important for this study that the subjects be old enough to have been previously diagnosed as learning disabled. Because the federal government's diagnosis for learning disability is based mainly on academic achievement compared with

intellectual ability, the children needed to be in school. The second reason is that it is very difficult to evaluate and diagnose a preschool-aged child on these behavioral levels, although two of the areas evaluated for learning disability are nonacademic (oral expression and listening comprehension). Kalverboer (1979), in his study on preschool-aged children, reported a wide variance of normal and appropriate behavior for 5-year-old children. This variance would make it difficult to determine what particular behavior of a younger population represented a severe discrepancy (the term used in the federal definition for learning disorders).

Before admission to their school the children were screened to ascertain that they do meet the requirements for learning disabilities presented by the federal government, and that their full scale IQs do not fall below 90. An IQ of 90 is less than one standard deviation below the mean of 100 and is considered to be in the average range (Wechsler, 1974).

The subjects were matched for sex, age, and educational level. They were not, however, matched for socioeconomical or sociocultural status. Although several studies have evaluated the possibility of an

interaction between socioeconomic status and learning disabilities, no clear connection exists (Gajar, 1980; Jorgenson, 1981; Ysseldyke, Algozzine, Shinn & McCue, 1982). Jorgenson, Stone, and Opella (1985) compared learning disabled and non-learning disabled students on environmental, sociocultural, biological, and developmental levels. They found that developmental delays, serious illness, and birth size, were the variables that most accurately differentiated, not environment or sociocultural factors. Studies that do implicate socioeconomic status indicate that it is only a factor if the economic status is sufficiently low to affect the nutritional status or medical care a child receives, or if it affects the educational level (Benton, Levin, & Van Allen, 1974; Finlayson, Johnson, & Reitan, 1977; Ostrosky-Solis, Canseco, Quintanar, Navarro, & Meneses, 1985).

An equal number of children of the same ages but not considered to be learning disabled were selected as a control group (see Appendix B). These children attended a private school for non-learning disabled students in greater Portland, Oregon. Developmental history and parental consent were obtained before these

children were administered the Nebraska Neuropsychological Evaluation.

Classification as learning disabled

As stated previously, the federal government has a specific definition of learning disabilities (US Office of Education, 1977b). According to that definition, a child has a specific learning disability if:

1. He/she does not achieve commensurate with his or her age and ability levels in one or more of her seven specific areas when provided with learning experiences appropriate for the child's age and ability levels.
2. A severe discrepancy is found between achievement and intellectual ability in one or more the following areas:
 - a. Oral expression
 - b. Listening comprehension
 - c. Written expression
 - d. Basic reading skill
 - e. Reading comprehension
 - f. Mathematics calculation
 - g. Mathematics reasoning.

The schools attended by all the children in this study comply with this definition and, for the purposes of

this study, will be the rationale for placement of a child within the learning disabled group.

Classification as non-learning disabled

Children were selected for the non-learning disabled group by their teachers based upon certain criteria given to them. Specifically, these children were considered neither gifted nor slow and were performing neither above nor below age level. Their grades and behavior were average among their age peers. The teachers involved had each taught for a minimum of 10 years and it was presumed that they had adequate experience to identify "normal" students. In addition, to avoid any chance that above-or below-average children would be included in the normal group, the examiner volunteered to administer psychoeducational batteries to other children in the classes. This gave the teachers access to information regarding their more advanced or slower learning students without contaminating the non-learning disabled sample.

Procedures

Instrument

The instrument used in this study was the NENE. This comprehensive battery was presented and discussed in a previous section.

Evaluation

The parents of the subjects chosen for the study were contacted by telephone. The study was explained to them, and they were asked to permit their children's participation (see Appendix C). After the parents had given their verbal consent, the children were given confirmatory consent forms as well as developmental questionnaires to bring home for their parents to fill out and sign (see Appendix D). These were completed and signed by the parents and returned to the school before the children were tested.

The test was administered by the author and one other graduate student. The author was trained in administration and scoring during an intensive, week-long independent session at Nebraska Psychiatric Institute, Omaha, Nebraska.

Administration of the test was performed in small examining rooms chosen by the school staff. The testing took place during the morning hours of school.

All of the learning disabled students were tested between the hours of 8:30 and 11:30 AM. All non-learning disabled were also tested in the morning with the exception of four fourth graders whose teacher requested, for the convenience of school activities, that they be tested during the afternoon.

Testing for each child was completed in a single day. It was interrupted, however, for the regularly scheduled physical education classes, recesses, and for the younger children, the morning snack breaks.

It was assumed that the testing breaks for physical education, recess, and snacks had no effect on the scores received on the NENE. Franzen (1985) stated that it is acceptable to administer a Luria Nebraska Neuropsychological Battery or the NENE over a period of multiple sessions and that the results will not be affected unless the patient received a traumatic head injury between testing sessions. Additionally, Golden et al.(1985) stated that the battery may be given in a series of sessions and that the length of the sessions may vary depending upon the fatigue of the client and his ability to concentrate.

Each item of the NENE has specific administration and scoring criteria. This is done according to the

procedures outlined by Golden during individual training sessions. The items were scaled on a 3-point system (0, 1, 2) using cutoff points established in preliminary studies (Golden et al., 1979; P. Scott, personal communication, July 30, 1985).

Each child's raw data were scored using a software program, NENE (Golden, 1985b) on an IBM PC. The program scaled each of the 37 subtests and displayed them in profile. These were the scores which were then analyzed for the purpose of this study (see Appendix E).

Statistical Design

The data were evaluated by Discriminant Analysis to determine if the NENE can correctly classify or discriminate learning disabled from non-learning disabled children, aged 7 to 10. Discriminant Analysis is a computerized statistical technique which determines, on the basis of several variables, how individuals can best be assigned to one of two or more groups (Kerlinger, 1973; Tatsuoaka, 1970).

Gondek (1981) described discriminant analysis as a technique which examines the differences among two or

more groups, using as large a set of measures as one wishes. The first step in a discriminant analysis examines the differences among two groups by selecting the set of variables in linear combination which best maximizes the separation of the groups (Gondek, 1981; Neufeld, 1977). The variables are inserted into the linear combination one at a time in order of their individual discriminating power, and the procedure continues until new variables make little or no contribution to the discrimination (Wentz, 1979).

Using that information (specifically, which of the linearly combined variables best separate the two groups), the second step of a discriminant analysis is performed. The investigator predicts into which of those groups additional subjects will best fit (Kerlinger, 1973; Franzen & Golden, 1985; Tatsuoka, 1970). The scores which the additional subjects received on the specific discriminating variables are measured against the scores of the original groups, and membership is predicted (Wentz, 1979).

The technique of discriminant analysis was chosen for this study for the following reasons:

1. Franzen and Golden, prominent neuropsychologists, have indicated that this particular statistical method is one of the most appropriate to use when doing investigations in the field of neuropsychology (Franzen & Golden, 1985).

2. Discriminant analysis is the preferred method of discriminating between two groups when there are six or more variables (Wentz, 1979). In this study there are two specific groups: (a) the learning disabled sample, and (b) the non-learning disabled sample. These two groups are discriminated by the 37 subtests of the NENE. This number, significantly more than six, as specified by Wentz, calls for discriminant analysis.

For the current study, statistical analysis was performed on a Hewlett-Packard Vectra computer system utilizing the Statistical Package for the Social Sciences/Personal Computer-Plus (SPSS/PC+) statistical software package (Norusis, 1986).

Before entering variables into the discriminant analysis, univariate F ratios were calculated for each variable. During the discriminant analysis, a canonical correlation and discriminant weights were

obtained. Chi-square was computed to determine the significance level of the function.

During the process of discrimination, group membership was predicted. Depending upon their discriminant scores, the subjects were predicted to be learning disabled or non-learning disabled. The results were compared with the actual group to which they belonged, and the percentage of subjects accurately classified was recorded. The ability of the subtests to accurately predict group membership was thereby tested.

To more fully assess the predictive ability of the subtests, classification results were obtained on a developmental sample and a cross validation sample (Franzen and Golden, 1985; Lehmann, 1979). For the developmental sample, 40 subjects, 20 of whom were learning disabled and 20 of whom were not, were selected. These subjects were used for the analysis phase, during which the specific discriminating subtests were established. The remaining 20 subjects, 10 each of the learning and non-learning disabled groups, became the cross-validation sample for the classification phase. In this way, correction was made

for any upward bias in the classification results (Franzen & Golden, 1985; Lehmann, 1979; Norusis, 1986).

When discriminant functions are derived from one (developmental) sample, and then applied to a later (cross validation) sample, the accuracy of classification in the new sample will be lower than that achieved in the original sample. This occurs because discriminant functions and other multivariate methods develop the 'best fitting' combination of variables in the developmental sample, thus closely matching the uniqueness of that sample. When the discriminant functions are applied to a validation sample their accuracy of classification is less because each new sample has its own uniqueness. Therefore, methods of cross-validation are recommended to more fully assess the classification accuracy of the discriminant function (Norusis, 1986).

For this reason the method of multiple cross-validation using five separate, random, validation samples was employed in this study. This was intended to approximate the multiple cross-validations which might occur in the future should the discriminant function developed in this study be applied to new samples of learning disabled and non-learning disabled

students. Also, it should be noted that alternate methods of cross-validation, such as the jack-knife procedure, were not available in the computer software used in the present study (Norusis, 1986).

Summary

Two groups of children, learning disabled and non-learning disabled students from the greater Portland, Oregon, area were administered the NENE. The scores earned by the students were evaluated by discriminant analysis. The purpose of the evaluation was to determine whether or not the NENE differentiated between the performance of the two groups and, if so, which particular subtests differentiated most clearly.

CHAPTER 3

Introduction

This chapter presents the results of the discriminant analysis in an attempt to determine if learning disabled children aged 7 through 10 could be discriminated from non-learning disabled children of the same age. Before performance of the discriminant analysis, univariate F-ratios and levels of significance for all 37 subtests were determined. These, along with descriptive statistics for the subtests of the NENE are presented in Appendix F.

Discriminant Analysis

Discriminant Function

To determine the generalizability of the subtests and of their ability to effectively discriminate between the two groups, stepwise discriminant analysis was performed a total of five times. Each time all 37 subtests of the NENE were included as predictor variables. The pooled within-groups covariance matrix is presented in Appendix G. Appendix H presents the pooled within-groups correlation matrix.

During the five individual analyses, 14 different subtests were found to be in the discriminating group of variables. Of these 14 subtests only three are among the five hypothesized to be discriminatory. They are subtests 16 (Visual Intellectual Analysis), 34 (Intellectual Analysis and Integration), and 36 (Analogies and Comparisons). These, as well as the mean scores earned by each of the two groups in the remaining subtests are presented on Figure 1. It can be seen that the scores vary, between groups, from a difference of 1.15 to 11.6. Not apparent in this figure, however, are the individual standard deviations, which would impact the meaning of the differences.

Because of this, and to further explore the clinical implications of the results of the discriminant analyses, the means and standard deviations of each NENE subtest score were examined for each group (learning disabled and non-learning disabled). Table 2 lists all subtests and indicates those most frequently included in the five separate discriminant analyses. As can be seen from the second column of Table 2, the number of inclusions varied from 1 to 5, with 5 indicating that the subtest had been

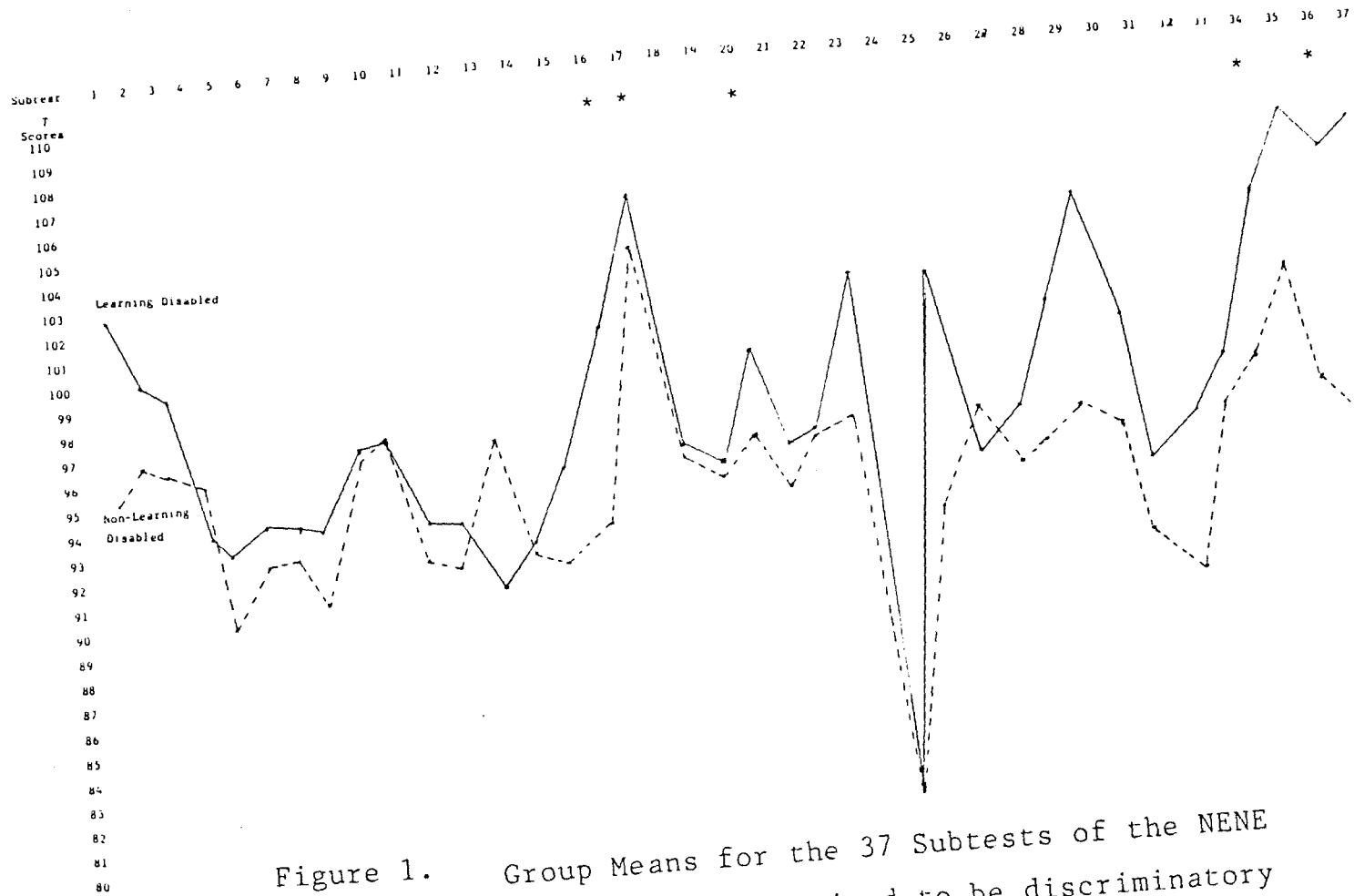


Figure 1. Group Means for the 37 Subtests of the NENE
 Note: * = Scales hypothesized to be discriminatory

included in each of the five discriminant function replications.

Also included in Table 2 are the means, standard deviations, and mean differences for the total learning disabled (N=30) and non-learning disabled (N=30) groups. The pattern of these means and the size of the mean differences provides a clinical interpretation of the results of the discriminant analyses. Means and standard deviations for the total groups are presented because the five replications of the discriminant analysis successively examined randomly drawn repeated subgroups, eventually sampling all subjects. Therefore, the pattern of results found in the discriminant analyses should be reflected in the total group. For most of the subtests, the learning disabled group has a higher mean subtest score.

The final column of Table 2 shows the standardized mean difference between the two criterion groups on each of the subtests. The standardized differences were calculated by dividing the difference between the group means by the pooled (averaged) standard deviations for the two groups. This is a standardizing technique suggested by Cohen (1977). The resultant "effect size" makes it possible to assess the

Table 2

Interpretation of the Discriminant Function Results: Number of Inclusions, Means, Standard Deviations and Effect Sizes for the Differences Between Learning Disabled and Non-Learning Disabled Groups

Scales	Inclusions	Learning Dis.		Non-Learning Dis.		Mean Diff.	Effect Size
		Mean	SD	Mean	SD		
1 *** (Bilateral Motor Coordination)	2	102.60	5.83	95.20	7.94	7.40	1.08
2 (Right Side Motor Movement)		100.00	5.42	96.55	7.01	3.45	.56
3 (Left Side Motor Movement)		99.05	7.24	96.25	7.28	2.80	.38
4 (Purposeful Motor Movement)		93.90	1.97	95.55	10.40	-1.65	.27
5 (Oral/Motor Movements)		92.85	6.37	87.75	7.11	5.10	.76
6 (Drawing)		94.00	3.13	92.10	3.81	1.90	.55
7 (Non-Verbal Auditory Processing)	3	93.95	2.04	92.20	2.42	1.75	.78
8 (Non-Verbal Sound Interpretation)		93.45	4.71	90.55	4.03	2.90	.66
9 (Right Tactile Discrimination)		96.70	2.85	96.20	2.42	.50	.19
10 (Left Tactile Discrimination)		96.80	3.30	96.90	2.88	-.10	.03
11 (Right Complex Tactile Pattern Recognition)		93.65	8.40	91.90	8.13	1.75	.21
12 (Left Complex Tactile Pattern Recognition)		93.60	8.17	91.60	9.27	2.00	.23

Table 2, cont.

Interpretation of the Discriminant Function Results: Number of Inclusions, Means, Standard Deviations and Effect Sizes for the Differences Between Learning Disabled and Non-Learning Disabled Groups

Scales	Inclusions	Learning Dis.		Non-Learning Dis.		Mean Diff.	Effect Size
		Mean	SD	Mean	SD		
13 (Double Tactile Stimulation)	2	90.70	4.82	97.45	10.63	-6.75	.87
14 (Visual Identification)		92.85	1.87	92.05	1.05	.80	.55
15 (Visual Spatial Analysis)	2	96.00	5.55	91.55	6.13	4.45	.76
16 *** (Visual Intellectual Analysis)	3	101.20	5.98	93.85	7.07	7.35	1.13
17 (Connecting the Circles)		106.85	13.47	104.95	9.12	1.90	.17
18 (Phonemic Discrimination)		96.20	1.77	95.75	1.86	.45	.25
19 (Auditory Comprehension)		95.50	1.57	94.70	2.11	.80	.43
20 (Complex Auditory Comprehension)		100.05	10.13	97.00	6.00	3.05	.38
21 (Repetition)		96.00	2.43	94.65	2.21	1.35	.58*
22 (Expressive Naming)		96.55	1.70	96.15	1.84	.40	.23
23 *** (Speeded Repetition)	1	102.55	5.26	97.05	4.82	5.50	1.09
24 (Patterned Expressive Speech)	2	81.40	2.33	80.25	1.12	1.15	.68
25 *** (Generation of Complex Expression)		102.10	8.77	90.30	10.61	11.80	1.22

Table 2, cont.

Interpretation of the Discriminant Function Results: Number of Inclusions, Means, Standard Deviations and Effect Sizes for the Differences Between Learning Disabled and Non-Learning Disabled Groups

Scales	Inclusions	Learning Dis.		Non-Learning Dis.		Mean Diff.	Effect Size
		Mean	SD	Mean	SD		
26 (Motor Writing)		95.25	2.43	96.60	6.26	-1.35	.31
27 *** (Spelling)	3	96.55	1.79	94.40	1.54	2.15	1.30
28 *** (Reading Recognition)	5	101.10	4.34	95.40	2.09	5.70	1.78
29 *** (Reading Comprehension)		105.25	6.07	96.75	7.83	8.50	1.22
30 (Arithmetic)		99.95	9.52	95.60	6.34	4.35	.55
31 (Non-Verbal Memory)		94.45	4.93	91.45	6.44	3.00	.53
32 *** (Verbal Memory)	2	96.40	5.76	89.75	5.30	6.65	1.20
33 (Stroop)		98.80	7.94	96.60	7.58	2.20	.28
34 *** (Intellectual Analysis and Integration)	1	104.90	6.79	98.45	6.84	6.45	.95
35 *** (General Intelligence and Orientation)	1	108.05	4.93	102.35	5.81	5.70	1.06
36 *** (Analogies and Comparisons)	2	106.80	6.76	97.65	5.58	9.15	1.48
37 *** (Visual Analysis)	5	107.80	7.62	96.20	7.32	11.60	1.55

Note: *** = Mean difference near to or greater than one standard deviation.

N = 60 (Learning Disabled: 30; Non-learning Disabled: 30)

comparative size of the mean differences. Any effect size larger than 1.0 indicates that the two groups differ by an amount equal to or greater than one standard deviation. Nine subtests were identified as having mean differences with the largest effect size. Of these nine, only two were hypothesized to discriminate between the two groups. These were subtests 16 (Visual Intellectual Analysis) and 36 (Analogies and Comparisons).

Additionally, Figure 2 graphically displays the mean scores achieved by each of the two groups. When considering Figure 2, however, it should be remembered that there is a significant difference in standard deviations between the groups and among the subtests. This difference is standardized by the effect size reported in Table 2.

To summarize across the five discriminant function analyses, summary statistics are presented in Table 3. The square of the canonical correlations for each analysis tells the amount of between-groups variance which is accounted for by the discriminant function. The canonical correlations range from .73 to .84. This means that 62 to 71% of the variance was accounted for by the discriminant functions. For each of the

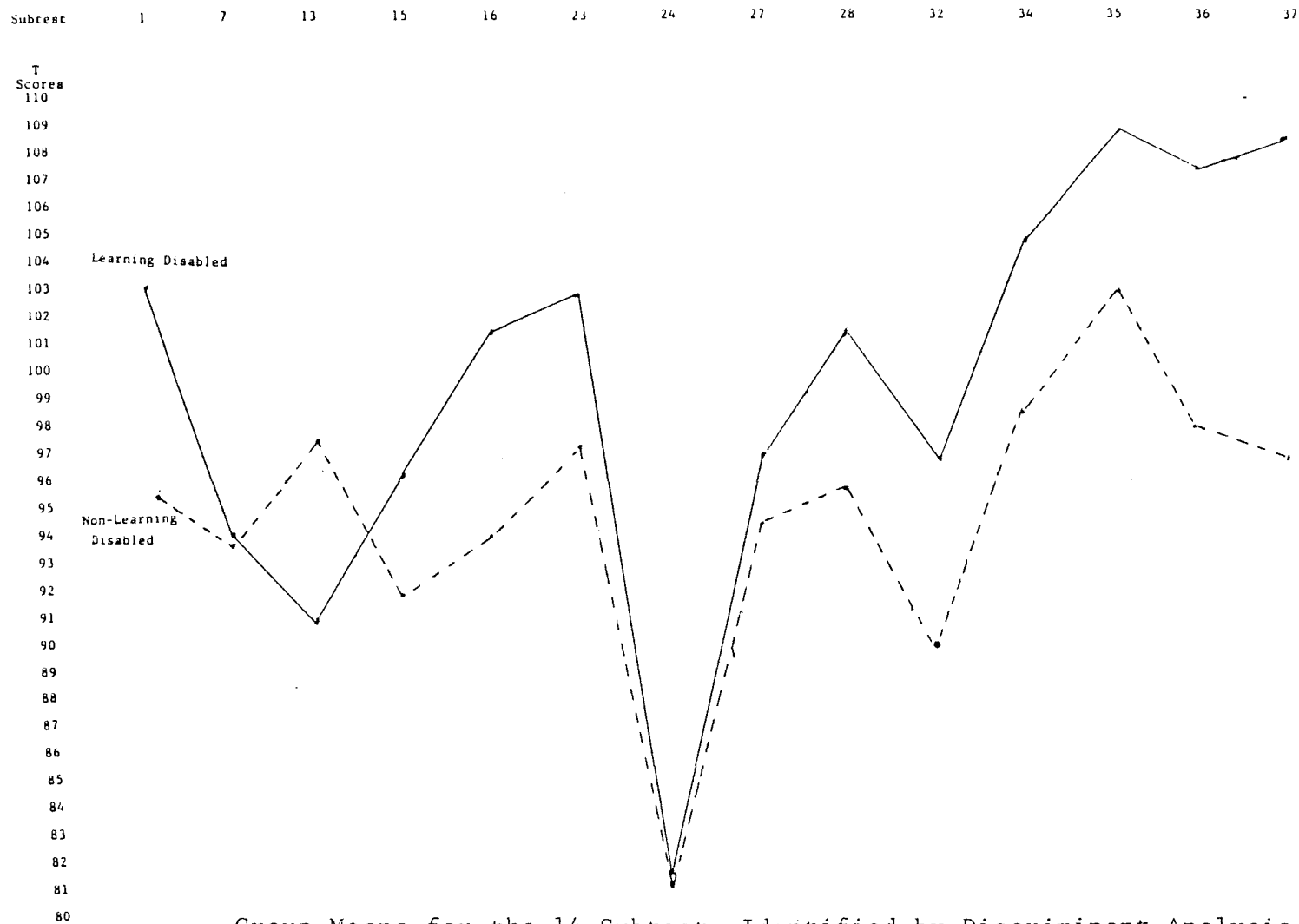


Figure 2. Group Means for the 14 Subtests Identified by Discriminant Analysis as Discriminating Between Learning Disabled and Non-Learning Disabled Children

discriminant analyses a chi square was computed. These range between 26.86 and 42.35, with 4 to 8 degrees of freedom, and significant at $p \leq .001$.

Table 3

Range of Canonical Correlations and Chi-Squares from the Discriminant Function Summaries.

Canonical Correlation	.73 to .84
Chi-Square	26.86 to 42.35 **
DF	4 to 8

Note: n = 40

** $p \leq .001$

The five discriminant functions derived from the stepwise analysis were used to classify group members as belonging to the learning disabled or non-learning disabled groups. It was possible to establish the percent of correct predictions because group membership was already known. This was done two times for each of the discriminant functions: once with no weighted probabilities set, and once with weighted prior probabilities that 15% of the population was learning disabled and 85% of the population was not. With no prior probabilities set, the data was validated with the assumption that 50% of the population was learning disabled and 50% was not.

The reasons for contrasting two types of prior probabilities are as follows. Beginning with the work of Rosen (1954), it has been widely discussed in the literature on psychological testing that the prediction of rare events, such as suicide or severe psychopathology, is a difficult process. The difficulty is that many false positives -- individuals said to be "sick" when they are actually "well" -- are identified by psychological tests when the true base rate of the criterion condition is not taken into account. The base rate is the estimated proportion of

a phenomenon, such as membership in a criterion group, within the general population. Since learning disabilities occur in only an estimated 15% of the general school population (Johnson & Morasky, 1980), a base rate of approximately 15% should be used when evaluating any classification or prediction system that tries to identify learning disabled students. Meehl and Rosen (1955) pointed out that a test may be validated on an artificially large criterion group, and the validity inflated if base rates are not taken into account.

Fortunately, most discriminant analysis computer programs including the one used in the present study include the adjustment of prior probabilities (base rate) as an option. This option was used for each of the five analyses, with the expectation that the percentage of correct classification would be lower when the prior probability of learning disabled status was lowered from 50% to 15%. The goal, however, was to assess the degree of shrinkage in the classification accuracy when the lower base rate was employed.

Table 4 presents the average percentage of correct classification for the total developmental and validation samples that presupposed an equal

probability of a child's being learning disabled or not. Table 5 presents the same information for the samples, based on the assumption that only 15% of the sample would be learning disabled. On the whole, as expected, the validation samples anticipating a 50/50 split between the groups more accurately predicted group membership, with a range of correct classifications of 70% to 80%. The samples anticipating a split of 15/85 correctly classified 60% to 70% of the populations.

Summary

In summary, the discriminant analysis did discriminate between the learning disabled and non-learning disabled groups, thereby affirming Hypothesis 1. When a 50/50 split was anticipated the percentage of correctly classified children was 70% to 80%. When a more typical 15/85 split was anticipated the percentage of correct classifications dropped to between 60% and 70%. This decrease in correct classifications was anticipated. It should be noted that even though the percentage correctly classified was decreased it did not fall to the level of random selection. This indicates that it is possible,

Table 4

Average Percentage of Correct Classifications with No
Prior Probabilities

	Classified Learning Disabled	Classified Non-Learning Disabled
Developmental Sample	91%	89%
(Range)	(85 to 95.2%)	(85 to 90.9%)
Validation Sample	78%	66%
(Range)	(50 to 90.0%)	(50 to 90.0%)
<hr/>		
Total Developmental N	= 40	
Total Validation N	= 20	

through discriminant analysis, to discriminate between the NENE scores of learning disabled and non-learning disabled children at a rate greater than random chance would indicate.

Hypotheses 2 was not affirmed. Of the five subtests predicted to discriminate between the learning disabled and non-learning disabled children, only three were involved in the discriminant function. These were

Table 5

Average Percentage of Correct Classifications with
Prior Probabilities of 85/15%

	Classified Learning Disabled	Classified Non-Learning Disabled
Developmental Sample	77%	96%
(Range)	(66.7 to 85%)	(90 to 100%)
Validation Sample	58%	72%
(Range)	(40 to 66.7%)	(62.5 to 90%)
<hr/>		
Total Developmental N	= 40	
Total Validation N	= 20	

subtests 16 (Visual Intellectual Analysis), 34 (Intellectual Analysis and Integration), and 36 (Analogies and Comparisons). The other subtests hypothesized to discriminate (subtest 17, Connecting the Circles, and subtest 20, Complex Auditory Comprehension) did not do so and, in fact, had effect sizes of .17 and .38 respectively .

CHAPTER 4

Introduction

The purpose of this chapter is to review and interpret the results of this study. The first section discusses the results of the discriminant analysis as they relate to the hypotheses. Included in this section is a brief profile analysis of the subtests considered as a whole and of the specific subtests included in the discriminant function. The second presents the major limitations of this study. Section three discusses some implications for those working with children, and the final section deals with considerations for future research.

Results of the Analysis

Discriminant Analysis

The major objective of this study was to determine if the NENE could accurately discriminate between learning disabled and non-learning disabled children, aged 7 through 10. To accomplish this, two hypotheses were set forth:

1. The NENE does discriminate between these two groups.

2. The subtests discriminating the two groups are Subtests 16 (Visual Intellectual Analysis), 17 (Connect the Circles), 20 (Complex Auditory Comprehension), 34 (Intellectual Analysis and Integration), and 36 (Analogies and Comparisons).

The first hypothesis was confirmed by the discriminant analysis. The analysis was run 10 separate times, using five different stratified random samples for both developmental and cross-validation groups. This was done to determine the extent to which the results of the analysis generalize from sample to sample. It is assumed that the range within which the accurate classifications fall will be the range within which classification of future samples also falls.

When the discriminant analysis was run with no previously set prior probabilities, so that it discriminated based on the assumption that 50% of the total population was learning disabled and 50% was not, the correctly classified cases ranged from 70 to 80%.

However, when the analysis was run five separate times with prior probabilities set to indicate that only 15% of the total population was learning disabled,

percentage of correctly classified cases dropped to a range of between 60 and 70%. Although this is lower, it is a more realistic picture of a discriminant analysis run on the NENE. It more nearly approximates the actual percentage of learning disabled children in the school-aged population. Should this neuropsychological battery, in its present form, be used as a diagnostic instrument in the general school system, and should a discriminant analysis be performed, it could be expected to accurately differentiate the two groups only 60% to 70% of the time. If it were to be used diagnostically in a clinic or setting which indeed is expected to have a percentage of learning disabled children greater than 15%, the NENE would accurately differentiate the two groups at a higher rate (up to 10% higher). Although both of these ranges are greater than would be expected for chance predictions, they are not sufficiently high to warrant use of the battery without caution on the part of the examiner, and they do indicate a need for future research or revisions on the NENE.

The second hypothesis, that the specific subtests that would discriminate most significantly would be subtests 16 (Visual Intellectual Analysis), 17

(Connecting the Circles), 20 (Complex Auditory Comprehension), 34 (Intellectual Analysis and Integration), and 36 (Analogies and Comparisons) was not supported. Of these five, only three entered into any of the discriminant functions when stepwise discriminant analyses were performed. These were subtests 16 (Visual Intellectual Analysis), 34 (Intellectual Analysis and Integration), and 36 (Analogue and Comparisons).

To summarize, two main benefits were derived from the discriminant analysis:

1. The classification results tend to generalize across samples within a range of 10%.
2. The battery discriminates more accurately within a sample where a larger percentage of children actually are learning disabled, contrasted to a sample more typical of a traditional school.

Profile Analysis of 37 Subtests

The Luria Nebraska Neuropsychological Batteries, Forms I, II, and the Children's Revision, upon which a large amount of the NENE is based, are primarily interpreted through profile analysis. A critical level is established and the individual subtest scores are

evaluated in part depending upon how many fall above the critical level (Golden et al., 1980).

The computerized scoring program for the NENE established the critical level for the subjects in this study to be 102. It is possible, therefore, to analyze the scores received by each group and determine how many mean scores were at or above the critical level of 102.

This information was presented on Figure 1 and Table 2. Examining the scores, two things can be seen:

1. There is a great deal of similarity between the patterns of the two groups with the primary difference being the elevation of the profile of the learning disabled group. It appears that the abilities and disabilities between the two groups are very similar. This suggests a delay in the learning disabled group and not a deviance in a particular area of function. Figure 2 also shows this pattern in a more magnified way by focusing on the scales with the greatest differences between the two groups.

2. It can also be seen that the subtest means received by the learning disabled group fell above the critical level a total of nine times. These were subtests 1 (Bilateral Motor Coordination), 17

(Connecting the Circles), 23 (Speeded Repetition), 25 (Generation of Complex Expression), 29 (Reading Comprehension), 34 (Intellectual Analysis and Integration), 35 (General Intelligence and Orientation), and 36 (Analogies and Comparisons). The means received by the non-learning disabled group, however, exceeded the critical level only twice. These were in subtests 17 (Connecting the Circles), and 35 (General Intelligence and Orientation).

In 33 of the subtests the mean scores received by the learning disabled group exceeded those of the non-learning disabled. In other words, the scores they received reflected more errors on the part of the learning disabled sample. In four of the subtests, however, the normal sample received means which were greater than those of the learning disabled sample. These were subtests 4 (Purposeful Motor Movement), 10 (Left Tactile Discrimination), 13 (Double Tactile Stimulation), and 26 (Motor Writing). Rather than suspecting some impairment in the non-learning disabled sample, however, or concluding that the NENE is in error, three things should be considered:

1. It has been previously established that there are many types of learning disabilities, and that all

individuals, whether learning disabled or non-learning disabled, have areas of strength and weakness which are particular to themselves. It would be expected that in a random sample of learning disabled children there would be areas of strength as well as of weakness.

2. Neither of the two groups received mean scores above the critical level in any of the four subtests under consideration.

3. The effect size for each of the four subtests was less than 1.0, indicating that the mean scores of the two groups were separated by less than one standard deviation.

In summary, the information presented in this study seems to support the traditional method of interpretation of the standardized Lurian-type batteries. Although the NENE has not yet been thoroughly validated it is quite likely that Golden, the author of the test, will continue to recommend the critical level and cut-off score technique of interpretation.

Profile Analysis of the Discriminating Subtests

During the process of discriminant analysis 14 subtests were included in the discriminant function as those subtests which interacted most effectively in

discriminating between the learning disabled and non-learning disabled samples. These subtests were numbers 1 (Bilateral Motor Coordination), 7 (Non-Verbal Auditory Processing), 13 (Double Tactile Stimulation), 15 (Visual Spatial Analysis), 16 (Visual Intellectual Analysis), 23 (Motor Writing), 24 (Patterned Expressive Speech), 27 (Spelling), 28 (Reading Recognition), 32 (Verbal Memory), 34 (Intellectual Analysis and Integration), 35 (General Intelligence and Orientation), 36 (Analogies and Comparisons), and 37 (Visual Analysis). It can be seen on Table 3 that these subtests had among the highest Effect Sizes. This indicates that there was a greater standardized difference between the mean scores of the two groups in these subtests than in most of the other subtests.

The learning disabled sample received higher mean scores, indicating more errors, in 13 of these 14 subtests. The subtest in which the non-learning disabled group received a higher mean score was Double Tactile Stimulation, subtest 13. Although no clear explanation for this is available, there are several possible reasons for the elevated score in the non-learning disabled sample. The first is, as previously stated, in the population as a whole each person has

strengths and weaknesses. It is possible that, due to the small number in this sample, this ability is overly represented as a weakness among the non-learning disabled children or a strength among the learning disabled. The second possibility is that there is a normal developmental phenomenon represented in the raw data but not accounted for in the computerized scores. In that case, as the normative and validation process on the NENE continues, this pattern with children aged 7 to 10 will become clear and adjustments will be made for it (J. Evans, personal communication, November, 1986).

The 14 discriminating subtests included in the discriminant function and the mean scores received by each group were displayed in Figure 2 and Table 2. Inspection of these reveals that of the 14, ten had effect sizes of near-to or greater-than 1.00, indicating that they had the greatest differences between group means. These subtests were numbers 1 (Bilateral Motor Coordination), 16 (Visual Intellectual Analysis), 23 (Speeded Repetition), 27 (Spelling), 28 (Reading Recognition), 32 (Verbal Memory), 34 (Intellectual Analysis and Integration), 35 (General

Intelligence and Orientation), 36 (Analogies and Comparisons), and 37 (Visual Analysis).

Examination of these subtests shows that they fall into three general categories.

1. The first general category is that of motor coordination and is represented by subtests 1 (Bilateral Motor Coordination) and 23 (Speeded Repetition). Both involve the organization of behavior and are influenced by tactile and kinesthetic feedback as well as internal language. It should be noted that these abilities are highly sensitive to injury in the frontal lobe and the prefrontal areas (Golden, Hammeke et al., 1982). This is especially important in light of the second general category represented by the subtests elevated among the learning disabled sample.

2. The second category is that of analysis and higher cognitive functions. These subtests, numbers 16 (Visual Intellectual Analysis), 34 (Intellectual Analysis and Integration), 36 (Analogies and Comparisons), and 37 (Visual Analysis). Subtest 34 (Intellectual Analysis and Integration) requires the subject to visually or auditorally process and understand a complex item and make a cognitive generalization about it. Subtests 16 (Visual

Intellectual Analysis), 36 (Analogies and Comparisons), and 37 (Visual Analysis) require the ability to see or hear and understand similarities and differences among several like items. All require the ability to cognitively hold and manipulate multiple bits of information. Although both auditory and visual modalities are represented in these subtests, there is a greater emphasis placed on visual skills. It should be noted that although it is generally believed that these skills do not fully develop until mid or late adolescence, these children are being evaluated against age-peers.

3. The final category is related to academic skill and is represented by subtests 27 (Spelling), 28 (Reading Recognition), and 35 (General Intelligence and Orientation). The previous two categories are related to process, perception, and organization. This category, however, requires information which the subject would need to specifically learn before performing well on the test. This inter-relatedness in subtests would be expected since intact perceptual, processing, and organizational skills are required before academic learning can occur.

Overall, the three areas which seem to discriminate between learning disabled and non-learning disabled children most effectively have to do with motor coordination, higher cognitive analytic functions, and academic skills. The fact that the three groups are all represented in the discriminating subtests indicates that the NENE is, as intended, differentiating these groups on perceptual and process skills as well as on learned information.

Limitations of the study

The results of this study must be understood in light of its limitations.

1. The size of the sample was less than optimal. Although an attempt was made to compensate for this weakness by choosing several samples and measuring the generalizability and range among them, a larger sample would have been preferable for the use of the discriminant analysis. Due to the preliminary and exploratory status of this study, it was felt that the present sample size would be adequate and would provide accurate results.

2. Because a model usually fits the sample from which it was derived better than it fits another sample

from the same population, the percentage of cases classified correctly by the discriminant function may be somewhat inflated (Norusis, 1986). This is an important consideration in this investigation because the cross-validation samples were very small. By performing the discriminant analysis five times, however, this problem was somewhat alleviated.

3. Because the instrument used is still in the experimental stage, little is known about the strengths or weaknesses of the test.

During the process of administering and scoring the 60 NENEs for this study, however, several areas of strength and weakness in the instrument were noted. These will be briefly discussed.

The strengths of the NENE are:

1. It remedies some weaknesses of simplicity and lack of flexibility (Spiers, 1981) found in the Luria Nebraska Neuropsychological Battery, Forms I and II. These were previously discussed. Webster et al. (1984) responded to this criticism and it is an area that is strengthened in the NENE. Each of the areas measured in the 37 subtests have items that are much more difficult than any on the Luria Nebraska Neuropsychological Battery, I or II, and some that are

much easier to perform. This permits flexibility because for each subtests or unit within a subtest, the evaluator simply establishes a floor and a ceiling for the subject. This also eliminates the need to redundantly assess areas that are too difficult or too simple.

2. The contamination of language skills by nonlanguage items in the Luria Nebraska Neuropsychological Battery (Crosson & Warren, 1982; Spiers 1981, 1982) has been reduced or eliminated by the extensive use of option cards when there is any language problems which might interfere with test performance. With these cards, the subject may simply point to the appropriate response.

3. Several scales have been included in the NENE that address areas not measured in the Luria Nebraska Neuropsychological Battery. These scales are non-verbal sound interpretation, connecting the circles (which is a trail-making test), speeded repetition, reading comprehension, and a stroop test.

In addition, as items were added to the existing areas to increase their levels of difficulty and simplicity, scales were factored into their component processes and separated into additional scales. An

example of this is the area of motor skills. The Luria Nebraska Neuropsychological Evaluation had one scale assessing motor skills. The NENE, however, has six: bilateral motor coordination; right-side motor movement; left-side motor movement; purposeful motor movement; oral/motor movement; and drawing.

4. Other strengths of the NENE are (a) it has continued to be compact and portable, making it easy to administer at a patient's bedside, in a schoolroom, or other places outside the neuropsychologist's office and, (b) it is easy to administer and score and takes a relatively short period of time to do so, so that an experienced evaluator should be able to complete both administration and scoring within three hours.

As one would expect with any test still in its formative stages, however, there are some areas of difficulty with the NENE. The difficulties are:

1. The area of intermediate or long term memory is lacking. This was noted in Form I of the Luria Nebraska Neuropsychological Battery (Maruish, 1985; Spiers, 1981), and a scale measuring intermediate memory was included in Form II. In the NENE, however, there is no intermediate memory scale, which makes the overall measure of memory inadequate.

2. Some redundancy exists in the visual identification scale. For example, there are four pictures of a typewriter. Although they are varied in the amount of interference and clarity, some learning is involved that contaminates the visual identification.

3. The scoring procedure for Subtest 17 (Connecting the Circles) is inappropriate. Actually, this is a trail-making test and, while it is known to be extremely sensitive to the effects of brain injury (Spreeen and Benton, 1965), Lezak (1983) criticized the scoring procedure used. The evaluator is required to point out errors as they occur, giving the subject a chance to correct them. This is a timed test, however, and, in effect, what is being timed is the examiner's speed in pointing out a problem and the subject's speed in correcting it. The author of the NENE is aware of this area of weakness, however, and some compensation in the scoring procedure will be introduced before it is published (P. Scott, personal communication, August 3, 1985).

Implications for Those Working with Children

Many benefits are clearly derived from a measure such as the NENE. If this battery were available to schools, children with academic or behavioral problems and possibly at risk for learning disabilities could be evaluated promptly. They could then have access to appropriate interventions and educational techniques in a much more timely manner.

Since this particular battery breaks into 37 subtests, the resulting profile is very helpful. A clear picture of the child is presented in terms of strengths and weaknesses between modalities, thus making evaluation a much more straightforward process. A remedial program to meet the child's particular needs can thus be easily instigated.

Although this type of battery will be used primarily in education or medical settings, the implications could apply to any aspect of the child's life and especially to those areas where the child is receiving some type of instruction or training. Religious training should not be overlooked, as this is an area which ultimately impacts all other parts of a person's life. A learning disability or any other type of neurological damage affecting the child's ability to

profit from educational experience would also affect his or her ability to benefit from religious instruction. If Sunday School teachers and church educators were more aware of the neurological strengths and weaknesses of children with learning disabilities, they could attempt to accommodate their teaching methods to these special needs. For example, a teacher could use visual modalities for a child with auditory processing weaknesses. There would be more likelihood, then, that the extremely important religious principles would be better understood, remembered, and utilized by the child.

Considerations for Future Research

Because this was the first study comparing normals and learning disabled children utilizing the NENE, one of the main benefits derived was the development of a discriminant function which discriminates between the two groups. This information can be used appropriately at a later time as the process of evaluating learning disabilities and of validating the NENE continues. Specifically, it would be important to determine exactly what behavioral dysfunctions are being tapped

by the subtests in the discriminant function and to what extent they correspond with learning disabilities.

Among the 14 subtests included in the discriminant function 10 were found to have the largest effect size. These subtests should be considered as especially meaningful in discriminating between the two groups. Additional studies involving these 10 subtests with additional samples would be beneficial.

Two additional facts can be noted regarding the 14 discriminating subtests: (a) The non-learning disabled sample have no mean scores above the critical level of 102 supplied by Golden, and (b) The learning disabled sample have six mean scores above the critical level. These are subtests 1 (Bilateral Motor Coordination), 23 (Speeded Repetition), 34 (Intellectual Analysis and Integration), 35 (General Intelligence and Orientation), 36 (Analogies and Comparisons), and 37 (Visual Analysis). If Golden's interpretive technique were applied, these six subtests would become especially meaningful. In light of the traditional interpretive methods of the standardized Lurian batteries, additional studies of these subtests would also be of benefit.

Factor analysis would be a very helpful aspect of this research. The information gained from the analysis would enable evaluators to know more exactly what skills and what weaknesses were being displayed by the subjects and to plan remediation more specifically. Additionally, if only very specific subscales and specific factors are found to be discriminatory, a shortened version of the NENE might be developed for use within the school systems.

Other variables require continued assessment. Future studies incorporating the developmental history and qualitative scores into the discriminating rule would be beneficial. These areas were not addressed within the scope of this study.

Finally, continued research is needed using the NENE with a variety of populations. Since it was proposed by Golden (personal communication, May, 1985) that this measure is appropriate for both children and adults, normative and validation studies are necessary with all ages as well as various clinical populations. Many studies have been done measuring the effectiveness of traditional neuropsychological instruments with both psychiatric and medical patients. Correlational studies are now needed evaluating the effectiveness of

the NENE in relationship with these previously established tests.

Conclusion

The most significant finding of this study was that the NENE can discriminate between learning and non-learning disabled students, aged 7 through 10. The particular subtests which the discriminant analysis identified as interacting to do this fall into three categories. These are:

1. Motor coordination. This includes subtests 1 (Bilateral Motor Coordination) and 23 (Speeded Repetition).

2. Analysis and higher cognitive functions. This includes subtests 16 (Visual Intellectual Analysis), 34 (Intellectual Analysis and Integration), and 37 (Visual Analysis).

3. Academic skill. This includes subtests 27 (Spelling), 28 (Reading Recognition), and 35 (General Intelligence and Orientation).

If learning disabilities are, as is popularly believed, based in neurological dysfunction, the NENE could be an important tool in neuropsychological diagnosis and in the identification of organicity among

these children. Although there is much research to be done, and many populations to be evaluated with the NENE, it appears to be a promising addition to neuropsychological investigation.

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APPENDIX A

Nebraska Neuropsychological Evaluation

SCORE

SUBTEST 1: BILATERAL MOTOR COORDINATION

A

Thumb-finger sequential touch, BOTH hands. Demonstrate and allow S. to practice. (Allow 10 seconds.)

Number of Repetitions _____

(0)≥8[B,C,D=0; E], (1)6-7, (2)5, (3)3-4, (4)2, (5)≤1

0 1 2 3 4 5

B

I WANT YOU TO COPY WHAT I DO AND CHANGE THE POSITION OF YOUR TWO HANDS LIKE THIS. FIRST, YOU ARE TO CLENCH YOUR RIGHT HAND AND AT THE SAME TIME EXTEND THE FINGERS OF YOUR LEFT HAND; THEN I WANT YOU TO REVERSE THE POSITIONS OF YOUR TWO HANDS. THAT IS I WANT YOU TO CLENCH THE FINGERS OF YOUR LEFT HAND AND EXTEND THE FINGERS OF YOUR RIGHT HAND, AT THE SAME TIME CHANGING SMOOTHLY FROM ONE HAND TO THE OTHER. Demonstrate and allow S to practice. DO THIS AS FAST AS YOU CAN UNTIL I TELL YOU TO STOP. (Allow 10 seconds.)

Number of Repetitions _____

(0)≥13 [C,D=0; E], (1)10-12, [A], (2)8-9, [A], (3)5-7, [A], (4)3-4, [A], (5)≤2[A=5]

0 1 2 3 4 5

C

TAP YOUR RIGHT HAND TWICE AND YOUR LEFT HAND ONCE, CHANGING FROM ONE HAND TO THE OTHER WITHOUT INTERRUPTION. Demonstrate and allow S to practice. DO THIS AS FAST AS YOU CAN UNTIL I TELL YOU TO STOP. (Allow 10 seconds.)

Number of Repetitions _____

(0)≥14; (1)12-13; (2)9-11; (3)7-8; (4)4-6; (5)2-3*; (6)≤1*

0 1 2 3 4 5 6

*Raw C&D are each ≤2 [A=5, B=5]

D

TAP YOUR LEFT HAND TWICE AND YOUR RIGHT HAND ONCE, CHANGING FROM ONE HAND TO THE OTHER WITHOUT INTERRUPTION. Demonstrate and allow S to practice. DO THIS AS FAST AS YOU CAN UNTIL I TELL YOU TO STOP. (Allow 10 seconds.)

Number of Repetitions _____

(0)≥14, (1)11-13, (2)9-10, (3)6-8, (4)4-5, (5)1-3*, (6)0*

0 1 2 3 4 5 6

E

TAP YOUR RIGHT FOOT TWICE AND YOUR LEFT FOOT ONCE CHANGING FROM ONE FOOT TO THE OTHER WITHOUT INTERRUPTION. Demonstrate and allow S to practice. DO THIS AS FAST AS YOU CAN UNTIL I TELL YOU TO STOP. (Allow 10 seconds.)

Number of Repetitions _____

(0)≥12, (1)10-11, (2)7-9, (3)5-6, (4)3-4, (5)1-2, (6)0
S-1.1

0 1 2 3 4 5 6

SCORE

F

NOW, TAP YOUR LEFT FOOT TWICE AND YOUR RIGHT FOOT ONCE CHANGING FROM ONE FOOT TO THE OTHER WITHOUT INTERRUPTION. Demonstrate and allow S to practice. DO THIS AS FAST AS YOU CAN UNTIL I TELL YOU TO STOP. (Allow 10 seconds.)

Number of Repetitions_____

(0)≥11, (1)9-10, (2)7-8, (3)5-6, (4)2-4, (5)≤1

0 1 2 3 4 5

G

GIVE ONLY AS LAST UNIT OF SUBTEST. [IF C & D=0, G=0] USING THIS STRING, I WANT YOU TO STRING THESE BEADS FOR ME ONE AT A TIME. DO IT AS QUICKLY AS YOU CAN. Present box of beads. (Allow 30 seconds.)

Number of Beads Strung_____

(0)≥13, (1)11-12, (2)9-10, (3)7-8, (4)5-6, (5)3-4, (6)1-2, (7)0 0 1 2 3 4 5 6 7

SUBTEST 2: RIGHT SIDE MOTOR MOVEMENT
A

Thumb-finger sequential touch, RIGHT hand. With palms facing up demonstrate and have S practice. (Allow 10 seconds.)

Number of Repetitions_____

(0)≥9[B=0; S3]; (1)7-8; (2)6; (3)5; (4)3-4; (5)2; (6)≤1

0 1 2 3 4 5 6

B

Alternating clench/extension, RIGHT hand. With palms facing up demonstrate and have S practice. (Allow 10 seconds)

Number of Repetitions_____

(0)≥ 21[A]; (1)18-20, [A]; (2)15-17, [A]; (3)12-14[A]; (4)9-11, [A]; (5)5-8, [A]; (6)2-4, [A=6]; (7)0-1, [A=6]

0 1 2 3 4 5 6 7

SUBTEST 3: LEFT SIDE MOTOR MOVEMENT
A

Thumb-finger sequential touch, LEFT hand. With palms facing up demonstrate and have S practice. (Allow 10 seconds)

Number of Repetitions_____

(0)≥9[B=0; S4]; (1)7-8; (2)5-6; (3)4; (4)3; (5)1-2; (6)0

0 1 2 3 4 5 6

B

Alternating clench/extension, LEFT hand. With palms facing up demonstrate and have S practice. (Allow 10 seconds)

Number of Repetitions_____

(0)≥ 21[A]; (1)18-20, [A]; (2)15-17, [A]; (3)12-14, [A]; (4)9-11, [A]; (5)6-8, [A]; (6)3-5, [A=6]; (7)0-2, [A=6]

0 1 2 3 4 5 6 7

SOCRE

SUBTEST 4: PURPOSEFUL MOTOR MOVEMENT (IMITATION/INSTRUCTION)

FLOOR = 6 CONSECUTIVE CORRECT; 0=CORRECT
CEILING = 6 CONSECUTIVE ERRORS; 1=ERROR

IF I KNOCK HARD, YOU KNOCK GENTLY; IF I KNOCK GENTLY, YOU KNOCK HARD. Demonstrate hard and gentle knocks, then knock in order indicated.

Gentle	1. (H)	1. 0 1
Hard	2. (G)	2. 0 1
Hard	3. (G)	3. 0 1
Gentle	4. (H)	4. 0 1
Hard	5. (G)	5. 0 1
Gentle	6. (H)	6. 0 1

PLEASE TAKE MY HAND. NOW, IF I SAY "RED" I WANT YOU TO SQUEEZE MY HAND, AND IF I SAY "GREEN" DO NOTHING.

RED	7. (squeeze)	7. 0 1
GREEN	8. (nothing)	8. 0 1
GREEN	9. (nothing)	9. 0 1
RED	10. (squeeze)	10. 0 1
RED	11. (squeeze)	11. 0 1
GREEN	12. (nothing)	12. 0 1

IF I KNOCK ONCE, YOU KNOCK TWICE; IF I KNOCK TWICE, YOU KNOCK ONCE. Knock in order indicated.

2	13. (1)	13. 0 1
1	14. (2)	14. 0 1
1	15. (2)	15. 0 1
2	16. (1)	16. 0 1
1	17. (2)	17. 0 1
2	18. (1)	18. 0 1

IF I KNOCK ONCE, I WANT YOU TO RAISE YOUR RIGHT HAND. IF I KNOCK TWICE I WANT YOU TO RAISE YOUR LEFT HAND. Knock in order indicated.

1	19. (Right)	19. 0 1
2	20. (Left)	20. 0 1
1	21. (Right)	21. 0 1
2	22. (Left)	22. 0 1
2	23. (Left)	23. 0 1
1	24. (Right)	24. 0 1

DO THE MOVEMENTS WITH YOUR HAND THAT I DO WITH MINE: FIRST WATCH. DO THE SAME MOVEMENTS IN THE SAME ORDER.

25. fist, palm, fist, side	25. 0 1
----------------------------	---------

DO WHAT I DO AND USE THE SAME HAND.

26. Demonstrate: Right hand points to left ear.	26. 0 1
27. Demonstrate: Left hand points to right ear.	27. 0 1

28. POINT TO YOUR LEFT EAR WITH YOUR RIGHT HAND.	28. 0 1
29. TOUCH YOUR RIGHT SHOULDER WITH YOUR LEFT HAND.	29. 0 1

30. PRETEND YOU ARE SCRAMBLING EGGS AND YOU HAVE A BOWL AND FORK AVAILABLE. SHOW ME HOW TO BREAK AND STIR THE EGGS.	30. 0 1
---	---------

SCORE

SHOW ME HOW YOU WOULD:

- | | |
|---|---------|
| 31. OPEN A CAN WITH A CAN OPENER. | 31. 0 1 |
| 32. HAMMER A NAIL INTO THE WALL. | 32. 0 1 |
| 33. OPEN A DOOR THAT HAS A KNOB. Subject must perform
in a slow and deliberate manner. | 33. 0 1 |
| 34. EAT WITH A FORK. | 34. 0 1 |
| 35. WRITE A SENTENCE. | 35. 0 1 |
| 36. COMB YOUR HAIR. | 36. 0 1 |

I WANT YOU TO CLOSE YOUR EYES AND KEEP THEM CLOSED UNTIL I TELL YOU.

I AM GOING TO PUT YOUR HAND IN A CERTAIN POSITION. I WILL ASK YOU TO REPEAT THE POSITION WITH YOUR OTHER HAND.

- | | |
|--|---------|
| 37. Right thumb against 4th finger for 2 seconds, then separate. | 37. 0 1 |
| NOW REPEAT THIS POSITION WITH YOUR OTHER HAND. | |
| 38. Left thumb against 4th finger for 2 seconds, then separate. | 38. 0 1 |

I AM GOING TO PUT YOUR HAND IN A CERTAIN POSITION. AFTER I AM FINISHED, I WANT YOU TO PUT YOUR HAND IN THE SAME POSITION.

- | | |
|--|---------|
| 39. Right thumb against 2nd finger for 2 seconds, then separate. | 39. 0 1 |
|--|---------|

I AM GOING TO PUT YOUR HAND IN A CERTAIN POSITION, REPEAT THAT SAME POSITION.

- | | |
|---|---------|
| 40. Left thumb against 2nd finger for 2 seconds, then separate. | 40. 0 1 |
|---|---------|

YOU CAN OPEN YOUR EYES NOW.

I AM GOING TO SHOW YOU SOME HAND MOVEMENTS. PLEASE COPY THEM EXACTLY AND MAKE SURE YOU USE THE SAME HAND I DO.

- | | |
|---|---------|
| 41. Demonstrate: Tips of vertical right hand fingers
(palm left) placed under palm of horizontal left hand. | 41. 0 1 |
| 42. Demonstrate: Tips of vertical left hand fingers
(palm right) placed under palm of horizontal right hand. | 42. 0 1 |
| 43. Demonstrate: Right arm and hand horizontal, palm down,
clenched fist and knuckles placed under chin. | 43. 0 1 |
| 44. Demonstrate: Left arm and hand horizontal, palm down,
clenched fist and knuckles placed under chin. | 44. 0 1 |
| 45. Demonstrate: Right hand fingers vertical, palm left,
index finger touching nose. | 45. 0 1 |
| 46. Demonstrate: Left hand fingers vertical, palm right,
index finger touching nose. | 46. 0 1 |
| 47. Demonstrate: With arms lowered, bend right arm up at
90° angle. | 47. 0 1 |
| 48. Demonstrate: With arms lowered, bend left arm up at
90° angle. | 48. 0 1 |

	SCORE
49. PRETEND YOU ARE WALKING UP SOME STAIRS, SHOW ME HOW YOU WOULD WALK UP SOME STAIRS.	49. 0 1
50. SHOW ME HOW TO WHISTLE.	50. 0 1
51. SHOW ME HOW TO CHEW.	51. 0 1
52. Place pencil on the table in front of the S's left shoulder and 12 inches from the edge of table. Say, GET THE PENCIL WITH THIS HAND, indicate S's right hand. Note: If S turns body to avoid midline cross, count as an error and prevent on next trial. Allow 3 trials. Any success = 0, All fail = 1	52. 0 1
53. Same as 52, but with LEFT hand and with pencil in front of RIGHT shoulder. Allow 3 trials. Any success = 0, All fail = 1	53. 0 1

.....

SCORE

SUBTEST 5: ORAL/MOTOR MOVEMENTS

A

I AM GOING TO ASK YOU TO MAKE THREE MOVEMENTS WITH YOUR MOUTH. I WILL FIRST SHOW YOU THE MOVEMENTS, THEN I WANT YOU TO DO THEM. FIRST I WANT YOU TO SHOW YOUR TEETH, THEN STICK OUT YOUR TONGUE, AND THIRD, PLACE YOUR TONGUE BETWEEN YOUR LOWER TEETH AND LOWER LIP, LIKE THIS. Demonstrate sequence. NOW DO THESE SAME THREE MOVEMENTS RAPIDLY SEVERAL TIMES UNTIL I TELL YOU TO STOP. REMEMBER, FIRST SHOW YOUR TEETH, THEN STICK OUT YOUR TONGUE. AND THEN PLACE YOUR TONGUE BETWEEN YOUR LOWER TEETH AND LOWER LIP. Demonstrate and allow S to practice. (Allow 10 seconds.)

A. Number of Repetitions _____

REPETITIONS \geq 5 [B=4; S6]**B**

NOTE: 0 = INCORRECT; 1 = CORRECT

- | | |
|--|--------|
| 1. PUT YOUR TONGUE BETWEEN YOUR UPPER TEETH AND UPPER LIP. | 1. 0 1 |
| 2. STICK OUT YOUR TONGUE AND ROLL IT UP. | 2. 0 1 |
| 3. STICK OUT YOUR TONGUE AS FAR AS POSSIBLE AND KEEP IT THERE UNTIL I ASK YOU TO PUT IT BACK IN YOUR MOUTH. 3 second minimum extension | 3. 0 1 |
| 4. PUFF OUT YOUR CHEEKS. | 4. 0 1 |

B. 0 1 2 3 4

SCORE

SUBTEST 6: DRAWING

FLOOR = QUALITY OF 0 AND COMPLETED WITHIN TIME ON 2 CONSECUTIVE ELEMENTS.
 CEILING = QUALITY OF 2 ON 2 CONSECUTIVE ELEMENTS OR
 FAILURE TO COMPLETE 2 CONSECUTIVE ELEMENTS WITHIN TIME.

Two trial items (copy/instruction) score best performance.
 Two trial items may also be given instruction/copy. If
 the first trial is 0, second trial need not be given.

ALLOW 30 SECONDS FOR ALL ITEMS UNLESS OTHERWISE NOTED.
 Do not allow overtime performance. If the patient continues
 drawing, indicate where the patient was at the cutoff.

COPY INSTRUCTIONS

WITHOUT LIFTING YOUR PENCIL FROM THE PAPER, COPY THIS FIGURE
 AS BEST AND AS QUICKLY AS YOU CAN. MAKE YOURS THE SAME SIZE
 AS THIS ONE. Point to the appropriate figure. Permit second
 attempt if pencil is lifted.

DRAW INSTRUCTIONS

WITHOUT LIFTING YOUR PENCIL FROM THE PAPER, I WANT YOU TO DRAW
 THE BEST (insert appropriate figure name) THAT YOU CAN AS QUICKLY
 AS YOU CAN. Permit second attempt if pencil is lifted.

Present Response Booklet

- | | |
|--|-----------|
| 1. Greek cross: Copy only (<i>Allow 30 seconds</i>) | 1. 0 1 2 |
| <i>Present Card 20.</i> | |
| 2. I WANT YOU TO DRAW THIS PATTERN AS QUICKLY AS YOU CAN WITHOUT
LIFTING YOUR PENCIL FROM THE PAPER. MAKE YOURS JUST LIKE THIS
ONE, THE SAME SIZE AND THE SAME NUMBER OF FORMS. Permit second
attempt if pencil is lifted. (<i>Allow 20 seconds.</i>) | 2. 0 2 |
| 3. Square: Copy (<i>Allow 30 seconds</i>); Draw (<i>Allow 30 seconds</i>) | 3. 0 1 2 |
| 4. Triangle: Copy (<i>Allow 30 seconds</i>); Draw (<i>Allow 30 seconds</i>) | 4. 0 1 2 |
| 5. Circle: Copy (<i>Allow 30 seconds</i>); Draw (<i>Allow 30 seconds</i>) | 5. 0 1 2 |
| 6. Cross: Copy (<i>Allow 30 seconds</i>); Draw (<i>Allow 30 seconds</i>) | 6. 0 1 2 |
| 7. I WANT YOU TO GET THIS SPIDER BACK TO ITS WEB. BE CAREFUL
NOT TO CROSS OVER ANY LINES. DO THIS AS QUICKLY AND CAREFULLY
AS YOU CAN. Maze.
(0) Correct; (1) Correct but with tremors or shakiness;
(2) Incorrect | 7. 0 1 2 |
| 8. Spider--Right Angle: Score in the same manner as 7. | 8. 0 1 2 |
| 9. Straight line: Copy (<i>Allow 30 seconds</i>); Draw (<i>Allow 30 seconds</i>) | 9. 0 1 2 |
| 10. Spider--Straight line: Score in the same manner as 7. | 10. 0 1 2 |

SCORE

TRACING INSTRUCTIONS

*Note: E may demonstrate the concept of tracing to the patient using a triangle.

TRACE* THIS WITHOUT LIFTING YOUR PENCIL FOR THE PAPER. Point to the appropriate figure. Permit a second attempt if pencil is lifted.

- | | |
|--|-----------|
| 11. Circle: Trace (<i>Allow 30 seconds</i>) | 11. 0 1 2 |
| 12. Horizontal line: Trace (<i>Allow 30 seconds</i>) | 12. 0 1 2 |
| 13. Vertical line: Trace (<i>Allow 30 seconds</i>) | 13. 0 1 2 |

.....

SCORE

SUBTEST 7: NON VERBAL AUDITORY PROCESSING (TONES AND PATTERNS)

FLOOR = 6 CONSECUTIVE CORRECT; 0=CORRECT
 CEILING = 6 ERRORS IN 8 CONSECUTIVE ELEMENTS; 1=ERROR

I WANT YOU TO MAKE A SERIES OF: If S fails to make a series, say,
 I WANT YOU TO MAKE A SERIES. THAT IS, I WANT YOU TO TAP THE RHYTHM
 ONCE, THEN REPEAT IT, THEN REPEAT IT AGAIN AND SO FORTH.

- | | |
|--|--------|
| 1. (Two taps and three taps) | 1. 0 1 |
| 2. (Three soft taps and two hard taps) | 2. 0 1 |
| 3. (Two hard and three soft taps) | 3. 0 1 |

LISTEN TO THIS RHYTHM ON THE TAPE. SOME BEEPS ARE LOUD AND
 SOME ARE SOFT. PLEASE REPEAT THE PATTERN YOU HEAR, TAPPING
 GENTLY FOR SOFT BEEPS AND HARD FOR LOUD BEEPS.

- | | |
|------------------------------|--------|
| 4. (LLL S LLL S) | 4. 0 1 |
| 5. (LL SSS LL SSS LL SSS LL) | 5. 0 1 |

NOW I AM GOING TO PLAY SEVERAL GROUPS OF BEEPS IN WHICH SOME OF
 THE BEEPS ARE LOUD AND SOME ARE SOFT. I WANT YOU TO LISTEN CAREFULLY
 AND TELL ME HOW MANY BEEPS THERE ARE IN EACH GROUP.

- | | |
|--------|--------|
| 6. (6) | 6. 0 1 |
| 7. (8) | 7. 0 1 |

I AM GOING TO PLAY A GROUP OF BEEPS. I WANT YOU TO TELL ME
 HOW MANY BEEPS ARE IN THE GROUPS ALL TOGETHER. KEEP COUNTING
 UNTIL I TELL YOU THAT ALL THE BEEPS HAVE ENDED.

- | | |
|---------|--------|
| 8. (8) | 8. 0 1 |
| 9. (12) | 9. 0 1 |

NOW LISTEN CAREFULLY. HOW MANY BEEPS ARE THERE IN EACH GROUP?

- | | |
|---------|---------|
| 10. (4) | 10. 0 1 |
| 11. (3) | 11. 0 1 |
| 12. (5) | 12. 0 1 |
| 13. (5) | 13. 0 1 |

I AM GOING TO PLAY THREE TONES. AFTER YOU LISTEN TO THEM, I WANT
 YOU TO HUM THEM.

- | | |
|-------------|---------|
| 14. (L-H-L) | 14. 0 1 |
| 15. (H-L-H) | 15. 0 1 |

NOW THERE WILL BE TWO TONES. AFTER YOU LISTEN TO THEM, I WANT
 YOU TO HUM THEM.

- | | |
|-----------|---------|
| 16. (L-H) | 16. 0 1 |
| 17. (H-L) | 17. 0 1 |

SCORE

NOW YOU WILL HEAR TWO GROUPS OF TONES. THERE WILL BE ABOUT FOUR TONES IN EACH GROUP. YOU WILL HEAR THE FIRST GROUP OF TONES, THERE WILL BE A PAUSE AND THEN YOU WILL HEAR THE SECOND GROUP OF TONES. I WANT YOU TO TELL ME WHETHER THE TWO GROUPS ARE IDENTICAL OR DIFFERENT. MAKE SURE YOU LISTEN ENTIRELY TO BOTH GROUPS.

18. (S)	18. 0 1
19. (D)	19. 0 1
20. (S)	20. 0 1
21. (D)	21. 0 1
22. (D)	22. 0 1
23. (S)	23. 0 1

SING "HAPPY BIRTHDAY " FOR ME.

24. 0 1

LISTEN TO THIS SONG AND THEN YOU SING IT. Play tape of Jingle Bells.

25. 0 1

I AM GOING TO TAP A RHYTHM, FIRST LISTEN AND THEN TAP THE SAME RHYTHM I DID. Examiner taps indicated rhythms out of S's view.

26. (// // //)	26. 0 1
27. (/ / /)	27. 0 1
28. (/// /// ///)	28. 0 1

I AM GOING TO PLAY A GROUP OF BEEPS. AFTER EACH GROUP OF BEEPS YOU HEAR, I WANT YOU TO TELL ME HOW MANY BEEPS WERE IN THE GROUP.

29. (2)	29. 0 1
30. (3)	30. 0 1
31. (2)	31. 0 1
32. (3)	32. 0 1

I WILL PLAY TWO TONES FROM THE TAPE. I WANT YOU TO TELL ME WHETHER THE FIRST TONE OR THE SECOND TONE IS HIGHER IN PITCH.

33. (1st)	33. 0 1
34. (2nd)	34. 0 1
35. (2nd)	35. 0 1
36. (1st)	36. 0 1
37. (2nd)	37. 0 1

YOU ARE NOW GOING TO HEAR TWO TONES ON THE TAPE. I WANT YOU TO TELL ME WHETHER THE TONES YOU HEAR ARE THE SAME OR DIFFERENT.

38. (S)	38. 0 1
39. (D)	39. 0 1
40. (S)	40. 0 1
41. (D)	41. 0 1
42. (D)	42. 0 1

SCORE

NOW I AM GOING TO HUM THREE TONES, PAUSE, AND THEN HUM THREE MORE TONES. LISTEN AND TELL ME IF THE FIRST THREE ARE JUST LIKE THE SECOND THREE. Examiner hums 3 tones, pauses, and hums 3 more tones, out of S's view.

LHL-LHL 43. (S)	43. 0 1
LLL-HLH 44. (D)	44. 0 1
HLH-HLH 45. (S)	45. 0 1
LHH-HHL 46. (D)	46. 0 1
LLL-LHL 47. (D)	47. 0 1

NOW THERE WILL BE TWO TONES EACH TIME. ARE THE FIRST TWO JUST LIKE THE NEXT TWO? Examiner hums 2 tones, pauses, and hums 2 more tones, out of S's view.

LL-LL 48. (S)	48. 0 1
LH-LL 49. (D)	49. 0 1
HH-HH 50. (S)	50. 0 1
HL-LL 51. (D)	51. 0 1
LH-HL 52. (D)	52. 0 1

I WANT YOU TO MAKE A SERIES OF: If S fails to make a series, say, I WANT YOU TO MAKE A SERIES. THAT IS, I WANT YOU TO TAP THE RHYTHM ONCE, THEN REPEAT IT, THEN REPEAT IT AGAIN AND SO FORTH.

53. (Two Taps)	53. 0 1
54. (Three Taps)	54. 0 1
55. (Two Taps)	55. 0 1

I AM GOING TO DO SOME TAPS LIKE THIS. Examiner taps hand on desk/object out of sight of S. YOU TAP JUST LIKE I DID.

56. (1)	56. 0 1
57. (3)	57. 0 1
58. (2)	58. 0 1
59. (1)	59. 0 1

THIS TIME I WANT YOU TO HUM JUST LIKE I DO. SO IF I HUM, Examiner hums two tones the same. YOU WOULD, signal S to repeat your tones. Repeat sample, if necessary to get S to repeat the tones spontaneously, then do trials out of S's view.

60. (S)	60. 0 1
61. (D)	61. 0 1
62. (S)	62. 0 1
63. (D)	63. 0 1
64. (D)	64. 0 1

I AM GOING TO DO TWO HUMS. TELL ME IF THE FIRST HUM IS HIGHER THAN THE SECOND. SAY YES OR NOOD YOUR HEAD IF THE FIRST HUM IS HIGHER. Give example of higher in tone if necessary for S to understand.

H-L 65. (1st)	65. 0 1
L-H 66. (2nd)	66. 0 1
L-H 67. (2nd)	67. 0 1
H-L 68. (1st)	68. 0 1
L-H 69. (2nd)	69. 0 1

SCORE

I AM GOING TO HUM SOUNDS LIKE THIS, give example of two tones
the same, THAT ARE JUST THE SAME. THIS TIME LISTEN; ARE THESE
THE SAME? Do two tones that are different. THOSE WERE NOT
THE SAME. S may nod head or say yes or no. ARE THESE THE
SAME. Begin trials out of S's view.

70. (S)	70. 0 1
71. (D)	71. 0 1
72. (S)	72. 0 1
73. (D)	73. 0 1
74. (D)	74. 0 1

.....

SCORE

SUBTEST 8: NON VERBAL SOUND INTERPRETATION

FLOOR = 6 CONSECUTIVE CORRECT; 0=CORRECT
 CEILING = 6 CONSECUTIVE ERRORS; 1=ERROR

Present Card 2-2.

THIS TIME YOU WILL HEAR MORE THAN ONE SOUND ON THE TAPE. LISTEN
 AND WHEN IT IS OVER TELL ME WHAT IS HAPPENING FROM THE SOUND OR YOU
 CAN POINT TO THE PICTURE. Tape may be stopped between sound pairs.

- | | |
|------------------------------------|--------|
| 1. (Dialing phone and busy signal) | 1. 0 1 |
| 2. (Can opener and pouring) | 2. 0 1 |
| 3. (Sawing and hammering) | 3. 0 1 |

Present Card 2-4.

LISTEN TO THE PERSON SAY A SENTENCE AND TELL ME HOW THE PERSON
 FEELS OR YOU MAY POINT TO THE WORD THAT DESCRIBES HOW THE PERSON
 FEELS.

- | | |
|-----------------|--------|
| 4. (Mad) | 4. 0 1 |
| 5. (Happy) | 5. 0 1 |
| 6. (Sad, tired) | 6. 0 1 |
| 7. (Excited) | 7. 0 1 |

Present Card 2-1 and 2-2.

LISTEN AND TELL ME WHAT IS THIS SOUND OR YOU MAY POINT TO
 THE PICTURE. Tape may be stopped between sounds.

- | | |
|-------------------|---------|
| 8. (Chickens) | 8. 0 1 |
| 9. (Train) | 9. 0 1 |
| 10. (Gun Shot) | 10. 0 1 |
| 11. (Car engine) | 11. 0 1 |
| 12. (Typewriter) | 12. 0 1 |
| 13. (Dog Barking) | 13. 0 1 |
| 14. (Baby) | 14. 0 1 |
| 15. (Horse) | 15. 0 1 |
| 16. (Cow) | 16. 0 1 |
| 17. (Phone) | 17. 0 1 |

Have S sit/stand in the middle of the room, for the bedfast try
 to arrange the setting so that the sounds can be given in the areas
 around the head at ear level. Say, PLEASE CLOSE YOUR EYES AND KEEP
 THEM CLOSED UNTIL I ASK YOU TO OPEN THEM. I AM GOING TO CLAP MY HANDS
 AND I WANT YOU TO POINT (TELL) ME WHERE THE SOUND CAME FROM. Clap
 hands once clearly in the indicated poistions. Do not allow S to turn.



- | | |
|--------------------|---------|
| 18. (Right front) | 18. 0 1 |
| 19. (Left middle) | 19. 0 1 |
| 20. (Right back) | 20. 0 1 |
| 21. (Left front) | 21. 0 1 |
| 22. (Right middle) | 22. 0 1 |
| 23. (Left back) | 23. 0 1 |

Q. SCORE

SCORE

SUBTESTS 9 & 10: RIGHT/LEFT TACTILE DISCRIMINATION

SUB 9 FLOOR = 8 CONSECUTIVE CORRECT; 0=CORRECT
RIGHT CEILING = 8 OUT OF 10 ERRORS; 1=ERROR

SUB 10
LEFT

Have Subject close their eyes or wear the blindfold.
Alternate between RIGHT (SUB 9) and LEFT (SUB 10).

I AM GOING TO PUT AN OBJECT IN ONE OF YOUR HANDS. FEEL IT WELL WITH JUST THE ONE HAND AND TELL ME EXACTLY WHAT IT IS. Alternate between hands. Option Card 3-3 is available for Ss who are unable to give a verbal response. (Allow 20 seconds per element.)

1. 0 1	1. (paperclip)	1. (eraser)	1. 0 1
2. 0 1	2. (key)	2. (paperclip)	2. 0 1
3. 0 1	3. (quarter)	3. (key)	3. 0 1
4. 0 1	4. (screw)	4. (quarter)	4. 0 1
5. 0 1	5. (eraser)	5. (screw)	5. 0 1

AM I TOUCHING YOU WITH THE POINT OR WITH THE HEAD OF A PIN? Demonstrate the difference between the head and point of the pin. Touch the back of the appropriate hand in the order indicated. Hold touch for 1 second.

6. 0 1	6. (HEAD)	6. (POINT)	6. 0 1
7. 0 1	7. (POINT)	7. (HEAD)	7. 0 1
8. 0 1	8. (HEAD)	8. (HEAD)	8. 0 1
9. 0 1	9. (HEAD)	9. (POINT)	9. 0 1
10. 0 1	10. (POINT)	10. (HEAD)	10. 0 1

I AM GOING TO TOUCH YOU WITH THE HEAD OF A PIN. SOME OF THE TOUCHES WILL BE HARD AND SOME OF THE TOUCHES WILL BE SOFT. THIS IS A HARD TOUCH. Demonstrate: depress 3 mm. AND THIS IS A SOFT TOUCH. Demonstrate: depress 1 mm. DO YOU NOTICE THE DIFFERENCE? If no difference is felt, repeat demonstration. NOW, TELL ME WHETHER YOU FEEL A HARD OR A SOFT TOUCH. Administer touches as indicated on the back of S's wrist.

11. 0 1	11. (HARD)	11. (SOFT)	11. 0 1
12. 0 1	12. (SOFT)	12. (HARD)	12. 0 1
13. 0 1	13. (SOFT)	13. (SOFT)	13. 0 1
14. 0 1	14. (HARD)	14. (HARD)	14. 0 1

NOW I AM GOING TO MOVE AN OBJECT ALONG YOUR ARM, EITHER UP YOUR ARM TOWARD YOUR SHOULDER OR DOWN YOUR ARM TOWARD YOUR FINGERS. TELL ME WHETHER I AM MOVING THE OBJECT UP OR DOWN.

15. 0 1	15. (UP)	15. (DOWN)	15. 0 1
16. 0 1	16. (DOWN)	16. (UP)	16. 0 1
17. 0 1	17. (DOWN)	17. (DOWN)	17. 0 1
18. 0 1	18. (UP)	18. (UP)	18. 0 1

Q. SCORE

SCORE

I AM GOING TO TOUCH YOU WITH THE ERASER END OF THE PENCIL. TELL
ME WHERE I AM TOUCHING YOU.

RIGHT

19. 0 1 19. (4)
20. 0 1 20. (SHOULDER)
21. 0 1 21. (2)
22. 0 1 22. (PALM)
23. 0 1 23. (5)
24. 0 1 24. (3)
25. 0 1 25. (FOREARM)
26. 0 1 26. (1-THUMB)

LEFT

19. (1-THUMB) 19. 0 1
20. (FOREARM) 20. 0 1
21. (4) 21. 0 1
22. (5) 22. 0 1
23. (SHOULDER) 23. 0 1
24. (2) 24. 0 1
25. (3) 25. 0 1
26. (PALM) 26. 0 1

.....

Q. SCORE

SCORE

SUBTESTS 11 & 12: RIGHT/LEFT COMPLEX TACTILE PATTERN
RECOGNITION

SUB 11 FLOOR = 4 CONSECUTIVE CORRECT; 0=CORRECT
RIGHT CEILING = 4 CONSECUTIVE ERRORS; 1=ERROR

SUB 12
LEFT

Have subject close their eyes or wear the blindfold.
Alternate between RIGHT (SUB 11) and LEFT (SUB 12).

I AM GOING TO TRACE A LETTER OF THE ALPHABET ON THE
BACK OF YOUR WRIST, A PRINTED LETTER. WHAT LETTER IS THIS?
*A-N Option Set is available for Ss who are unable to give a
verbal response.*

1. 0 1	1. (L)	1. (M, W)	1. 0 1
2. 0 1	2. (B)	2. (S)	2. 0 1
3. 0 1	3. (H, W)	3. (L)	3. 0 1
4. 0 1	4. (S)	4. (B)	4. 0 1

I AM GOING TO TRACE A NUMBER ON THE BACK OF YOUR WRIST. WHAT
NUMBER IS THIS? *A-N Option Set is available for Ss who are
unable to give a verbal response.*

5. 0 1	5. (4)	5. (6)	5. 0 1
6. 0 1	6. (3)	6. (5)	6. 0 1
7. 0 1	7. (6)	7. (4)	7. 0 1
8. 0 1	8. (5)	8. (3)	8. 0 1

I AM GOING TO TRACE EITHER A CROSS, A TRIANGLE, OR A CIRCLE ON
YOUR WRIST. I WANT YOU TO TELL ME WHAT I AM TRACING. Remind S
of the three forms after the first error. Traced figures are to
be approximately 30 mm (1 inch) in size. *Option Card 3-1 is
available for Ss who can not give a verbal response.*

9. 0 1	9. (Cross)	9. (Circle)	9. 0 1
10. 0 1	10. (Triangle)	10. (Triangle)	10. 0 1
11. 0 1	11. (Circle)	11. (Cross)	11. 0 1

SCORE

SUBTEST 13: DOUBLE TACTILE STIMULATION

A

Have subject close their eyes or wear the blindfold.
Alternate between RIGHT (A) and LEFT (B).

NOW I AM GOING TO TOUCH YOU AGAIN AND I WANT YOU TO TELL ME HOW MANY
POINTS YOU FEEL. Alternate single and two-point stimuli. See Manual.

Two-point distance, RIGHT hand, by 5mm intervals
(0)5mm, (1)10mm, (2)15mm, (3)20mm, (4)25mm+

A. 0 1 2 3 4

B

Two-point distance, LEFT hand, by 5mm intervals
(0)5mm, (1)10mm, (2)15mm, (3)20mm, (4)25mm+

B. 0 1 2 3 4

C

I AM GOING TO TOUCH YOU WITH THE ERASER END OF A PENCIL. PLEASE
TELL ME (OR SHOW ME) EVERYWHERE YOU FEEL A TOUCH. Only for the
first double touch trial (L hand & R cheek) ask ANYWHERE ELSE?
if only single touch is reported.

1. (L cheek)
2. (R cheek)
3. (L hand & R cheek) 3. 0 1
4. (R hand & L cheek) 4. 0 1
5. (R cheek)
6. (R & L cheeks) 6. 0 1
7. (L hand & L cheek) 7. 0 1
8. (R hand & R cheek) 8. 0 1

(0)0, (1)1, (2)2, (3)3, (4)24

C. 0 1 2 3 4

SCORE

SUBTEST 14: VISUAL IDENTIFICATION

FLOOR = 6 CONSECUTIVE CORRECT; 0=CORRECT
 CEILING = 6 CONSECUTIVE ERRORS; 1 OR HIGHEST SCORE=ERROR

Present Appropriate Card.

TELL ME WHAT THIS IS A PICTURE OF. (Allow 15 seconds)

- | | |
|----------------------------|--------|
| 1. (Card 89 B; typewriter) | 1. 0 1 |
| 2. (Card 4-9; tractor) | 2. 0 1 |

Present Card 4-37

I WILL SHOW YOU A CARD WITH A PICTURE AT THE TOP. FIND ONE JUST LIKE IT FROM THE PICTURES AT THE BOTTOM. (Allow 20 seconds per element.)

- | | |
|---------|--------|
| 3. (#4) | 3. 0 1 |
|---------|--------|

Present Appropriate Card.

I WILL SHOW YOU A CARD WITH A PICTURE OF A PERSON AT THE TOP. FIND THAT SAME PERSON IN THE PICTURES AT THE BOTTOM. (Allow 20 seconds per element.)

- | | |
|--------------------|--------|
| 4. (Card 4-40, #1) | 4. 0 1 |
| 5. (Card 4-39, #3) | 5. 0 1 |

Present Card 4-19.

HERE IS A WHOLE BIRD. Show only bird. FIND ALL THE WHOLE BIRDS IN THIS PICTURE. (Allow 30 seconds.)

Pass = 0-1 errors/Fail = 2-6 errors.



- | | |
|--------------------------|---------------|
| a. (top middle) | a. 0 1 |
| b. (R outer middle) | b. 0 1 |
| c. (L outer middle) | c. 0 1 |
| d. (middle lower leaves) | d. 0 1 |
| e. (trunk) | e. 0 1 |
| f. (R ground) | f. 0 1 |
| 6. (Total errors) | 0 1 2 3 4 5 6 |

Present Card 4-18.

FIND ALL THE GARDEN TOOLS HIDDEN IN THIS PICTURE. (Allow 30 seconds)

Pass = 0-1 errors/Fail = 2-6 errors.



- | | |
|---------------------|---------------|
| a. (hose) | a. 0 1 |
| b. (sprinkling can) | b. 0 1 |
| c. (shears) | c. 0 1 |
| d. (hoe) | d. 0 1 |
| e. (spade) | e. 0 1 |
| f. (rake) | f. 0 1 |
| 7. (Total errors) | 0 1 2 3 4 5 6 |

Present Card 91.

TELL ME ALL THE OBJECTS YOU CAN MAKE OUT IN THIS PICTURE.

(Allow 20 seconds) Pass = 0-1 errors/Fail = 2-5 errors.

- | | |
|---------------------|-------------|
| a. (toothbrush) | a. 0 1 |
| b. (spoon) | b. 0 1 |
| c. (coffee/tea pot) | c. 0 1 |
| d. (hammer) | d. 0 1 |
| e. (bird) | e. 0 1 |
| 8. (Total errors) | 0 1 2 3 4 5 |

SCORE

Present Card 90.

TELL ME ALL THE OBJECTS YOU CAN MAKE OUT IN THIS PICTURE.

(Allow 20 seconds) Pass = 0-1 errors/Fail = 2-5 errors.

- | | | |
|----------------------|--------|-------------|
| a. (saw) | a. 0 1 | |
| b. (scissors/shears) | b. 0 1 | |
| c. (bottle) | c. 0 1 | |
| d. (knife/dagger) | d. 0 1 | |
| e. (pitcher) | e. 0 1 | |
| 9. (Total errors) | | 0 1 2 3 4 5 |

Present Appropriate Card.

I AM GOING TO SHOW YOU SOME PICTURES. TELL ME WHAT THEY ARE.

- | | | |
|---------------------------------|-----------------------------|---------|
| (Allow 15 seconds per element.) | 10. (Card 88 A: telephone) | 10. 0 1 |
| | 11. (Card 88 D: typewriter) | 11. 0 1 |
| | 12. (Card 88 E: typewriter) | 12. 0 1 |

Present Card 4-15 A&B

WHAT THINGS DO YOU SEE HERE? (Allow 20 seconds per picture.)

Pass = 0 error/Fail = any error.

- | | | |
|----------------------|----------|-----------|
| a. (cane/candy cane, | | |
| cowboy hat/hat) | a. 0 1 2 | |
| b. (fish, glasses) | b. 0 1 2 | |
| 13. (Total errors) | | 0 1 2 3 4 |

Present Appropriate Card.

I AM GOING TO SHOW YOU SOME PICTURES. TELL ME WHAT THEY ARE.

- | | | |
|---------------------------------|------------------------------------|---------|
| (Allow 15 seconds per element.) | 14. (Card 88 B: telephone) | 14. 0 1 |
| | 15. (Card 88 C: typewriter) | 15. 0 1 |
| | 16. (Card 87 D: tape recorder) | 16. 0 1 |
| | 17. (Card 87 B: can opener) | 17. 0 1 |
| | 18. (Card 87 E: milk/juice carton) | 18. 0 1 |
| | 19. (Card 87 A: wallet/billfold) | 19. 0 1 |
| | 20. (Card 87 C: drinking glass) | 20. 0 1 |

Present Card 4-14

SHOW ME A: (Allow 10 seconds per element.)

Pass = 0-2 errors/Fail = 3-8 errors.

- | | | |
|--------------------|--------|-------------|
| a. (safety pin) | a. 0 1 | |
| b. (kite) | b. 0 1 | |
| c. (ice cream) | c. 0 1 | |
| d. (ladder) | d. 0 1 | |
| e. (flower) | e. 0 1 | |
| 21. (Total errors) | | 0 1 2 3 4 5 |

Present Appropriate Card.

I AM GOING TO SHOW A PICTURE AND PART OF IT IS MISSING. TELL ME

WHAT THE PICTURE IS. (Allow 20 seconds per element.)

- | | | |
|-----------|-----------------|---------|
| Card 4-12 | 22. (mermaid) | 22. 0 1 |
| | 23. (pear) | 23. 0 1 |
| Card 4-10 | 24. (girl/doll) | 24. 0 1 |
| | 25. (tree) | 25. 0 1 |

SCORE

WHAT DO YOU CALL THIS? (Allow 15 seconds per element.)

26. (Eraser)	26. 0 1
27. (rubber band)	27. 0 1
28. (pencil)	28. 0 1
29. (nickel)	29. 0 1
30. (ball)	30. 0 1

Present Card 4-51

SHOW ME ON THIS CARD THE THING THAT GOES WITH WHAT I'M DOING.
Do motion for 2 seconds.

31. (salting food)	31. 0 1
32. (writing)	32. 0 1
33. (combing hair)	33. 0 1
34. (eating)	34. 0 1

Present Card 4-9.5

LOOK AT THIS (point to the general area of first figure on card)
IT'S NOT ALL THERE. SHOW ME WHERE IT'S MISSING. (Allow 20 seconds
per element.)

35. (bear-3)	35. 0 1
36. (hand-3)	36. 0 1
37. (dog-1)	37. 0 1
38. (cup-1)	38. 0 1
39. (square-1)	39. 0 1
40. (circle-1)	40. 0 1

Present Appropriate Card.

SEE THIS, point to top figure. FIND ONE JUST LIKE IT DOWN HERE.
(Allow 20 seconds per element.)

41. (Card 4-6, #3)	41. 0 1
42. (Card 4-5, #1)	42. 0 1
43. (Card 4-7, #4)	43. 0 1
44. (Card 4-3B, #1)	44. 0 1
45. (Card 4-3A, #3)	45. 0 1
46. (Card 4-36, #3)	46. 0 1
47. (Card 4-35, #3)	47. 0 1
48. (Card 4-2, #3)	48. 0 1

Present Card 4-1

SHOW ME ONE JUST LIKE THIS ONE, Point to 1st circle, DOWN HERE.
(Allow 20 seconds per element.)

49. (Green)	49. 0 1
50. (yellow)	50. 0 1
51. (black)	51. 0 1
52. (blue)	52. 0 1
53. (white)	53. 0 1
54. (red)	54. 0 1

SCORE

SUBTEST 15: VISUAL SPATIAL ANALYSIS

FLOOR = 6 CONSECUTIVE CORRECT; 0=CORRECT
 CEILING = 6 CONSECUTIVE ERRORS; 1 OR HIGHEST SCORE=ERROR

Present Card 4-50A&B

WHAT IS WRONG WITH THIS PICTURE? (Allow 20 seconds per element.)

- | | |
|---------------|--------|
| 1. (Triangle) | 1. 0 1 |
| 2. (Box) | 2. 0 1 |

In Reading Booklet

YOU HAVE A CUBE, A THREE DIMENSIONAL FIGURE. THE OPPOSITE SIDES OF EACH OF THE 3 SIDES YOU CAN SEE ARE EXACTLY THE SAME AS WHAT YOU SEE. IN OTHER WORDS, OPPOSITE THIS ALL WHITE SIDE IS AN ALL WHITE SIDE. HERE IS THE BASELINE. (Point to sample figure) WHICH OF THESE IS EXACTLY LIKE THIS ONE. (C is correct) NOW THIS TIME YOU HAVE TO TURN, IN YOUR HEAD, THE SAMPLE CUBE TO GET THE BASELINE ON THE BOTTOM. WHEN YOU DO THAT, REMEMBER THE BLACK AND WHITE SIDES WILL CHANGE. SO THAT WITH ONE TURN TO THE LEFT, WHITE WILL BE ON THE TOP. AFTER YOU TURN IT, WHICH ONE WILL IT LOOK LIKE. (B is correct) NOW PLEASE DO THE REST OF THESE. (Allow 90 seconds.)

- | | |
|--------|--------|
| 3. (C) | 3. 0 1 |
| 4. (B) | 4. 0 1 |
| 5. (C) | 5. 0 1 |

In Reading Booklet

AT THE LEFT OF THIS SHEET OF PAPER IS A SQUARE WITH A CIRCLE IN ONE CORNER. (Point to sample 1) NOTICE THE HEAVY DARK LINE ON ONE SIDE OF THE SQUARE. THIS IS THE BASELINE. NOW, LOOK AT THE SQUARES (Point to choices in sample 1) AND NOTICE THAT EACH SQUARE HAS A CIRCLE IN ONE CORNER AND THE BOTTOM OF EACH SQUARE IS A HEAVY LINE, THE BASELINE. ONE OF THESE FOUR SQUARES IS JUST LIKE THE SAMPLE SQUARE. BY USING THE BASELINE AS A REFERENCE POINT, YOU CAN TELL WHICH SQUARE IS JUST LIKE THE SAMPLE SQUARE. (Allow response) SQUARE A IS THE CORRECT SQUARE BECAUSE THE CIRCLE IS IN THIS CORNER NEXT TO THE BASELINE, JUST AS IT IS IN THE SAMPLE. NOW LOOK AT SAMPLE 2. THIS IS THE SAME TYPE OF PROBLEM, WITH A HEAVY BASELINE ON THE LEFT SIDE OF THE SQUARE. (Trace with pencil) TO SOLVE THE PROBLEM YOU HAVE TO TURN THE SAMPLE SQUARE IN YOUR HEAD SO THAT THE BASELINE IS ON THE BOTTOM, LIKE IT IS IN THE POSSIBLE ANSWERS. NOW YOU SHOW ME THE LETTER UNDER THE CORRECT SQUARE. (Allow response) SQUARE B IS THE CORRECT CHOICE BECAUSE IF YOU TURN THE SAMPLE SO THAT THE BASELINE IS AT THE BOTTOM, THE CIRCLE WILL BE IN THE UPPER RIGHTHAND CORNER JUST AS IT IS IN THIS SQUARE. NOW I WANT YOU TO DO THE REST OF THESE BY TELLING ME OR POINTING TO THE LETTER UNDER THE CORRECT SQUARE. DO THEM AS QUICKLY AS YOU CAN BUT TRY NOT TO MAKE ANY MISTAKES. IF YOU ARE HAVING TROUBLE WITH ONE PROBLEM, SKIP IT AND COME BACK TO IT LATER. (Allow 90 seconds)

- | | |
|---------|---------|
| 6. (d) | 6. 0 1 |
| 7. (c) | 7. 0 1 |
| 8. (a) | 8. 0 1 |
| 9. (b) | 9. 0 1 |
| 10. (c) | 10. 0 1 |
| 11. (c) | 11. 0 1 |
| 12. (d) | 12. 0 1 |
| 13. (a) | 13. 0 1 |

SCORE

Present Appropriate Card.

THIS DRAWING SHOWS A STACK OF BLOCKS. WHEN I SHOW YOU THIS CARD AGAIN, I WANT YOU TO TELL ME HOW MANY BLOCKS MAKE UP THE STACK. BE SURE TO INCLUDE THE ONES YOU SEE AS WELL AS THE ONES YOU DON'T SEE. (Allow 20 seconds per element)

14. (Card 97D, #13)	14. 0 1
15. (Card 97C, #16)	15. 0 1
16. (Card 97B, #14)	16. 0 1
17. (Card 97A, #15)	17. 0 1
18. (Card 4-34, #9)	18. 0 1
19. (Card 4-33, #5)	19. 0 1
20. (Card 4-32, #3)	20. 0 1

Present Response Booklet

I WANT YOU TO DRAW THE HANDS OF A CLOCK ON THIS SHEET WITH BLANK FACES FOR THE FOLLOWING TIMES. MAKE SURE YOU DRAW THE MINUTE HAND LONGER THAN THE HOUR HAND. (Allow 20 seconds per clock.)

21. (3:55)	21. 0 1
22. (10:20)	22. 0 1
23. (1:40)	23. 0 1

Present Card 94

TELL ME EXACTLY WHAT TIME THESE CLOCKS TELL ON THIS CARD. (Allow 10 seconds per element)

24. (8:29)	24. 0 1
25. (5:19)	25. 0 1
26. (1:30)	26. 0 1
27. (6:47)	27. 0 1

Present Response Booklet

HERE IS A SET OF LINES MAKING DIFFERENT ANGLES. LINE A IS THE BASELINE AND THE OTHER LINES MEET A AT DIFFERENT ANGLES. CIRCLE THE LETTER OF THE LINE THAT YOU THINK MATCHES THE ANGLE SHOWN. FOR EXAMPLE, (point to example 1) THIS IS JUST LIKE WHAT LINE HERE? (E is correct) NOW DO SAMPLE 2. (H is correct) DO THE REST OF THESE. (Allow 90 seconds)

28. (G)	28. 0 1
29. (C)	29. 0 1
30. (F)	30. 0 1
31. (B)	31. 0 1
32. (H)	32. 0 1
33. (D)	33. 0 1
34. (E)	34. 0 1

Present Card 95

IF THIS COMPASS WERE ON A MAP, WHICH WAY WOULD BE NORTH? If S gives an incorrect response for North, correct but count that response as wrong. (Allow 10 seconds per response)




35. (North, top)	35. 0 1
36. (East, S's right)	36. 0 1
37. (West, S's left)	37. 0 1

THE NENE 154

SCORE

Present Response Booklet

I AM GOING TO SHOW YOU A CARD FOR ABOUT 10 SECONDS. BE SURE TO LOOK AT IT CAREFULLY BECAUSE I SHALL TAKE IT AWAY AND ASK YOU TO DRAW FROM MEMORY WHAT YOU HAVE SEEN.

Card 4-31	38.	()	38. 0 1
	39.	()	39. 0 1
Card 4-30	40.	()	40. 0 1

Present puzzles one at a time.

PUT THIS TOGETHER. (Allow 30 seconds per element.)

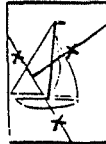
Card 4-23.	41.	(Key)	41. 0 1 2 3 4 5
------------	-----	-------	-----------------



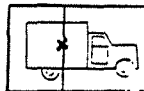
Card 4-22.	42.	(Boot)	42. 0 1 2 3 4 5
------------	-----	--------	-----------------



Card 4-21.	43.	(Sailboat)	43. 0 1 2 3
------------	-----	------------	-------------



Card 4-20.	44.	(Truck)	44. 0 1
------------	-----	---------	---------



Present Card 92A as example

PLEASE LOOK AT THIS CARD. THE LARGER DESIGN AT THE TOP HAS A PIECE MISSING. BELOW IT ARE SEVERAL ALTERNATE PIECES THAT ALL HAVE THE RIGHT SHAPE TO FIT IN THE SPACE THAT IS MISSING IN THE LARGER DESIGN. I WANT YOU TO SHOW ME WHICH PIECE AT THE BOTTOM HAS A DESIGN ON IT THAT WILL ENABLE IT TO COMPLETE THE PATTERN OF THE LARGER DESIGN. (#5 is correct) (Allow 30 seconds per element)

45.	(Card 92C, #3)	45. 0 1
46.	(Card 92B, #6)	46. 0 1
47.	(Card 4-29, #1)	47. 0 1
48.	(Card 4-28, #1)	48. 0 1
49.	(Card 4-27A, #1)	49. 0 1
50.	(Card 4-27B, #2)	50. 0 1

SCORE

SUBTEST 16: VISUAL INTELLECTUAL ANALYSIS

FLOOR = 5 CONSECUTIVE CORRECT; 0=CORRECT
 CEILING = 5 OUT OF 6 ERRORS; 1=ERROR

Present Appropriate Card.

WHICH DESIGN WILL COMPLETE THE SEQUENCE OF DESIGNS IN THE TOP ROW?
 (Allow 15 seconds per element.)

- | | |
|---------------------|--------|
| 1. (Card 11-21, #D) | 1. 0 1 |
| 2. (Card 11-20, #A) | 2. 0 1 |
| 3. (Card 11-19, #D) | 3. 0 1 |
| 4. (Card 11-18, #D) | 4. 0 1 |
| 5. (Card 11-17, #D) | 5. 0 1 |

Present Appropriate Card.

WHICH ONE OF THESE point to the bottom set. IS LIKE ALL OF THESE?
 (Allow 15 seconds per element.)

- | | |
|----------------------|--------|
| 6. (Card 11-12B, #3) | 6. 0 1 |
| 7. (Card 11-12A, #4) | 7. 0 1 |
| 8. (Card 11-11A, #4) | 8. 0 1 |
| 9. (Card 11-11B, #2) | 9. 0 1 |

Present Appropriate Card.

WHICH FIGURE DOES NOT BELONG WITH THE OTHER THREE? POINT TO THE
 ONE THAT DOES NOT BELONG. (Allow 15 seconds per element.)

- | | |
|-----------------------------|---------|
| 10. (Card 11-15, 3 circles) | 10. 0 1 |
| 11. (Card 11-15, circle) | 11. 0 1 |
| 12. (Card 11-14, diamond) | 12. 0 1 |
| 13. (Card 11-14, lion) | 13. 0 1 |

Present Card 11-13. (Allow 15 seconds per element.)

POINT TO ALL THE MAMMALS.

14. (3) 14. 0 1

POINT TO ALL THE BIRDS.

15. (3) 15. 0 1

POINT TO ALL THE PLANTS.

16. (3) 16. 0 1

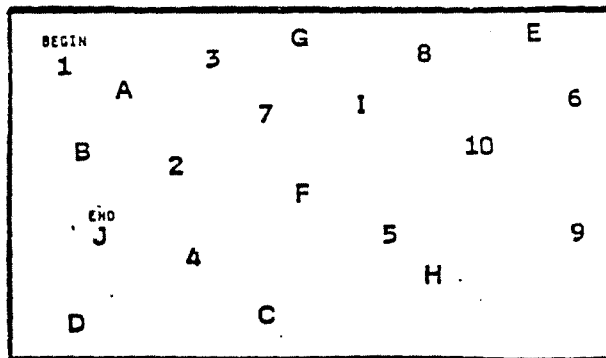
SCORE

SUBTEST 17: CONNECTING THE CIRCLES

A

HERE ARE BOTH NUMBERS AND LETTERS (briefly indicate arrangement).
 YOU SHOULD GO 1-A, THEN A-2, 2-B, LIKE THAT. MAKE A LINE CONNECTING
 NUMBER-LETTER, NUMBER-LETTER, IN ORDER. Have subject correct errors
 as they occur and continue until completed or time elapsed.
 (Allow 60 seconds.)

0 1 2 3 4 5
 6 7 8 9 10
 11 12 13 14 15
 16 17 18 19 20

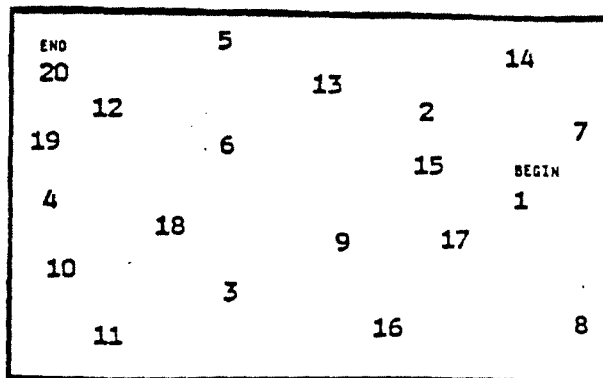


Time _____

B

HERE ARE NUMBERS 1-20 (briefly indicate arrangement) PLEASE START
 AT 1 AND WITH YOUR PENCIL DRAW A LINE FROM 1-2, THEN 2-3, CONNECTING
 ALL THE NUMBERS IN ORDER. DO IT QUICKLY BUT CORRECTLY. Have subject
 correct errors as they occur and continue until completed or time
 elapsed. (Allow 40 seconds.)

0 1 2 3 4 5
 6 7 8 9 10
 11 12 13 14 15
 16 17 18 19 20



Time _____

SCORE

SUBTEST 18: PHONEMIC DISCRIMINATION

FLOOR = 5 CONSECUTIVE CORRECT; 0=CORRECT

CEILING = 6 CONSECUTIVE ERRORS; 1 OR HIGHEST SCORE=ERROR

STIMULI MAY NOT BE REPEATED AND MUST BE GIVEN OUT OF S's VIEW.

If S misses repeating an element, offer the Option Card. The element is scored as correct if S is correct on either trial (repetition or option card).

I AM GOING TO SAY TWO WORDS. YOU REPEAT THEM (OR POINT TO THEM)

- | | | |
|---------------------|---------------|-----------|
| 1. (relieve-relief) | or Card 5-2 | 1. 0 1 2 |
| 2. (bus-buff) | or Card 5-2 | 2. 0 1 2 |
| 3. (deaf-death) | or Card 5-2 | 3. 0 1 2 |
| 4. (sack-sag) | or Card 5-2 | 4. 0 1 2 |
| 5. (hid-hit) | or Card 5-2 | 5. 0 1 2 |
| 6. (cao-cab) | or Card 5-2 | 6. 0 1 2 |
| 7. (other-offer) | or Card 5-1 | 7. 0 1 2 |
| 8. (save-safe) | or Card 5-1 | 8. 0 1 2 |
| 9. (net-knit) | or Card 5-1 | 9. 0 1 2 |
| 10. (supper-summer) | or Card 5-1 | 10. 0 1 2 |
| 11. (big-beg) | or Card 5-1 | 11. 0 1 2 |
| 12. (pat-pot) | or Card 5-1 | 12. 0 1 2 |
| 13. (sun-fun) | or Card 5-1.2 | 13. 0 1 2 |
| 14. (van-tham) | or Card 5-1.2 | 14. 0 1 2 |
| 15. (mat-pat) | or Card 5-1.2 | 15. 0 1 2 |
| 16. (cot-got) | or Card 5-1.2 | 16. 0 1 2 |
| 17. (pad-bad) | or Card 5-1.2 | 17. 0 1 2 |

I AM GOING TO SAY THREE SOUNDS. LISTEN AND THEN YOU SAY (OR POINT TO) THE SAME SOUNDS.

- | | | |
|----------------|---------------|-------------|
| 18. (bi-ba-bo) | or Card 5-1.1 | 18. 0 1 2 3 |
| 19. (bi-bo-ba) | or Card 5-1.1 | 19. 0 1 2 3 |
| 20. (d-t-d) | or A-N set | 20. 0 1 2 3 |
| 21. (b-p-b) | or A-N set | 21. 0 1 2 3 |
| 22. (m-s-d) | or A-N set | 22. 0 1 2 3 |
| 23. (u-a-i) | or A-N set | 23. 0 1 2 3 |
| 24. (a-o-a) | or A-N set | 24. 0 1 2 3 |

I AM GOING TO SAY TWO SOUNDS THAT REPRESENT LETTERS. LISTEN AND THEN YOU SAY (OR POINT TO) THEM.

- | | | |
|-----------|------------|-----------|
| 25. (r-l) | or A-N set | 25. 0 1 2 |
| 26. (k-g) | or A-N set | 26. 0 1 2 |
| 27. (d-t) | or A-N set | 27. 0 1 2 |
| 28. (b-p) | or A-N set | 28. 0 1 2 |
| 29. (p-s) | or A-N set | 29. 0 1 2 |
| 30. (m-p) | or A-N set | 30. 0 1 2 |

SAY WHAT I SAY. IF YOU HEAR "TUH" SAY "TUH." (POINT TO THE LETTER THAT GOES WITH WHAT I SAY.)

- | | | |
|---------|------------|---------|
| 31. (C) | or A-N set | 31. 0 1 |
| 32. (N) | or A-N set | 32. 0 1 |
| 33. (S) | or A-N set | 33. 0 1 |
| 34. (M) | or A-N set | 34. 0 1 |
| 35. (P) | or A-N set | 35. 0 1 |
| 36. (B) | or A-N set | 36. 0 1 |

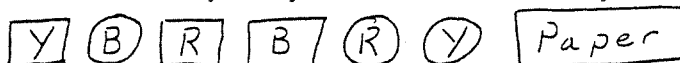
SCORE

SUBTEST 19: AUDITORY COMPREHENSION

FLOOR = 6 CONSECUTIVE CORRECT; 0=CORRECT
 CEILING = 6 CONSECUTIVE ERRORS; 1=ERROR

STIMULI MAY NOT BE REPEATED AND MUST BE SAID OUT OF S's VIEW.

Place the following arrangement in front of S leaving space between figures.



- | | | | |
|---|----|---|---|
| AFTER YOU PICK UP THE YELLOW SQUARE, POINT TO ME. | 1. | 0 | 1 |
| PICK UP ALL THE SQUARES EXCEPT THE RED ONE. | 2. | 0 | 1 |
| PLACE THE RED SQUARE BESIDE THE RED CIRCLE. | 3. | 0 | 1 |
| PUT THE YELLOW SQUARE ON THE BLUE CIRCLE. | 4. | 0 | 1 |
| GIVE ME THE YELLOW SQUARE OR THE BLUE CIRCLE. | 5. | 0 | 1 |
| GIVE ME THE BLUE SQUARE AND THE RED CIRCLE. | 6. | 0 | 1 |
| PUT THE YELLOW SQUARE ON THE PAPER. | 7. | 0 | 1 |

Present Card 5-14.

- | | | | |
|---|---------|-----|-----|
| POINT TO THE PICTURE THAT SHOWS WHAT I SAY. | | | |
| The boy is riding his bike and waving his hand. | 8. (1) | 8. | 0 1 |
| The boy on the bike is eating an apple. | 9. (4) | 9. | 0 1 |
| The boy is sitting on a step. | 10. (3) | 10. | 0 1 |
| The boy is walking. | 11. (2) | 11. | 0 1 |

Present Card 5-13.

- | | | | |
|------------------------------------|---------|-----|-----|
| The boys are watching a car go by. | 12. (2) | 12. | 0 1 |
| The man is watching TV. | 13. (4) | 13. | 0 1 |
| The boys are watching a game. | 14. (3) | 14. | 0 1 |
| The boys are watching TV. | 15. (1) | 15. | 0 1 |

Present Card 5-14. 1, show only two large Red squares and one large Red circle.

- | | | | |
|--|-----|---|---|
| POINT TO: ONE. When response given, immediately say: | 16. | 0 | 1 |
| ANOTHER ONE. | 17. | 0 | 1 |
| THE ONE THAT IS DIFFERENT. | 18. | 0 | 1 |
| THE ONES THAT ARE THE SAME. | 19. | 0 | 1 |

Present Card 5-14. 2

- | | | | |
|-----------------------------------|-----|---|---|
| POINT TO THE SMALL YELLOW CIRCLE. | 20. | 0 | 1 |
| POINT TO THE SMALL SQUARE. | 21. | 0 | 1 |

Present Card 5-14. 1, covering the Red square.

- | | | | |
|----------------------------|-----|---|---|
| POINT TO: ALL THE CIRCLES. | 22. | 0 | 1 |
| THE BLUE CIRCLE. | 23. | 0 | 1 |
| BOTH SQUARES. | 24. | 0 | 1 |

Present Card 116.

- | | | | |
|---|-----|---|---|
| WHICH PICTURE SHOWS WHAT YOU USE TO LIGHT A FIRE? | 25. | 0 | 1 |
|---|-----|---|---|

SCORE

Present Card 5-12.

POINT TO WHAT YOU WANT WHEN YOU ARE:

COLD.	26. (3)	26. 0 1
TIRED/SLEEPY.	27. (1)	27. 0 1
HUNGRY.	28. (4)	28. 0 1
THIRSTY.	29. (2)	29. 0 1

Present Card 113.

POINT TO THE PICTURE THAT SHOWS:

SUMMER.	30. 0 1
TYPEWRITING.	31. 0 1
MEALTIME.	32. 0 1

Present Card 5-11.

POINT TO THE PICTURE THAT SHOWS:

SLEEPING.	33. (2)	33. 0 1
SITTING.	34. (4)	34. 0 1
RUNNING.	35. (1)	35. 0 1
JUMPING.	36. (3)	36. 0 1

Present Card 5-10.

HERE ARE SOME PICTURES. POINT TO THE PICTURE THAT SHOWS:

WHAT YOU CUT WITH.	37. (2)	37. 0 1
WHAT YOU SLEEP ON.	38. (3)	38. 0 1
WHAT YOU PLAY WITH.	39. (1)	39. 0 1
WHAT YOU EAT WITH.	40. (4)	40. 0 1

TELL ME WHO THIS BELONGS TO. (Point to something belonging to S.)

41. 0 1

TELL ME WHOSE THIS IS. (Point to your watch, shirt, etc.)

42. 0 1

DO WHAT I SAY. PUT YOUR HAND ON YOUR KNEE.

43. 0 1

MOVE AN ARM.

44. 0 1

WHAT DOES THE WORD ... MEAN.

45. (FAT)	45. 0 1
46. (RAT)	46. 0 1
47. (HAT)	47. 0 1

Present Appropriate Card.

LOOK AT THESE PICTURES. SHOW ME THE:

Card 5-8	HALF FULL GLASS.	48. (2)	48. 0 1
	EMPTY GLASS.	49. (3)	49. 0 1
	FULL GLASS.	50. (1)	50. 0 1

Place the following arrangement in front of S.

PUT ONE IN THE BOX.

51. 0 1

GIVE ME ONE.

52. 0 1

SCORE

Present Appropriate Card.

LOOK AT THESE PICTURES. SHOW ME THE:

Card 5-7	SURPRISED ONE.	53. (1)	53. 0 1
	HAPPY ONE.	54. (2)	54. 0 1
	SAD ONE.	55. (3)	55. 0 1
Card 110	BOOK.		56. 0 1
	PURSE.		57. 0 1
	HORSE.		58. 0 1
Card 5-4	SOCKS.		59. 0 1
	SHORTS.		60. 0 1
	SHOES.		61. 0 1
Card 5-3	BOY.	62. (1)	62. 0 1
	BABY.	63. (2)	63. 0 1
	GIRL.	64. (4)	64. 0 1
Card 5-9	BAT		65. 0 1
	CAT		66. 0 1
	HAT		67. 0 1
POINT TO YOUR:		68. (L Hand)	68. 0 1
		69. (R Hand)	69. 0 1
		70. (Stomach)	70. 0 1
		71. (Forehead)	71. 0 1
		72. (Thigh)	72. 0 1
		73. (Wrist)	73. 0 1
		74. (Knee)	74. 0 1
		75. (Elbow)	75. 0 1
		76. (Finger)	76. 0 1
		77. (Eye)	77. 0 1
		78. (Ear)	78. 0 1
		79. (Hair)	79. 0 1
		80. (Mouth)	80. 0 1
		81. (Nose)	81. 0 1

SCORE

SUBTEST 20: COMPLEX AUDITORY COMPREHENSION

FLOOR = 6 CONSECUTIVE CORRECT; 0=CORRECT
 CEILING = 6 CONSECUTIVE ERRORS; 1=ERROR

STIMULI MAY NOT BE REPEATED AND MUST BE GIVEN OUT OF S's VIEW.

Present Appropriate Card.

LISTEN TO THE SENTENCES I WILL READ AND THEN POINT TO THE PICTURE THAT SHOWS WHAT THE SENTENCE SAYS. It is essential the key word be said with the proper inflection. Key words are underlined.

- | | | | |
|------------|---|--------|--------|
| Card S-16. | TAKE MY <u>HANOBILL</u> . | 1. (1) | 1. 0 1 |
| | TAKE MY <u>HAND, BILL</u> . | 2. (4) | 2. 0 1 |
| | WE OFTEN WALKED PAST THE <u>LIGHT HOUSE</u> . | 3. (3) | 3. 0 1 |
| | WE OFTEN WALKED PAST THE <u>LIGHTHOUSE</u> . | 4. (2) | 4. 0 1 |
| Card S-15. | THE GIRL WROTE ON THE <u>BLACKBOARD</u> . | 5. (2) | 5. 0 1 |
| | THE GIRL WROTE ON THE <u>BLACK BOARD</u> . | 6. (1) | 6. 0 1 |
| | THE GIRL MOVED THE <u>BLACK BOARD</u> . | 7. (4) | 7. 0 1 |
| | THE GIRL MOVED THE <u>BLACKBOARD</u> . | 8. (3) | 8. 0 1 |

- | | | |
|---|------------|--------|
| TELL ME WHICH MAN IS HEAVIEST IF BOB IS LIGHTER THAN ERNIE, BUT HEAVIER THAN MARK WHO IS HEAVIER THAN MIKE. (<i>Allow 15 seconds</i>) | 9. (Ernie) | 9. 0 1 |
|---|------------|--------|

- | | | |
|---|------------|---------|
| WHICH GIRL IS SHORTEST, IF MARY IS TALLER THAN RONA BUT SHORTER THAN ANN? (<i>Allow 15 seconds</i>) | 10. (Rona) | 10. 0 1 |
|---|------------|---------|

- | | | |
|--|-----------|---------|
| TELL ME WHICH GIRL IS TALLEST, IF MARY IS TALLER THAN RONA BUT SHORTER THAN ANN. (<i>Allow 15 seconds</i>) | 11. (Ann) | 11. 0 1 |
|--|-----------|---------|

Place triangle of pencil, key, & comb in front of S.

- | | |
|---------------------------------------|---------|
| POINT WITH THE KEY TOWARD THE PENCIL. | 12. 0 1 |
| POINT WITH THE PENCIL TOWARD THE KEY. | 13. 0 1 |

PLEASE LISTEN TO THIS STATEMENT. "THE WOMAN WHO WORKED AT THE FACTORY CAME TO THE OFFICE WHERE MARY TYPED TO GET SOME PAPERS. (*Allow 15 seconds per element.*)

- | | | |
|-------------------------------|--------------|---------|
| TELL ME, WHAT WAS MARY DOING. | 14. (Typing) | 14. 0 1 |
| TELL ME, WHO GOT THE PAPERS. | 15. (Woman) | 15. 0 1 |

- | | | |
|---|------------|---------|
| IS THE FOLLOWING SENTENCE SAID BY A NEAT OR SLOPPY PERSON. "I AM UNACCUSTOMED TO DISREGARDING MY APPEARANCE." (<i>Allow 15 seconds</i>) | 16. (Neat) | 16. 0 1 |
|---|------------|---------|

- | | | |
|--|-------------------|---------|
| IF I HAD DINNER AFTER I READ A BOOK, WHAT DID I DO FIRST. (<i>Allow 15 seconds.</i>) | 17. (Read a book) | 17. 0 1 |
|--|-------------------|---------|

- | | | |
|---|-------------|---------|
| SOMEONE HAS JUST TOLD YOU THAT "BRIAN PUSHED STEVE." WHO WAS THE VICTIM? (<i>Allow 15 seconds.</i>) | 18. (Steve) | 18. 0 1 |
|---|-------------|---------|

- | | | |
|---|------------|---------|
| IF I SAY: "PETER HIT JOHN," WHICH OF THE BOYS WAS HURT? (<i>Allow 15 seconds</i>) | 19. (John) | 19. 0 1 |
|---|------------|---------|

SCORE

Present Card 117.

HERE IS A CARD WITH ONE WHITE SIDE AND ONE BLACK SIDE.
 IF IT IS EVENING NOW, POINT TO THE WHITE SIDE, AND IF IT IS MORNING
 (AFTERNOON) NOW, POINT TO THE BLACK SIDE. 20. 0 1
 THIS TIME, IF IT IS MORNING (AFTERNOON) NOW, POINT TO THE BLACK
 SIDE AND IF IT IS EVENING NOW, POINT TO THE WHITE SIDE. 21. 0 1
 WHICH OF THE TWO IS LESS DARK. 22. (Light) 22. 0 1
 WHICH OF THE TWO IS LESS LIGHT. 23. (Dark) 23. 0 1
 WHICH OF THE TWO IS DARKER. 24. (Dark) 24. 0 1
 WHICH OF THE TWO IS LIGHTER. 25. (Light) 25. 0 1

Present Card 121.

ON THIS CARD I WOULD LIKE YOU TO POINT TO THE FATHER'S SON.
 (Allow 15 seconds.) 26. 0 1

Present Response Booklet.

I WOULD LIKE YOU TO DRAW A CROSS ABOVE A CIRCLE. 27. 0 1
 WOULD YOU PLEASE DRAW A CIRCLE TO THE LEFT OF A CROSS. 28. 0 1

Place triangle of pencil, key, & comb in front of S.

POINT TO THE PENCIL WITH THE COMB. 29. 0 1
 NOW, POINT TO THE COMB WITH THE KEY. 30. 0 1

WHICH BOY IS TALLER IF STEVE IS SHORTER THAN BRIAN? (Allow 15
 seconds) 31. (Brian) 31. 0 1

TELL ME WHICH IS RIGHT, "SUMMER COMES BEFORE FALL" OR "FALL
 COMES BEFORE SUMMER." (Allow 15 seconds) 32. 0 1

TELL ME WHICH OF THESE SENTENCES IS CORRECT. "AN ANT IS BIGGER
 THAN A HORSE," OR "A HORSE IS BIGGER THAN AN ANT." (Allow 15
 seconds) 33. 0 1

TELL ME WHICH IS RIGHT. IS YOUR HEAD ON TOP OF YOUR BODY OR YOUR
 BODY ON TOP OF YOUR HEAD? (Allow 15 seconds) 34. 0 1

Place triangle of pencil, key, & comb in front of S.

POINT AT THE KEY. 35. 0 1
 POINT AT THE PENCIL. 36. 0 1

SCORE

SUBTEST 21: REPETITION

FLOOR = 6 CONSECUTIVE CORRECT; 0=CORRECT
 CEILING = 6 CONSECUTIVE ERRORS; 1 OR HIGHEST SCORE=ERROR

PLEASE REPEAT WHAT I SAY.

1. THE PLANE IS ON TIME, THE ICE IS MELTING, THE BALL IS ROLLING.	1. 0 1
2. IN THE MIDDLE OF THE MEADOW, THE BOY PICKED THE FLOWER.	2. 0 1
3. THE BEANS GREW IN THE FIELD BEHIND THE RED BARN.	3. 0 1
4. ARCUATE FASCICULUS	4. 0 1
5. DEOXYRIBONUCLEIC ACID	5. 0 1
6. MASSACHUSETTES-EPISCOPAL	6. 0 1
7. STREPTOMYCIN	7. 0 1
8. DISCRETIONARY	8. 0 1
9. PARTICIPATE	9. 0 1
10. THE MOON SHINES AND THE STARS ARE BRIGHT.	10. 0 1
11. THE WIND IS STRONG TODAY.	11. 0 1
12. CLARIFY	12. 0 1
13. ABUSE	13. 0 1
14. EXHAUST	14. 0 1
15. HUMIDITY	15. 0 1
16. THE BOY HIT THE BALL HARD.	16. 0 1
17. I SEE THE CAT.	17. 0 1
18. GO HOME.	18. 0 1
19. SAY-SANE-SAINT	19. 0 1 2 3
20. RAY-RAIN-RAINED	20. 0 1 2 3
21. FAT-RAT-PAT	21. 0 1 2 3
22. ME-MY-MAY	22. 0 1 2 3
23. TREE-WORK-FAIR	23. 0 1
24. WORK-TREE-FAIR	24. 0 1
25. RAT-TELL-FUN	25. 0 1
26. RAT-FUN-TELL	26. 0 1
27. KEY-KICK	27. 0 1
28. TEE-TEED	28. 0 1
29. SEE-BIG	29. 0 1
30. BIG-SEE	30. 0 1
31. DOLL-CAT	31. 0 1
32. CAT-DOLL	32. 0 1
33. TREE	33. 0 1
34. LETTER	34. 0 1
35. WORK	35. 0 1
36. SEE	36. 0 1
37. THE	37. 0 1
38. MAN	38. 0 1
39. CAT	39. 0 1
40. DOG	40. 0 1

SCORE

REPEAT THE FOLLOWING SOUNDS:

41. IMP (as in important)	41. 0 1
42. SPU (as in spun)	42. 0 1
43. PR (as in prune)	43. 0 1
44. ST (as in steel)	44. 0 1
45. CH (as in children)	45. 0 1
46. CR (as in crust)	46. 0 1
47. P (as in pilot)	47. 0 1
48. N (as in night)	48. 0 1
49. O (as in toe)	49. 0 1
50. E (as in deep)	50. 0 1

SCORE

SUBTEST 22: EXPRESSIVE NAMING

FLOOR = 6 CONSECUTIVE CORRECT; 0=CORRECT
 CEILING = 6 CONSECUTIVE ERRORS; 1=ERROR

I AM GOING TO DESCRIBE SEVERAL ITEMS TO YOU AND I WANT YOU TO
 TELL ME WHAT THEY ARE. (*Allow 15 seconds per element.*)

TELL ME: WHAT GOES ON YOUR BED TO KEEP YOU WARM AT NIGHT?
 1. (Blanket, quilt, bedcovers, sheets) 1. 0 1
 WHAT SHOWS YOU WHAT DAY OF THE YEAR IT IS?
 2. (Calender) 2. 0 1
 WHAT DO YOU USE TO DRY WITH WHEN YOU TAKE A BATH?
 3. (Towel) 3. 0 1

Present Appropriate Card

I AM GOING TO SHOW YOU SOME CARDS THAT REPRESENT PARTS OF THE
 BODY. I WANT YOU TO TELL ME WHICH PART. (*Allow 10 seconds per element*)

Card 158C 4. (Knee, leg) 4. 0 1
 Card 158B 5. (finger) 5. 0 1
 Card 158A 6. (hand) 6. 0 1
 Card 6-15 7. (ear) 7. 0 1
 8. (eye) 8. 0 1

Present Appropriate Card

WHAT IS THIS? (*Allow 10 seconds per element.*)

Card 157E 9. (Stapler) 9. 0 1
 Card 157A 10. (Guitar) 10. 0 1
 Card 157C 11. (Can Opener) 11. 0 1
 Card 157D 12. (Candle) 12. 0 1
 Card 157B 13. (Table) 13. 0 1

Present Card 6-14

I AM GOING TO SHOW YOU SOME PICTURES. TELL ME WHAT OBJECTS ARE
 IN THE PICTURES. (*Allow 10 seconds per element*)

14. (Truck) 14. 0 1
 15. (horse) 15. 0 1
 16. (cat) 16. 0 1
 17. (dog) 17. 0 1

Present Card 4-1

HERE IS A CARD WITH SOME COLORED CIRCLES. I AM GOING TO POINT
 TO ONE CIRCLE AT A TIME. AND I WANT YOU TO TELL ME WHAT COLOR
 THE CIRCLE IS.

18. (Black) 18. 0 1
 19. (White) 19. 0 1
 20. (Yellow) 20. 0 1
 21. (Green) 21. 0 1
 22. (Blue) 22. 0 1
 23. (Orange/Red) 23. 0 1

SCORE

SUBTEST 23: SPEEDED REPETITION

FLOOR = TWO CONSECUTIVE UNITS OF 9
CEILING = TWO CONSECUTIVE UNITS OF 0

THE HIGHEST ALLOWABLE SCORE ON A UNIT IS 9.

A

Present Reading Booklet.

PLEASE REPEAT THIS SENTENCE SEVERAL TIMES, QUICKLY BUT CAREFULLY.

Patty picked a pail of pretty posies. (Allow 10 seconds)

0 1 2 3 4
5 6 7 8 9

B

Sandy seldom saw the sun. (Allow 10 seconds)

0 1 2 3 4
5 6 7 8 9

C

Peter petted puppies. (Allow 10 seconds)

0 1 2 3 4
5 6 7 8 9

D

I AM GOING TO SAY A WORD. I WANT YOU TO JUST REPEAT THAT WORD
SEVERAL TIMES, AS QUICKLY AS YOU CAN, BUT CAREFULLY.

Cracker Barrel (Allow 5 seconds)

0 1 2 3 4
5 6 7 8 9

E

Rewind (Allow 5 seconds)

0 1 2 3 4
5 6 7 8 9

F

Moustache (Allow 5 seconds)

0 1 2 3 4
5 6 7 8 9

G

Bumblebee (Allow 5 seconds)

0 1 2 3 4
5 6 7 8 9

H

Pa-pa (Allow 5 seconds)

0 1 2 3 4
5 6 7 8 9

SCORE

SUBTEST 24: PATTERNED EXPRESSIVE SPEECH

FLOOR = 2 CONSECUTIVE CORRECT; 0=CORRECT
CEILING = 2 CONSECUTIVE ERRORS; 1=ERROR

Have subject correct errors as they occur and continue until
the correct sequence is reached or time has elapsed.

I WANT YOU TO SAY THE DAYS OF THE WEEK BACKWARDS, STARTING WITH
SUNDAY. (*Allow 20 seconds*)

1. 0 1

COUNT BACKWARDS FROM 20 TO 1, STARTING WITH 20, THEN 19, 18 AND
SO ON. (*Allow 20 seconds*)

2. 0 1

TELL ME THE DAYS OF THE WEEK. (*Allow 20 seconds*)

3. 0 1

COUNT FROM 1 TO 20 OUT LOUD. (*Allow 20 seconds*)

4. 0 1

PLEASE SAY THE ALPHABET OUT LOUD. (*Allow 20 seconds*)

5. 0 1

SCORE

SUBTEST 25: GENERATION OF COMPLEX EXPRESSION

A

Number of words I&II=0[A=6; B]
Number of words I&II≥23[A=0; B]

I. TELL ME ALL THE THINGS YOU CAN EAT. KEEP NAMING THEM UNTIL I TELL YOU TO STOP. (*Allow 20 seconds*)

Number of words _____

II. NAME ALL THE WORDS YOU CAN THAT START WITH THE LETTER "T" LIKE TRUCK. (*Allow 20 seconds*)

Number of words _____

(0)≥23; (1)19-22; (2)15-18; (3)11-14; (4)7-10; (5)3-6; (6)0-2 A. 0 1 2 3 4 5 6

B

No response in 30"[B=6, C=5, D=6; E]

Present Card 115 for adults, Card 5-16 for children.
LOOK AT THIS PICTURE AND TELL ME WHAT IS HAPPENING. (*Allow 30 seconds to begin response. Score number of words said in the first 10 seconds of response.*)

Number of words _____

(0)≥24; (1)21-23; (2)17-20; (3)12-16; (4)8-11; (5)4-7; (6)0-3 B. 0 1 2 3 4 5 6

C

Present Card 166

I AM GOING TO READ THIS STORY OUT LOUD FROM THIS CARD AND GIVE YOU A COPY OF IT. FOLLOW ALONG CAREFULLY BECAUSE WHEN I AM THROUGH I AM GOING TO TAKE AWAY THE CARD AND YOU ARE GOING TO HAVE TO TELL THE STORY BACK TO ME IN YOUR OWN WORDS.

JUDY LIKED TO DO THINGS FOR HER PARENTS. ONE DAY WHEN THEY WERE NOT HOME, SHE DECIDED TO PAINT A PICTURE ON THEIR WHITE WALL TO MAKE IT PRETTIER. WHEN THEY ARRIVED HOME, HOWEVER, SHE WAS ONLY HALF FINISHED AND HER PARENTS WERE VERY ANGRY. JUDY LEARNED TO ALWAYS LEAVE ENOUGH TIME TO FINISH A PICTURE BEFORE SHOWING TO YOUR PARENTS. (Take away card) GO AHEAD, TELL ME ABOUT THE STORY. (*Allow 30 seconds to begin response. Score number of words said in the first 10 seconds of response.*)

Number of words _____

(0)≥26; (1)21-25; (2)17-20; (3)12-16; (4)8-11, (5)7-4, (6)3-0 C. 0 1 2 3 4 5 6

SCORE

D

For adults: PLEASE MAKE UP A SPEECH FOR ME ABOUT THE WEATHER.
For children: PLEASE MAKE UP A SPEECH FOR ME ABOUT YOUR ROOM AT HOME.

If S replies that he/she doesn't know anything about it, say JUST SAY WHAT YOU THINK ABOUT IT. If S still refuses, say TELL ME ABOUT SPORTS. (Allow 30 seconds to begin response. Score number of words said in the first 10 seconds of response.)

Number of words _____

(0)>24; (1)20-23; (2)16-19; (3)12-15; (4)8-11; (5)4-7; (6) 3-0 D. 0 1 2 3 4 5 6

E

FLOOR = 3 CONSECUTIVE CORRECT
CEILING = 3 CONSECUTIVE ERRORS
IF E=5[F=5,G=5]

Present Appropriate Card

I AM GOING TO SHOW YOU SOME CARDS WITH SENTENCES THAT HAVE WORDS MISSING. PLEASE GIVE ME WORDS THAT YOU THINK CAN FILL IN EACH SENTENCE. (Allow 15 seconds)

THERE ARE TWO WORDS MISSING IN THIS FIRST SENTENCE.

Card 6-17 1. (surprised/because) 1. 0 1 2

THERE IS ONE WORD MISSING IN THIS ONE.

Card 170C 2. (because) 2. 0 1

Card 170B 3. (airplane) 3. 0 1

Card 170A 4. (store) 4. 0 1

YOU FINISH WHAT I SAY.

TAMMY FED THE CAT. ANOTHER WAY OF SAYING THAT IS, THE CAT WAS:

5. (Fed by Tammy) 5. 0 1

MR. SMITH IS A MAN AND MR. JONES IS A MAN. THEY ARE TWO:

6. (Men) 6. 0 1

A MOUSE IS SMALL, BUT A FLY IS :

7. (Smaller) 7. 0 1

ANN LIKES TO PLAY WITH HER TOYS EVERYDAY. YESTERDAY SHE:

8. (Played) 8. 0 1

JOHN HAS A DOG AND MARY HAS A DOG. THEY HAVE TWO:

9. (Dogs) 9. 0 1

(0)0; (1)1-2; (2)3-4; (3)5-7; (4)8-9; (5)10

E. 0 1 2 3 4 5

SCORE

F

FLOOR = 2 CONSECUTIVE CORRECT
CEILING = 2 CONSECUTIVE ERRORS

Present Reading Booklet

NOW I AM GOING TO SHOW YOU SOME WORDS. IF THEY ARE ARRANGED
CORRECTLY THEY CAN MAKE A SENTENCE. If S responds incorrectly,
say, THAT'S NOT QUITE RIGHT; KEEP TRYING. (Allow 60 seconds
per element.)

- | | |
|--|--------|
| 1. (Jane asked her mother to give her money) | 1. 0 1 |
| 2. (The man changed the flat tire before he went home) | 2. 0 1 |
| 3. (The girl fed a cat) | 3. 0 1 |
| 4. (John ate his food.) | 4. 0 1 |
| 5. (He likes coke.) | 5. 0 1 |
| 6. (I eat pie.) | 6. 0 1 |

(0)0; (1)1; (3)2; (4)3; (5)4; (6)5; (7)6

F. 0 1 3 4 5 6 7

G

I=0[II=0;G=0]
I=1[II]

Present Reading Booklet

I. HERE ARE THREE WORDS. MAKE UP A SENTENCE THAT INCLUDES ALL THREE
OF THESE WORDS. (Allow 20 seconds) (Water, Bike, Dirty)

_____ I. 0 1

II. HERE ARE TWO WORDS. MAKE UP A SENTENCE THAT INCLUDES BOTH OF
THESE WORDS. (Allow 20 seconds) (Boy, Dog)

_____ II. 0 1

(0)0; (3)1; (5)2

G. 0 3 5

.....

Q. SCORE

SCORE Q.

SUBTEST 26 & 27: MOTOR WRITING AND SPELLING

SUB 26

MOTOR WRITING

SUB 27

SPELLING

FLOOR = 5 CONSECUTIVE CORRECT; 0=CORRECT
 CEILING = 5 CONSECUTIVE ERRORS; 1 OR HIGHEST SCORE=ERROR

Present Response Booklet

WRITE SOME SENTENCES ABOUT:

For adults: YOUR MAIN IDEAS ON EDUCATION.

For children: YOUR ROOM. (Allow 60 seconds)

1. 0 1 Writing: (0) ≥ 11 Words, no motor writing errors
 (1) < 11 Words, or motor writing error

1. 0 1

Spelling: (0) no spelling errors; (1) any spelling error

Present Response Booklet.

PLEASE WRITE WHAT I SAY.

2. 0 1 2 3 2. THE ORANGE TREES BLOSSOM IN WINTER.
 4 5 6

2. 0 1 2 3
 4 5 6

3. 0 1 3. MILITARY
 4. 0 1 4. PRESUMPTUOUS
 5. 0 1 2 3 4 5. LAST YEAR BEFORE EASTER
 6. 0 1 2 3 4 6. ONCE UPON A TIME
 7. 0 1 7. WRONG
 8. 0 1 8. KNIFE
 9. 0 1 2 3 9. RAT BIG FUN
 10. 0 1 2 3 10. THE DOG BARKED AT THE CAR.
 4 5 6

3. 0 1
 4. 0 1
 5. 0 1 2 3 4
 6. 0 1 2 3 4
 7. 0 1
 8. 0 1
 9. 0 1 2 3
 10. 0 1 2 3
 4 5 6

11. 0 1 11. MORE
 12. 0 1 12. POOR
 13. 0 1 13. GO
 14. 0 1 14. PA
 15. 0 1 15. HA

11. 0 1
 12. 0 1
 13. 0 1
 14. 0 1
 15. 0 1

16. 0 1 16. B
 17. 0 1 17. E
 18. 0 1 18. R
 19. 0 1 19. W

16. 0 1
 17. 0 1
 18. 0 1
 19. 0 1

PLEASE WRITE YOUR FIRST AND LAST NAME.

20. 0 1 2

20. 0 1 2

Present Response Booklet

PLEASE COPY THESE IN SCRIPT.

21. 0 1 21. (str)
 22. 0 1 22. (awk)
 23. 0 1 23. (pl)
 24. 0 1 24. (th)
 25. 0 1 25. (pa)

Q. SCORE

SCORE

Present Response Booklet

COPY ALL THESE LETTERS IN CURSIVE (PRINT). S is allowed to do either all in cursive or all in print.

25. 0 1	26. (G)
27. 0 1	27. (R)
28. 0 1	28. (L)
29. 0 1	29. (P)
30. 0 1	30. (M)

Present Response Booklet

COPY THESE LETTERS ALL IN CURSIVE. DO NOT PRINT.

31. 0 1	31. (Q)
32. 0 1	32. (E)
33. 0 1	33. (S)
34. 0 1	34. (I)
35. 0 1	35. (H)

Present Response Booklet

COPY THESE LETTERS ALL IN CURSIVE.

36. 0 1	36. (A)
37. 0 1	37. (X)
38. 0 1	38. (Y)
39. 0 1	39. (J)
40. 0 1	40. (B)

Present Response Booklet

COPY THESE PRINTED LETTERS AND MARKS IN THE BOX BELOW EACH ONE.

41. 0 1	41. (K)
42. 0 1	42. (A)
43. 0 1	43. (B)
44. 0 1	44. (f)
45. 0 1	45. (S)
46. 0 1	46. (w)
47. 0 1	47. (G)
48. 0 1	48. (J)
49. 0 1	49. (W)
50. 0 1	50. (P)

Present Response Booklet

HERE ARE SOME DIFFERENT MARKS. COPY THESE DOWN HERE.

51. 0 1	51. (✓)
52. 0 1	52. (X)
53. 0 1	53. (L)
54. 0 1	54. (7)
55. 0 1	55. (L)

SCORE

SUBTEST 28: READING RECOGNITION

Present Reading Booklet

READ THIS PARAGRAPH OUT LOUD. (Allow 30 seconds)

The assimilation of knowledge has long baffled theoreticians and practitioners. Physiologists, psychologists, and statisticians each have their own unique perspective regarding this topic. None of the formulations postulated to date are universally acceptable.

1. =0, [2. =0, 3.]; 1. ≥1, [2.]

1. 0 1 2 3 4 5 6 7 8
9 10 11 12 13 14
15 16 17 18 19 20
21 22 23 24 25 26
27 28 29 30 31 32 33

Present Reading Booklet

READ THIS PARAGRAPH OUT LOUD TO ME QUICKLY, BUT CAREFULLY. (Allow 30 seconds.)

Sally liked to play with boats. One day she went to the harbor and sneaked onto a boat. She tried to start the boat, but had no key. Hearing noises, she tried to hide at the back of the boat, but she tripped and fell into the water. Now she only sneaks onto boats on dry land.

2. =57, [1. =33, 3.]

2. 0 1 2 3 4 5 6 7 8
9 10 11 12 13 14 15
16 17 18 19 20 21
22 23 24 25 26 27
28 29 30 31 32 33
34 35 36 37 38 39
40 41 42 43 44 45
46 47 48 49 50 51
52 53 54 55 56 57

FLOOR = 5 CONSECUTIVE CORRECT; 0=CORRECT

CEILING = 5 CONSECUTIVE ERRORS; 1=ERROR

Present Reading Booklet

NOW I AM GOING TO SHOW YOU SOME SENTENCES AND WORDS. PLEASE READ THEM.

(Allow 15 seconds per element.)

3. (The ostentatious equestrian surveyed his accoutrements.)	3. 0 1
4. (Sally won the prize because he was smart.)	4. 0 1
5. (irresponsible)	5. 0 1
6. (reliable)	6. 0 1
7. (audacious)	7. 0 1
8. (horizon)	8. 0 1
9. (struck)	9. 0 1
10. (abuse)	10. 0 1
11. (glutton)	11. 0 1
12. (imply)	12. 0 1
13. (stalk)	13. 0 1
14. (wrong)	14. 0 1
15. (before)	15. 0 1
16. (There were chairs on the floor.)	16. 0 1
17. (The dog barked at the car.)	17. 0 1

WHAT WORD IS MADE BY THE FOLLOWING LETTERS. (Allow 15 seconds)

SCORE

WHAT WORD IS MADE BY THE FOLLOWING LETTERS. (Allow 15 seconds per element.)

- | | |
|---------------|---------|
| 18. P-H-O-N-E | 18. 0 1 |
| 19. K-N-I-F-E | 19. 0 1 |

WHAT SOUND IS MADE BY THESE LETTERS. (Allow 15 seconds per element.)

- | | |
|-----------|---------|
| 20. C-R-O | 20. 0 1 |
| 21. S-L-Y | 21. 0 1 |

Present Reading Booklet

I AM GOING TO SHOW YOU SOME WORDS AND SENTENCES. READ EACH ONE. (Allow 15 seconds per word.)

- | | |
|--------------------|---------|
| 22. (hold) | 22. 0 1 |
| 23. (fire) | 23. 0 1 |
| 24. (blame) | 24. 0 1 |
| 25. (above) | 25. 0 1 |
| 26. (trip) | 26. 0 1 |
| 27. (play) | 27. 0 1 |
| 28. (The boy ran.) | 28. 0 1 |
| 29. (bat) | 29. 0 1 |
| 30. (go) | 30. 0 1 |

Present Reading Booklet

READ THESE SOUNDS. (Allow 15 seconds per sound.)

- | | |
|------------|---------|
| 31. (bo) | 31. 0 1 |
| 32. (bor) | 32. 0 1 |
| 33. (bro) | 33. 0 1 |
| 34. (brot) | 34. 0 1 |
| 35. (po) | 35. 0 1 |
| 36. (cor) | 36. 0 1 |
| 37. (cra) | 37. 0 1 |
| 38. (spro) | 38. 0 1 |
| 39. (prot) | 39. 0 1 |

Present Reading Booklet

I AM GOING TO SHOW YOU SOME LETTERS. READ THEM AS SEPARATE LETTERS. (Allow 15 seconds per item.)

- | | |
|-----------|---------|
| 40. (HEW) | 40. 0 1 |
| 41. (DOE) | 41. 0 1 |
| 42. (PR) | 42. 0 1 |

Present Reading Booklet

SAY THE SOUNDS THAT GO WITH THESE LETTERS. (Allow 15 seconds per item.)

- | | |
|---------|---------|
| 43. (H) | 43. 0 1 |
| 44. (P) | 44. 0 1 |
| 45. (T) | 45. 0 1 |
| 46. (R) | 46. 0 1 |
| 47. (L) | 47. 0 1 |

SCORE

Present Reading Booklet.

LOOK AT THIS. READ THE LETTERS YOU SEE.

48. (P)	48. 0 1
49. (K)	49. 0 1
50. (T)	50. 0 1
51. (H)	51. 0 1
52. (S)	52. 0 1
53. (W)	53. 0 1
54. (R)	54. 0 1

Present A-N Set.

SHOW ME A(N):

55. T	55. 0 1
56. H	56. 0 1
57. L	57. 0 1
58. E	58. 0 1
59. P	59. 0 1
60. S	60. 0 1
61. K	61. 0 1

Present Reading Booklet.

NOW MATCH THE LETTERS IN THE FOLLOWING ROWS. (Allow 30 seconds per row)

62. (N)	62. 0 1
63. (F)	63. 0 1
64. (C)	64. 0 1
65. (E)	65. 0 1
66. (J)	66. 0 1
67. (S)	67. 0 1
68. (Z)	68. 0 1
69. (M)	69. 0 1
70. (L)	70. 0 1
71. (R)	71. 0 1
72. (A)	72. 0 1
73. (G)	73. 0 1

Present Reading Booklet.

NOW MATCH THE LETTERS IN THE FOLLOWING ROW. (Allow 30 seconds)

74. (D)	74. 0 1
75. (J)	75. 0 1
76. (P)	76. 0 1
77. (Y)	77. 0 1
78. (A)	78. 0 1
79. (S)	79. 0 1

Present Reading Booklet.

SEE THESE MARKS IN THIS ROW. FIND THE ONE IN THE BOTTOM ROW WHICH MATCHES EACH OF THESE. (Allow 30 seconds)

80. (D)	80. 0 1
81. (L)	81. 0 1
82. (K)	82. 0 1
83. (b)	83. 0 1
84. (T)	84. 0 1
85. (P)	85. 0 1

SCORE

Present Reading Booklet

LOOK AT THIS. READ THE LETTERS YOU SEE.

48. (P)	48. 0 1
49. (K)	49. 0 1
50. (T)	50. 0 1
51. (H)	51. 0 1
52. (S)	52. 0 1
53. (W)	53. 0 1
54. (R)	54. 0 1

Present A-N Set.

SHOW ME A(N):

55. T	55. 0 1
56. H	56. 0 1
57. L	57. 0 1
58. E	58. 0 1
59. P	59. 0 1
60. S	60. 0 1
61. K	61. 0 1

Present Reading Booklet.

NOW MATCH THE LETTERS IN THE FOLLOWING ROWS. (Allow 30 seconds per row)

62. (N)	62. 0 1
63. (F)	63. 0 1
64. (C)	64. 0 1
65. (E)	65. 0 1
66. (J)	66. 0 1
67. (S)	67. 0 1
68. (Q)	68. 0 1
69. (V)	69. 0 1
70. (X)	70. 0 1
71. (R)	71. 0 1
72. (M)	72. 0 1
73. (G)	73. 0 1

Present Reading Booklet.

NOW MATCH THE LETTERS IN THE FOLLOWING ROW. (Allow 30 seconds)

74. (D)	74. 0 1
75. (J)	75. 0 1
76. (P)	76. 0 1
77. (Y)	77. 0 1
78. (A)	78. 0 1
79. (S)	79. 0 1

Present Reading Booklet.

SEE THESE MARKS IN THIS ROW. FIND THE ONE IN THE BOTTOM ROW WHICH MATCHES EACH OF THESE. (Allow 30 seconds)

80. (T)	80. 0 1
81. (L)	81. 0 1
82. (K)	82. 0 1
83. (b)	83. 0 1
84. (T)	84. 0 1
85. (P)	85. 0 1

SCORE

Present Reading Booklet.

SEE THESE MARKS IN THIS ROW. FIND THE ONE IN THE BOTTOM ROW WHICH
MATCHES EACH OF THESE. (*Allow 30 seconds*)

86. (\)	86. 0 1
87. (L)	87. 0 1
88. (V)	88. 0 1
89. (L)	89. 0 1
90. (A)	90. 0 1
91. (+)	91. 0 1

.....

SCORE

SUBTEST 29: READING COMPREHENSION

FLOOR = 3 CONSECUTIVE CORRECT; 0=CORRECT
 CEILING = 3 CONSECUTIVE ERRORS; 1=ERROR

I WANT YOU TO READ A SENTENCE OUT LOUD. THEN I WILL SHOW YOU FOUR
 PICTURES. POINT TO THE PICTURE THAT SHOWS WHAT YOU READ.

Present Reading Booklet and Appropriate Card

- Card 8-13. 1. It was a pedantic orator whose didactic discourse
 served as a lure for the surreptitious activity of
 another. (3) 1. 0 1
2. Among the dissidents by the decrepit building, a
 debonair observer appeared unaware of a likely
 altercation. (4) 2. 0 1
3. The haggard but corpulent citizen looked apathetic
 as he perambulated in the agrarian setting. (1) 3. 0 1
- Card 8-15. 4. The guide positioned himself next to the spherical
 artifacts hidden amidst the foliage. (4) 4. 0 1
5. He looked intent as he peered through the vegetation
 at the circular objects. (2) 5. 0 1
6. He approached the edge of the precipice. (1) 6. 0 1
- Card 8-12. 7. Confused by the elaborate structure the adolescent
 sketched a diagram. (3) 7. 0 1
8. Although frightened, the young girl scanned the
 dilapidated paper. (2) 8. 0 1
9. The girl is embracing a feline. (1) 9. 0 1
- Card 8-10 10. The girl is next to a huge box. (1) 10. 0 1
11. The girl looks sad. (4) 11. 0 1
12. The girl ran. (2) 12. 0 1

SCORE

SUBTEST 30: ARITHMETIC

FLOOR = 10 CONSECUTIVE CORRECT; 0=CORRECT
 CEILING = 10 CONSECUTIVE ERRORS; 1=ERROR

Present Card 9-8

LOOK AT THE PROBLEMS ON THIS CARD AND TELL ME YOUR ANSWER.
 (Allow 20 seconds per element.)

$4! = [4 \times 3 \times 2 \times 1]$	1. (24)	1. 0 1
$^3J-27$	2. (-3)	2. 0 1
3J64	3. (4)	3. 0 1
$J25$	4. (5)	4. 0 1
3^2	5. (9)	5. 0 1
$3/4$	6. (.75)	6. 0 1

Present Reading Booklet

I AM GOING TO SHOW YOU SOME NUMBERS THAT FORM MATHEMATICAL EQUATIONS.
 WHAT IS THE MISSING SIGN IN EACH OF THESE PROBLEMS: A PLUS, A
 MINUS, OR SOME OTHER SIGN. (Allow 10 seconds per element.)

$9(\div)3=3$	7. 0 1
$9(\times)3=27$	8. 0 1
$9(-)3=6$	9. 0 1
$9(+)3=12$	10. 0 1
$10(\div)2=5$	11. 0 1
$10(\times)2=20$	12. 0 1
$10(-)2=8$	13. 0 1
$10(+)2=12$	14. 0 1

Present Card 217

NOW SUBTRACT THE NUMBER THAT IS ABOVE FROM THE ONE THAT IS BELOW.
 (Allow 10 seconds)

15. (9)	15. 0 1
---------	---------

Present Response Booklet

I AM GOING TO SHOW YOU A SHEET WITH SEVERAL MATH PROBLEMS ON IT.
 I WANT YOU TO WRITE THE ANSWER IN FOR EACH PROBLEM. TRY AND DO ALL
 OF THEM IN ORDER. (Allow 30 seconds.)

16. (9)	16. 0 1
17. (6)	17. 0 1
18. (8)	18. 0 1
19. (13)	19. 0 1
20. (27)	20. 0 1
21. (5)	21. 0 1
22. (12)	22. 0 1
23. (23)	23. 0 1
24. (23)	24. 0 1
25. (48)	25. 0 1
26. (11)	26. 0 1
27. (11)	27. 0 1
28. (47)	28. 0 1
29. (21)	29. 0 1
30. (12)	30. 0 1
31. (12)	31. 0 1
32. (27)	32. 0 1
33. (11)	33. 0 1

PASS = <2 ERRORS IN 16-33, IN 30 SECONDS
 FAIL = 3 ERRORS

SCORE

I WANT YOU TO COUNT DOWN FROM 100 BY 13'S. PLEASE START AT 100 AND SUBTRACT 13 EACH TIME. Correct after each mistake by saying, NO THAT'S NOT CORRECT. WHAT IS (previous correct response) MINUS 3? (Allow 45 seconds)

	34. (87)	34. 0 1
	35. (74)	35. 0 1
PASS = 0 ERRORS 34-37	36. (61)	36. 0 1
FAIL ≥ 1 ERROR 34-37	37. (48)	37. 0 1
	38. (35)	38. 0 1
	39. (22)	39. 0 1

Present Reading Booklet

WHAT IS THE ANSWER TO THE TOP PROBLEM? FIGURE THE ANSWER IN YOUR HEAD. NOW DO THE BOTTOM PROBLEM. (Allow 20 seconds per element)

148+385	40. (533)	40. 0 1
26+35+17	41. (78)	41. 0 1

I WANT YOU TO COUNT BACKWARDS FROM 50 BY 3'S, LIKE THIS, 50, 47, 44, AND SO ON. START FROM 50 AND SUBTRACT 3 EACH TIME. Correct after each mistake by saying, NO, THAT'S NOT THE CORRECT ANSWER. WHAT IS (previous answer) MINUS 3. (Allow 60 seconds)

42. (47)	42. 0 1
43. (44)	43. 0 1
44. (41)	44. 0 1
45. (38)	45. 0 1
46. (35)	46. 0 1
47. (32)	47. 0 1

Present Reading Booklet

HERE THE NUMBERS ARE ARRANGED UP AND DOWN. ADD ALL THREE OF THEM TOGETHER IN YOUR HEAD. (Allow 10 seconds per element)

48. (11)	48. 0 1
49. (18)	49. 0 1

Present Reading Booklet.

WHAT IS THE MISSING NUMBER IN THIS EQUATION. (Allow 10 seconds per element)

100-(21)=79	50. 0 1
14-(5)=9	51. 0 1
48-(5)=43	52. 0 1

Present Reading Booklet

WHAT IS THE MISSING NUMBER IN EACH EQUATION? (Allow 10 seconds per element)

42+(58)=100	53. 0 1
37+(42)=79	54. 0 1
14+(4)=18	55. 0 1

Present Response Booklet

NOW I WILL ASK YOU TO SOLVE SOME PROBLEMS AND YOU MAY WRITE THEM DOWN IF YOU LIKE. HOW MUCH IS: (Allow 15 seconds per element)

23×11	56. (253)	56. 0 1
8×16	57. (128)	57. 0 1
54/6	58. (9)	58. 0 1
27/9	59. (3)	59. 0 1
9/3	60. (3)	60. 0 1
9×8	61. (72)	61. 0 1
32-8	62. (24)	62. 0 1
7×6	63. (42)	63. 0 1
43+58	64. (101)	64. 0 1

		SCORE
Math Problems Continued:	53-13 65. (40)	65. 0 1
	3x4 66. (12)	66. 0 1
	12+15 67. (27)	67. 0 1
	9-4 68. (5)	68. 0 1
	3-1 69. (2)	69. 0 1
	5+8 70. (13)	70. 0 1
	3+4 71. (7)	71. 0 1
	2+1 72. (3)	72. 0 1
I AM GOING TO TELL YOU TWO NUMBERS. TELL ME WHICH NUMBER IS LARGER. (Allow 10 seconds per element.)	16 or 57 73. (57)	73. 0 1
	78 or 14 74. (78)	74. 0 1
	198 or 202 75. (202)	75. 0 1
<i>Present Reading Booklet</i>		
SHOW ME BY POINTING: (Allow 10 seconds per element.)		
WHICH OF THE TOP TWO NUMBERS IS LARGER.	76. (2001)	76. 0 1
WHICH OF THE BOTTOM TWO NUMBERS IS LARGER.	77. (3101)	77. 0 1
Place a quarter, dime, nickel, and 5 pennies in front of S.		
IF I BUY SOMETHING FOR 17¢ AND I GIVE THIS COIN (show quarter),		
WHAT MONEY SHOULD I GET BACK?	78. (8¢)	78. 0 1
<i>Present Reading Booklet</i>		
HERE ARE NUMBERS ARRANGED FROM TOP TO BOTTOM. READ EACH NUMBER AS A WHOLE NUMBER. (Allow 20" per element.)	79. (2015)	79. 0 1
	80. (382)	80. 0 1
	81. (271)	81. 0 1
	82. (26)	82. 0 1
<i>Present Response Booklet</i>		
WRITE DOWN THESE NUMBERS. (Allow 20 seconds)	83. 442,792	83. 0 1
(Allow 10 seconds)	84. 9154	84. 0 1
	85. 1032	85. 0 1
<i>Present Reading Booklet</i>		
READ THESE NUMBERS. (Allow 10 seconds)	86. (9154)	86. 0 1
	87. (649)	87. 0 1
<i>Present Response Booklet</i>		
WRITE DOWN THESE NUMBERS. (Allow 10 seconds)	88. 108	88. 0 1
	89. 271	89. 0 1
Place a quarter, dime, nickel, and 5 pennies in front of S.		
IF I BUY SOMETHING THAT COSTS THIS MUCH (show nickel) AND GIVE THIS COIN, (show dime), WHAT MONEY/CHANGE SHOULD I GET BACK.		
	90. (5¢, 5 pennies)	90. 0 1
<i>Present Response Booklet</i>		
WRITE DOWN THESE NUMBERS. (Allow 10 seconds)	91. 69 and 96	91. 0 1
	92. 24	92. 0 1
	93. 18	93. 0 1

SCORE

Present Reading Booklet

READ THESE NUMBERS. (Allow 10 seconds)

94. (71)	94. 0 1
95. (17)	95. 0 1
96. (24)	96. 0 1
97. (8-6-2)	97. 0 1 2 3
98. (1-3-5)	98. 0 1 2 3

Present Response Booklet

WRITE THESE NUMBERS. (Allow 10 seconds)

99. (8-6-2)	99. 0 1 2 3
100. (1-3-5)	100. 0 1 2 3

Present A-N Set

WHAT NUMBER IS THIS? Point to:

101. (3)	101. 0 1
102. (6)	102. 0 1
103. (9)	103. 0 1

Present A-N Set

SHOW ME A:

104. (5)	104. 0 1
105. (7)	105. 0 1

Place quarter, dime, nickel, and 5 pennies in front of S.

WHAT IS THIS? Point to each coin respectively.

106. (5¢)	106. 0 1
107. (25¢)	107. 0 1
108. (1¢)	108. 0 1
109. (10¢)	109. 0 1

Present 15 cardboard squares in a row.

PLEASE COUNT THESE FOR ME AND POINT TO EACH ONE AS YOU COUNT THEM.

NOW GIVE ME ALL BUT 3 SQUARES. LEAVE 3 ON THE TABLE.	110. (15)	110. 0 1
Put squares back on the table. GIVE ME 4 SQUARES.	111. (12)	111. 0 1
GIVE ME ONE MORE.	112. (4)	112. 0 1
HOW MANY DO I HAVE NOW?	113. (1)	113. 0 1
	114. (5)	114. 0 1

Present Reading Booklet

POINT TO THE NUMBERS. If correct, POINT TO THE NUMBER FOUR.

If correct, WHAT DO WE CALL THE OTHER NUMBER? If S verbalizes the number he/she has just pointed to, THAT'S THE RIGHT NAME FOR THE ONE THAT YOU POINTED TO, WHAT DO WE CALL THE OTHER NUMBER?

115. (9/4)	115. 0 1
116. (4)	116. 0 1
117. (9)	117. 0 1

Present Card 9-38

POINT TO THE NUMBER.

118. 0 1

Present Card 9-3A

HERE ARE SOME PLATES WITH COOKIES ON THEM. WHICH PLATES HAVE THE SAME NUMBER OF COOKIES ON THEM.

119. (Upper R, Lower L) 119. 0 1

HOW MANY ARMS DO YOU HAVE?

120. (2) 120. 0 1

HOW MANY NOSES DO YOU HAVE?

121. (1) 121. 0 1

HOW MANY LEGS DOES A HORSE HAVE?

122. (4) 122. 0 1

Present Card 9-2A

HERE ARE BOXES WITH BALLS IN THEM. WHICH BOX HAS THE MOST BALLS? POINT TO IT.

123. (lower right) 123. 0 1

SCORE

Present Card 9-2B

HERE ARE BOXES WITH BALLS IN THEM. WHICH BOX HAS MORE BALLS?
POINT TO IT. 124. (L) 124. 0 1

Present Card 9-1B

HERE ARE SOME DOGS. WHICH DOG IS BIGGEST? 125. (Upper left) 125. 0 1

Present Card 9-1A

HERE ARE SOME PIECES OF CANDY? WHICH ONE IS BIGGER. 126. (L) 126. 0 1

.....

SCORE

SUBTEST 31: NON-VERBAL MEMORY

FLOOR = 3 CONSECUTIVE UNITS WITH A SCORE OF 0
 CEILING = 3 CONSECUTIVE UNITS WITH A SCORE OF 5 OR MORE
 Units above the ceiling are assigned the highest possible score.

IF HARDER LEVELS WITHIN A UNIT ARE DONE CORRECTLY, CREDIT IS GIVEN FOR EASIER LEVELS, WHICH THEN DO NOT NEED TO BE ADMINISTERED.

A

Present Appropriate Card. Card 10-32 is the choice card.
 I AM GOING TO SHOW YOU A CARD WITH PICTURES OF PEOPLE'S FACES.
 LOOK CAREFULLY BECAUSE I WANT YOU TO PICK THEM OUT FROM SEVERAL
 PICTURES. (Show for 10 seconds.)

THESE VIEWS MAY BE DIFFERENT FROM THOSE ON THE CARD I'LL
 HAVE YOU FIND THEM ON.

Card 10-31	1. (7, 8, 9, 11, 12)	1. 0 1 2 3 4 5
Card 10-30	2. (2, 4, 6, 9, 12)	2. 0 1 2 3 4 5
Card 10-29	3. (5, 7, 1, 10)	3. 0 1 2 3 4
Card 10-28	4. (7, 11, 3)	4. 0 1 2 3

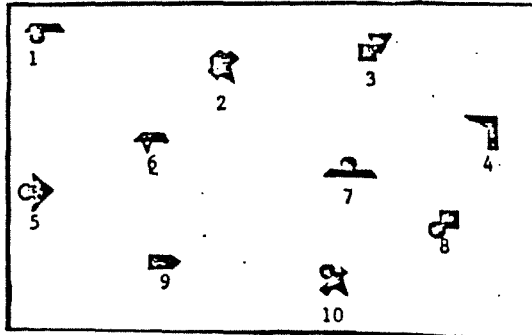
(0)0-4, (1)5-7, (2)8-10, (3)11-13, (4)14-16, (5)17

A. 0 1 2 3 4 5

B

Present Appropriate Card, then Reading Booklet.
 I AM GOING TO SHOW FIGURES ON A CARD, THEN
 I WANT YOU TO COUNT OUT LOUD UNTIL I ASK
 YOU TO SHOW ME THE FIGURES IN THE SAME ORDER.
 S need only get either trial on a given level.
 (Show card for 2" per figure. Allow 15 seconds
 of interference)

	Trial 1	Trial 2
Card 10-10	1. (9, 1, 5, 4, 6)	1. (7, 10, 3, 8, 2)
Card 10-9	2. (9, 6, 2)	2. (4, 7, 1)
	3. (4, 8)	3. (1, 9)
	4. (3)	4. (5)



(0)Level 1 correct, (1)level 2 correct, (2)level 3 correct,
 (3)level 4 correct, (5)no levels correct.


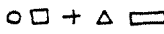
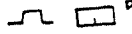
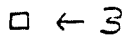

B. 0 1 2 3 5

SCORE

C

Present Appropriate Card and Patient Response Booklet.

I AM GOING TO SHOW YOU A CARD AND I WANT YOU TO LOOK AT IT CAREFULLY. WHEN I REMOVE THE CARD, I WANT YOU TO DRAW AS MUCH OF IT AS YOU CAN REMEMBER. *(Present card for 10 seconds)*

- | | | | |
|------------|----|---|----------------|
| Card 10-19 | 1. |  | 1. 0 1 2 |
| Card 227 | 2. |  | 2. 0 1 2 3 4 5 |
| Card 10-18 | 3. |  | 3. 0 1 2 3 |
| Card 10-17 | 4. |  | 4. 0 1 2 3 |
| Card 10-15 | 5. |  | 5. 0 1 2 |

(0)0, (1)1-3, (2)4-5, (3)6-8, (4)9-10, (5)11-13, (6)14-15 C. 0 1 2 3 4 5 6

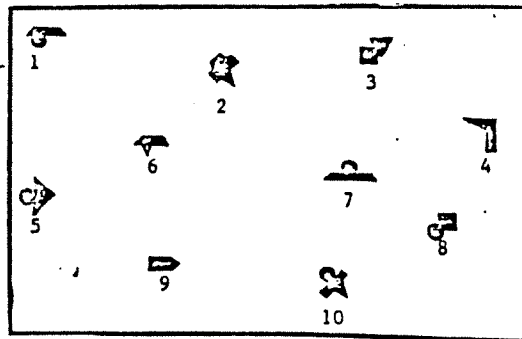
D

Present Appropriate Card

I AM GOING TO SHOW FIGURES ON A CARD, THEN I WANT YOU TO POINT TO THE FIGURES YOU SAW, FROM A GROUP OF FIGURES. POINT TO THEM IN THE SAME ORDER THAT YOU SAW THEM ON THE CARD. S need only get either trial on a given level. *(Show card for 2" per figure.)*

Credit is given for Levels correct on B and need not be repeated here. Start one level higher then highest correct level on B.

- | | Trial 1 | Trial 2 |
|-----------|--------------------|---------------------|
| Card 10-8 | 1. (4, 5, 1, 6, 9) | 1. (3, 7, 2, 8, 10) |
| Card 10-7 | 2. (2, 6, 9) | 2. (7, 1, 4) |
| | 3. (3, 8) | 3. (1, 5) |
| | 4. (4) | 4. (9) |



(0)Level 1 correct, (1)level 2 correct, (3)level 3 correct, (4)level 4 correct, (5)no levels correct. D. 0 1 3 4 5

E

Present Appropriate Card.

I'M GOING TO SHOW YOU A PICTURE OF SOME BLOCKS. LOOK AT IT CAREFULLY BECAUSE I WANT YOU TO PICK IT OUT FROM OTHER PICTURES I'LL SHOW YOU. *(Present card for 10 seconds)*

FIND ONE OF THIS SAME ARRANGEMENT BUT A DIFFERENT VIEW.

Card 10-26, Card 10-27. 1. (1) 1. 0 1

FIND ONE OF THE SAME VIEW.

Card 10-24, Card 10-25 2. (2) 2. 0 1

Card 10-22, Card 10-23 3. (2) 3. 0 1

Card 10-20, Card 10-21 4. (3) 4. 0 1

(0)0, (2)1, (4)2, (5)3, (6)4 E. 0 2 4 5 6

SCORE

F

Present Appropriate Card.

SEE THESE, REMEMBER WHERE THEY ARE. Show grid. POINT TO WHERE YOU SAW THEM. (*Present card for 5 seconds*)

Card 10-6 1.	(1, 2, 3, 6, 7, 8)	1.	0	1	2	3	4	5	6
Card 10-5 2.	(1, 4, 6, 8, 9)	2.	0	1	2	3	4	5	
Card 10-4 3.	(3, 5, 7, 8)	3.	0	1	2	3	4		
Card 10-3 4.	(1, 6, 7)	4.	0	1	2	3			
Card 10-2 5.	(3, 4)	5.	0	1	2				
Card 10-1 6.	(9)	6.	0	1					

HERE ARE SOME PLACES WHERE THE PAPERS ARE, put 3 pieces of paper on table. NOW WATCH WHERE I PUT THIS BALL. Put first on paper to S's left, then shield paper and remove ball, remove shield. WHERE WAS IT? Do the same procedure with ball in the middle position, then S's right.

7. (L)	7.	0	1
8. (M)	8.	0	1
9. (R)	9.	0	1

(0)0, (2)1-3, (3)4-7, (4)8-10, (5)11-14, (6)15-17, (7)18-21, (8)22-24

F. 0 2 3 4
5 6 7 8

G

NOTE: FLOOR=2 CONSECUTIVE CORRECT; 0=CORRECT
CEILING=2 CONSECUTIVE ERRORS; 1=ERROR

Present Appropriate Card

I AM GOING TO SHOW YOU A CARD WITH SOME PICTURES ON IT. YOU WILL HAVE 5 SECONDS TO EXAMINE IT AND THEN I WILL REMOVE. Have S talk for 30 seconds. IS THE PICTURE ON THIS CARD EXACTLY THE SAME OR DIFFERENT FROM THE ONE ON THE CARD I SHOWED YOU BEFORE?

(*Present card for 5 seconds*)

Card 10-13, Card 10-14	1. (Same)	1.	0	1
Card 226A, Card 226C	2. (Different)	2.	0	1
Card 10-11, Card 10-12	3. (Different)	3.	0	1

Use Red, Yellow, and Blue large squares.

Present red square. SEE THIS. Put up shield and add other squares in this order B R Y. Remove shield. FIND IT, SHOW IT TO ME. Repeat with yellow and blue as targets. (*Allow 10 seconds*)

4. (Red)	4.	0	1
5. (Yellow)	5.	0	1
6. (Blue)	6.	0	1

(0)0, (1)1, (2)2, (3)3, (4)4, (5)5, (6)6

G. 0 1 2 3 4 5 6

SCORE

SUBTEST 32: VERBAL MEMORY

FLOOR = 3 CONSECUTIVE UNITS WITH A SCORE OF 0
CEILING = 3 CONSECUTIVE UNITS WITH A SCORE OF 5 OR MORE

A

I AM GOING TO SAY SOME WORDS. LISTEN CAREFULLY, THEN TELL ME THE WORDS I SAID. Allow response. NOW COUNT OUT LOUD UNTIL I ASK YOU TO TELL ME THE SAME WORDS AGAIN. S need only get either trial on a given level. *(Allow 15 seconds of interference.)*

Trial 1		Trial 2	Number correct
1. (ruler-king-glove-hit-box-snow)	(lion-wish-belt-dot-rose-kite)		1.0 4 5 6
2. (drum-rug-cake-pig)	(horn-egg-candle-tie)		2.0 3 4
3. (apple-bush-horse)	(wagon-cork-pill)		3.0 2 3
4. (bird-fork)	(rain-glass)		4.0 1 2
(0)6 words, (1)5 words, (2)4 words, (3)3 words, (4)2 words			A. 0 1 2 3 4 5 6
(5)1 word, (6)0 words			

SCORE

B

FLOOR = 2 CONSECUTIVE 0 SCORES
CEILING = 2 CONSECUTIVE 2 SCORES

NOW I AM GOING TO TELL YOU TWO SENTENCES AND I WOULD LIKE YOU TO REMEMBER THEM.

1. THE COLLEGE PROFESSOR REQUESTED AN EXTENSION BECAUSE THE STUDENT WAS ILL. PLEASE REPEAT THAT. Allow response
THE PILOT, NOTICING THE FLASHING LIGHT, TOLD THE PASSENGERS TO BE SEATED. PLEASE REPEAT THAT. Allow response.
WHAT WAS THE FIRST SENTENCE? (The college professor requested an extension because the student was ill.)
WHAT WAS THE SECOND SENTENCE? (The pilot, noticing the flashing light, told the passengers to be seated.) 1. 0 1 2
2. WHEN THE GIRL AWOKE THE ROOM HAD BEEN CLEANED. PLEASE REPEAT THAT. Allow response. SHE DID NOT WALK HOME BECAUSE SHE WAS TIRED. PLEASE REPEAT THAT. Allow response.
WHAT WAS THE FIRST SENTENCE? (When the girl awoke the room had been cleaned.)
WHAT WAS THE SECOND SENTENCE? (She did not walk home because she was tired.) 2. 0 1 2
3. MOTHER PACKED A LARGE LUNCH FOR ME. PLEASE REPEAT THAT. Allow response. WE WENT TO SCHOOL FOR THE DAY. PLEASE REPEAT THAT. Allow response.
WHAT WAS THE FIRST SENTENCE? (Mother packed a large lunch for me.)
WHAT WAS THE SECOND SENTENCE? (We went to school for the day.) 3. 0 1 2
4. THE DOG CHASES THE CAR. PLEASE REPEAT THAT. Allow response. AT NIGHT THE STARS COME OUT. PLEASE REPEAT THAT. Allow response.
WHAT WAS THE FIRST SENTENCE? (The dog chases the car.)
WHAT WAS THE SECOND SENTENCE? (At night the stars come out.) 4. 0 1 2
5. THE CAR STOPPED. PLEASE REPEAT THAT. Allow response. SHE EATS COOKIES. PLEASE REPEAT THAT. Allow response.
WHAT WAS THE FIRST SENTENCE? (The car stopped.)
WHAT WAS THE SECOND SENTENCE? (She eats cookies.) 5. 0 1 2

(0)0-2, (1)3, (2)4-5, (3)6, (4)7-8, (5)9, (6)10

B. 0 1 2 3 4 5 6

JLJME

C

NOTE: ONCE TOTAL PARTS FOR 1, 2, & 3 RECALLED 25; DISCONTINUE UNIT; C=0

I AM GOING TO READ YOU A SHORT STORY. I WANT YOU TO LISTEN
CAREFULLY BECAUSE WHEN I AM FINISHED I WANT YOU TO REPEAT TO
ME ALL THAT YOU CAN REMEMBER ABOUT THE STORY. Score number
of parts recalled across paragraphs.

- _____ ON THE 14TH DAY OF APRIL/
 _____ IN 1957/
 _____ AN AUTOMOBILE WITH GREEN FENDERS AND A WHITE TOP/
 _____ PULLED INTO AN INTERSECTION/
 _____ AT THE CORNER OF 5TH STREET AND BLOUDDO./
 _____ AS THE CAR CROSSED THE STREET,/
 _____ A LARGE TRUCK/
 _____ FULL OF KITCHEN APPLIANCES,/
 _____ BOOKSHELVES/
 _____ AND CHAIRS PULLED IN FRONT OF THE CAR,/
 _____ CAUSING THE DRIVER OF THE CAR TO SLAM ON THE BRAKES/
 _____ AND TURN THE WHEEL./
 _____ THE TRUCK DRIVER SWERVED TO MISS THE ON-COMING CAR,/
 _____ SLID ON A SLICK SPOT ON THE PAVEMENT,/
 _____ AND NARROWLY MISSED STRIKING/
 _____ A SMALL BROWN COCKER SPANIEL/
 _____ THAT HAD STEPPED OFF THE CURB./
 _____ A KITCHEN CHAIR/
 _____ AND A ROASTING PAN/
 _____ FELL OFF THE TRUCK./
 _____ THE DRIVER OF THE CAR WAS SHAKEN BY THE INCIDENT/
 _____ BUT DID NOT CALL THE POLICE.
 1. _____ Number of parts recalled

- _____ A MAN WAS WALKING/
 _____ ON A STREET/
 _____ AND SAW A WOMAN/
 _____ WHO WAS CARRYING MANY PACKAGES./
 _____ HE WENT OVER/
 _____ TO OFFER HER HELP/
 _____ BUT SHE MISUNDERSTOOD/
 _____ AND RAN FROM HIM./
 _____ AS SHE RAN, SHE DROPPED ONE PACKAGE AT A TIME./
 _____ HE PICKED UP EACH PACKAGE/
 _____ UNTIL HE WAS CARRYING ALL OF THEM./
 _____ THE LADY RAN INTO A HOUSE./
 _____ THE MAN FOLLOWED/
 _____ AND RANG HER DOORBELL./
 _____ WHEN SHE OPENED THE DOOR,/
 _____ IT HIT THE MAN/
 _____ AND HE DROPPED ALL THE PACKAGES.
 2. _____ Number of parts recalled

- _____ A BOY HAD A RED BIKE./
 _____ HE RODE THE BIKE ACROSS THE STREET./
 _____ HIS MOTHER WAS ANGRY/
 _____ BECAUSE HE CROSSED THE STREET WITHOUT TELLING HER.
 3. _____ Number of parts recalled

(0)25, (1)20-24, (2)15-19, (3)10-14, (4)4-9, (5)0-3

C. 0 1 2 3 4 5

S-32.3

SCOPE

D*Present Appropriate Card*

I WILL SHOW YOU A CARD WITH WORDS. PLEASE LOOK AT THE WORDS.

(Present card 10 seconds). WHAT WERE THE WORDS YOU SAW?

		Number Correct
Card 10-36	1. (Jar, radio, map, bowl, pie, grass, top)	1. 0 5 6 7
Card 230	2. (tree, sun, block, girl, dry)	2. 0 4 5
Card 10-35	3. (pear, cow, ring)	3. 0 2 3
Card 10-34B	4. (pop, mouse)	4. 0 2

(0)7 words, (1)5-6 words, (2)4 words, (3)3 words, (4)2 words,
(5)0-1 words

D. 0 1 2 3 4 5

E

I AM GOING TO SAY SOME WORDS. LISTEN AND THEN TELL ME THE WORDS I SAID. S need only get one trial on a given level.

Begin at one level higher than highest correct level unit A.

Credit is given for levels correct on A and need not be repeated.

Trial 1	Trial 2	Number correct
1. (boat-nose-dish-comb-grass-mat-top-pan)	(rabbit-sled-time-dress-rake-shoe-rocket-phone)	1.0 6 7 8
2. (book-house-cat-game-girl-fan)	(saw-cook-fork-mouse-drum-cane)	2.0 5 6
3. (car-juice-plane-boy-water)	(baby-pan-bone-wash-tin)	3.0 4 5
4. (oven-truck-milk-table)	(pig-line-fun-bike)	4.0 3 4
5. (box-cat-light)	(button-chair-nail)	5.0 2 3
6. (dog-ball)	(book-spoon)	6.0 1 2
7. (doll)	(cat)	7.0 1

(0)>6 words, (2)5 words, (3)4 words, (4)3 words, (5)2 words, (6)1 word
(7)0 words

E. 0 2 3 4 5 6 7

F*Present Appropriate Card.*

NOW I AM GOING TO SHOW YOU SOME PICTURES. WITH EACH PICTURE, I AM GOING TO SAY A WORD. WHEN I FINISH, I WILL SHOW YOU THE PICTURES AGAIN, AND I WANT YOU TO SAY THE WORD. FOR EXAMPLE, I WILL SHOW YOU THIS PICTURE, present 235A briefly, AND SAY STRENGTH. WHEN I SHOW YOU THIS PICTURE LATER, WHAT WOULD YOU SAY? Allow response. YOU WILL HAVE 5 SECONDS TO LOOK AT EACH PICTURE. Show cards in Presentation order. Then say, WHAT WORD GOES WITH THIS PICTURE. Show cards in Recall order.

(Allow 5 seconds for presentation as well as recall.)

Presentation	Recall	
Card 235A-STRENGTH	Card 235H 1. (game)	1. 0 1
Card 235B-USE	Card 235I 2. (sad)	2. 0 1
Card 235C-PLAY	Card 235J 3. (use)	3. 0 1
Card 235D-SAD	Card 235K 4. (strength)	4. 0 1
Card 235E-GROUP	Card 235L 5. (play)	5. 0 1
Card 235F-GAME	Card 235M 6. (group)	6. 0 1
Card 235G-DIRT	Card 235N 7. (dirt)	7. 0 1

(0)0, (1)1, (2)2, (3)3, (4)4, (5)5, (6)6, (7)7

F. 0 1 2 3 4 5 6 7

SCORE

SUBTEST 33: STROOP

THE ENTIRE SUBTEST IS GIVEN TO ALL SUBJECTS

A

Present Card 11-11

LOOK AT THE CARD. READ THE WORDS DOWN EACH COLUMN UNTIL I TELL YOU TO STOP. IF YOU COME TO THE END OF THE CARD, GO BACK TO THE BEGINNING AND START OVER. READ QUICKLY BUT CAREFULLY.
(Allow 30 seconds)

Number of words _____

B

Present Card 11-12.1

LOOK AT THE CARD. GO DOWN EACH COLUMN AND SAY THE COLORS THAT YOU SEE UNTIL I TELL YOU TO STOP. IF YOU COME TO THE END OF THE CARD, GO BACK TO THE BEGINNING AND START OVER.
(Allow 30 seconds)

Number of colors _____

C

Present Card 11-13.1

LOOK AT THIS CARD. DO NOT READ THE WORDS ON IT. GO DOWN EACH COLUMN AND SAY THE COLORS THAT YOU SEE UNTIL I TELL YOU TO STOP. IF YOU COME TO THE END OF THE CARD, GO BACK TO THE BEGINNING AND START OVER.
(Allow 30 seconds)

Number of colors _____

[D]

This is a calculated score based on the raw scores for A, B, and C. It need not be figured by the examiner as it will be calculated by the computer. The formula is:

$$\text{Interference Score: } C - \left[\frac{B \times A}{B + A} \right] = \underline{\hspace{2cm}}$$

SCORE

**SUBTEST 34: INTELLECTUAL ANALYSIS
AND INTEGRATION**

A

FLOOR=2 CONSECUTIVE SCORES OF 0
CEILING=2 CONSECUTIVE SCORES OF 2
See manual for scoring criteria.

Present Appropriate Card

WHAT IS HAPPENING IN THIS PICTURE?

Card 11-2	1.	_____	1. 0 1 2

Card 237	2.	_____	2. 0 1 2

Card 236	3.	_____	3. 0 1 2

Card 11-1A	4.	_____	4. 0 1 2

(0)0, (2)1, (3)2-3, (4)4, (5)5-6, (6)7-8

A. 0 2 3 4 5 6

B

FLOOR=2 CONSECUTIVE CORRECT WITHIN TIME
CEILING=2 CONSECUTIVE ERRORS; HIGHEST SCORE=ERROR

Present Appropriate Cards

I AM GOING TO SHOW YOU SOME PICTURES. THEY ARE IN THE WRONG ORDER.
I WANT YOU TO PUT THEM IN THE RIGHT ORDER SO THAT THEY MAKE SENSE.
TELL ME WHEN YOU ARE FINISHED. DO THIS AS QUICKLY AS YOU CAN.

(Allow 45 seconds)

Card 240	1. (ABCDE)	Time_____
	(0)correct in 15", (1)correct in 30", (2)correct in 45",	
	(3)incorrect	1.0 1 2 3

Card 238	2. (ABCDE)	Time_____
	(0)correct in 15", (1)correct in 30", (2)correct in 45",	
	(3)incorrect	2.0 1 2 3

NOW PUT THESE THREE PICTURES IN THE RIGHT ORDER. If after 15 seconds, the subject is still moving the 3 pictures in a random fashion, THIS IS A STORY ABOUT MAKING A SNOWMAN. PUT THE PICTURES IN THE RIGHT ORDER. (Allow 20 seconds after prompt)

Card 11-6	3. (boy)
	(0)correct, (1)correct with one prompt, (2)incorrect
	3.0 1 2

SCORE

UNIT B, CONTINUED

Present Card 11-3

THESE TWO PICTURES TELL A LITTLE STORY. POINT TO THE PICTURE THAT COMES FIRST IN THE STORY. If the subject does not respond in 10 seconds, repeat the instructions. If the subject has not made a response after an additional 10 seconds, THIS IS A STORY ABOUT MAKING A JELLY SANDWICH. WHICH PICTURE COMES FIRST? POINT TO IT. (Allow 45 seconds maximum)

(0)correct, (1)incorrect

4. 0 1

(0)0, (1)1, (2)2-3, (3)4, (4)5-6, (5)7-8, (6)9

B. 0 1 2 3 4 5 6

C

FLOOR=3 CONSECUTIVE CORRECT; 0=CORRECT
CEILING=3 CONSECUTIVE ERRORS; HIGHEST SCORE=ERROR

Present Appropriate Card

WHAT IS COMICAL OR ABSURD ABOUT THIS PICTURE?

Card 11-10 1. 0 1

Card 243 2. 0 1

LISTEN TO WHAT I SAY. TELL ME WHAT IS WRONG OR FUNNY ABOUT IT.
THE MAN JUMPED AS HIGH AS HE COULD SO HE COULD LOOK
INTO THE BASEMENT WINDOW.

3. 0 1

Present Card 242.

WHAT IS COMICAL OF ABSURD ABOUT THIS PICTURE?

4. 0 1

LISTEN TO WHAT I SAY. TELL ME WHAT IS WRONG OR FUNNY ABOUT IT.
THE WOMEN SAILED HER BOAT DOWN THE HIGHWAY BEHIND
THE TRUCK.

5. 0 1

Present Appropriate Card.

WHAT IS FUNNY ABOUT THIS PICTURE? a. Card 11-8 a. 0 1

b. Card 11-9 b. 0 1 6. 0 1 2

LISTEN TO WHAT I SAY. TELL ME WHAT IS WRONG OR FUNNY ABOUT IT.
THE CAT FLEW INTO THE TREE AND LANDED IN HER NEST.

7. 0 1

Present Appropriate Card.

WHAT IS FUNNY ABOUT THIS PICTURE? a. Card 11-7A a. 0 1

(Allow 20 seconds)

b. Card 11-7B b. 0 1 8. 0 1 2

(0)0, (1)1, (2)2, (3)3, (4)4, (5)5, (6)6, (7)7-10.

C. 0 1 2 3 4 5 6 7

SCORE

UNIT B, CONTINUED

Present Card 11-3

THESE TWO PICTURES TELL A LITTLE STORY. POINT TO THE PICTURE THAT COMES FIRST IN THE STORY. If the subject does not respond in 10 seconds, repeat the instructions. If the subject has not made a response after an additional 10 seconds, THIS IS A STORY ABOUT MAKING A JELLY SANDWICH. WHICH PICTURE COMES FIRST? POINT TO IT. (Allow 45 seconds maximum)

(0)correct, (1)incorrect

4. 0 1

(0)0, (1)1, (2)2-3, (3)4, (4)5-6, (5)7-8, (6)9

B. 0 1 2 3 4 5 6

C

FLOOR=3 CONSECUTIVE CORRECT; 0=CORRECT
CEILING=3 CONSECUTIVE ERRORS; HIGHEST SCORE=ERROR

Present Appropriate Card

WHAT IS COMICAL OR ABSURD ABOUT THIS PICTURE?

Card 11-10 1. 0 1

Card 243 2. 0 1

LISTEN TO WHAT I SAY. TELL ME WHAT IS WRONG OR FUNNY ABOUT IT.
THE MAN JUMPED AS HIGH AS HE COULD SO HE COULD LOOK
INTO THE BASEMENT WINDOW.

3. 0 1

Present Card 242.

WHAT IS COMICAL OF ABSURD ABOUT THIS PICTURE?

4. 0 1

LISTEN TO WHAT I SAY. TELL ME WHAT IS WRONG OR FUNNY ABOUT IT.
THE WOMEN SAILED HER BOAT DOWN THE HIGHWAY BEHIND
THE TRUCK.

5. 0 1

Present Appropriate Card.

WHAT IS FUNNY ABOUT THIS PICTURE? a. Card 11-8 a. 0 1

b. Card 11-9 b. 0 1 6. 0 1 2

LISTEN TO WHAT I SAY. TELL ME WHAT IS WRONG OR FUNNY ABOUT IT.
THE CAT FLEW INTO THE TREE AND LANDED IN HER NEST.

7. 0 1

Present Appropriate Card.

WHAT IS FUNNY ABOUT THIS PICTURE? a. Card 11-7A a. 0 1

(Allow 20 seconds.) b. Card 11-7B b. 0 1 8. 0 1 2

(0)0, (1)1, (2)2, (3)3, (4)4, (5)5, (6)6, (7)7-10.

C. 0 1 2 3 4 5 6 7

SCORE

D

LISTEN CAREFULLY. I AM GOING TO READ YOU A STORY. WHEN I AM FINISHED, I AM GOING TO ASK YOU SOME QUESTIONS ABOUT IT.

A MAN HAD A HEN WHICH LAID GOLDEN EGGS. WISHING TO OBTAIN MORE GOLD WITHOUT HAVING TO WAIT FOR IT, HE KILLED THE HEN. BUT HE FOUND NOTHING INSIDE IT, FOR IT WAS JUST AS ANY OTHER HEN.

- | | |
|--|----------|
| 1. WHAT DID THE MAN DO? _____ | 1. 0 1 |
| 2. DID HE DO THE RIGHT? _____ | 2. 0 1 |
| 3. WHAT IS THE MORAL OF THE STORY? _____ | 3. 0 1 2 |

(0)0. (2)1. (3)2. (5)3. (6)4

D. 0 2 3 5 6

E

Present Card 4-52

SEE THIS PICTURE. HOW DO YOU THINK THE PERSON FEELS?

- | | | |
|--------------|--------|--------------|
| 1. (Angry) | 1. 0 1 | |
| 2. (Sad) | 2. 0 1 | |
| 3. (Happy) | 3. 0 1 | |
| 4. (Puzzled) | 4. 0 1 | E. 0 1 2 3 4 |

SCORE

SUBTEST 35: GENERAL INTELLIGENCE AND ORIENTATION

A

FLOOR=2 CONSECUTIVE CORRECT; 0=CORRECT
CEILING=2 CONSECUTIVE ERRORS; 2=ERROR

NOW I WILL SAY SOME WORDS. I WANT YOU TO DEFINE THEM. TELL
ME WHAT THESE WORDS MEAN. See manual for scoring criteria.

- | | |
|-----------------|----------|
| 1. HAVEN _____ | 1. 0 1 2 |
| 2. LOYAL _____ | 2. 0 1 2 |
| 3. SQUARE _____ | 3. 0 1 2 |
| 4. SUMMER _____ | 4. 0 1 2 |
| 5. SWING _____ | 5. 0 1 2 |
| 6. APPLE _____ | 6. 0 1 2 |

A. 0 1 2 3 4 5 6
7 8 9 10 11 12

B

1.=0[2&3=0;C]

See manual for scoring criteria

1. WHAT DOES THIS SAYING MEAN: A BIRD IN THE HAND IS WORTH TWO IN
THE BUSH. _____

1. 0 1 2

Present Reading Booklet

I AM GOING TO SHOW YOU A SAYING. BELOW THE SAYING ARE THREE POSSIBLE
EXPLANATIONS OF IT. POINT TO THE ONE WHICH IS CORRECT.

2. (B) 2. 0 1
3. (C) 3. 0 1

B. 0 1 2 3 4

C

See Manual for scoring criteria
WHAT IS MEANT BY THESE EXPRESSIONS:

- | | |
|-----------------------|----------|
| 1. TIGHT-FISTED _____ | 1. 0 1 2 |
| 2. BOOKWORM _____ | 2. 0 1 2 |

C. 0 1 2 3 4

SCORE

D

FLOOR=2 CONSECUTIVE CORRECT; 0=CORRECT
CEILING=2 CONSECUTIVE ERRORS; 2=ERROR
See manual for scoring criteria

- WHAT IS THE DIFFERENCE BETWEEN A "ROCK" AND AN "ORANGE?"
8. 0 1 2
- WHAT IS THE DIFFERENCE BETWEEN A "CAT" AND A "LION?"
9. 0 1 2
- IN WHAT WAY ARE "PUPPY", "TADPOLE," AND "CATERPILLAR"
ALIKE?
10. 0 1 2
- IN WHAT WAY ARE A "BOOK," "NEWSPAPER," AND "TELEPHONE"
ALIKE?
11. 0 1 2
- IN WHAT WAY ARE A "HAMMER" AND "SCREWDRIVER" ALIKE?
12. 0 1 2
- IN WHAT WAY ARE "TOMATOES" AND "BEANS" ALIKE?
13. 0 1 2

D. 0 1 2 3 4 5 6
7 8 9 10 11 12

E

FLOOR=2 CONSECUTIVE CORRECT; 0=CORRECT
CEILING=2 CONSECUTIVE ERRORS; HIGHEST SCORE=ERROR
See manual for scoring criteria
All problems are in the Reading Booklet. Allow S to read along.

- MIKE IS STANDING 3 FEET FROM JANE'S LEFT. BILL IS STANDING
4 FEET DIRECTLY IN FRONT OF JANE. HOW MANY FEET FROM BILL
IS MIKE STANDING. (Allow 30 seconds)
1. (5) 1. 0 1 2
(0)Correct in 15", (1)correct in 30", (2)incorrect
- THERE WERE 24 RECORDS ON TWO SHELVES. THERE WERE THREE TIMES
AS MANY ON ONE SHELF AS ON THE OTHER. HOW MANY RECORDS WERE
THERE ON EACH SHELF. (Allow 30 seconds)
2. (6-18) 2. 0 1 2
(0)correct in 15", (1)correct on 30", (2)incorrect
- A BUSINESSMAN OWNED 10 STORES. IN EACH HE STOCKED 9 SHIRTS. HE
SOLD TWO-THIRDS OF THE SHIRTS. HOW MANY SHIRTS DID HE HAVE LEFT.
(Allow 30 seconds) 3. (30) 3. 0 1

SCORE

UNIT E, CONTINUED

SOMEONE RIDING A BICYCLE CAN RIDE TO THE POST OFFICE IN 30 MINUTES AND SOMEONE CAN DRIVE A CAR THERE 6 TIMES FASTER. HOW LONG DOES THE PERSON DRIVING THE CAR TAKE TO GET TO THE POST OFFICE. (*Allow 30 seconds*) 4. (5') 4. 0 1

GRETA HAD 6 PEACHES AND KEN HAD 2 PEACHES MORE THAN GRETA. HOW MANY PEACHES DID THEY HAVE TOGETHER? (*Allow 15 seconds*) 5. (14) 5. 0 1

DAVID HAD 9 PEACHES AND GAVE 5 AWAY. HOW MANY DID HE HAVE LEFT? (*Allow 15 seconds*) 6. (4) 6. 0 1

CINDY HAD 3 PEACHES AND FAULA HAD 5 PEACHES. HOW MANY DID THEY HAVE TOGETHER? (*Allow 15 seconds*) 7. (8) 7. 0 1

E. 0 1 2 3 4
5 6 7 8 9

F

INSERT SCORE FROM FRONT PAGE OF RESPONSE BOOKLET.

F. 0 1 2 3 4 5 6
7 8 9 10 11 12
13 14 15 16 17

SCORE

SUBTEST 36: ANALOGIES AND COMPARISONS

0-CORRECT

1-ERROR

A*Present Reading Booklet, begin time after E reads problem.*

TAMMY RECEIVED A PRESENT. SHE WANTED TO GUESS WHAT WAS IN IT BEFORE SHE OPENED THE BOX. WHEN SHE TIPPED THE BOX FORWARD, THE OBJECT SLID. WHEN SHE TIPPED THE BOX SIDEWAYS THE OBJECT ROLLED. THE OBJECT INSIDE MOST LIKELY IS A:

(Allow 15 seconds)

1. (Car) 1. 0 1

Present Reading Booklet

THE FASTEST MEMBER OF THE TRACK TEAM IS KEN. HIS USUAL TIME FOR THE 1000 METER RUN IS 5 MINUTES. TIM'S USUAL TIME FOR 1000 METERS IS 11 MINUTES. HIS IS THE SLOWEST TIME ON THE TEAM. POINT TO THE NAME OF THE PERSON IN THE LIST BELOW WHO IS ALSO ON THE TRACK TEAM. *(Allow 15 seconds)*

2. (Jack) 2. 0 1

A. 0 1 2

B

WHICH ONE OF THE FOUR WORDS I WILL NOW SAY DOES NOT BELONG TO THE SAME GROUP AS THE OTHER THREE?

PEN-ERASER-PENCIL-CRAYON

1. (Eraser) 1. 0 1

CAR-WHEELBARROW-TRUCK-BUS

2. (Wheelbarrow) 2. 0 1

IF I HAVE SOAP, A SPOON AND CEREAL, WHICH ONE CAN I EAT?

3. (Cereal) 3. 0 1

IF I HAVE A SHOE, A HAT, AND A BALL, WHICH ONE SHOULD I WEAR ON MY HEAD?

4. (Hat) 4. 0 1

B. 0 1 2 3 4

C

THE OPPOSITE IN MEANING TO THE WORD "SMOOTH" IS "ROUGH".

WHAT IS THE OPPOSITE OF "UP"?

1. (Down) 1. 0 1

WHAT IS THE OPPOSITE OF "WET"?

2. (Dry) 2. 0 1

WHAT WORD HAS THE SAME RELATIONSHIP TO "WEST" AS "NIGHT" HAS TO "DAY"?

3. (East) 3. 0 1

WHAT WORD HAS THE SAME RELATIONSHIP TO "TALL" AS "LARGE" HAS TO "SMALL"?

4. (Short) 4. 0 1

WHAT WORD HAS THE SAME RELATIONSHIP TO "RADIO" THAT "PICTURE" HAS TO "TELEVISION"?

5. (Sound, music, voice) 5. 0 1

C. 0 1 2 3 4 5

SCORE

D

FLOOR = 3 CONSECUTIVE CORRECT: 0=CORRECT
CEILING = 3 CONSECUTIVE ERRORS: 1=ERROR

IF WE START WITH THE PART "FINGER" THE WHOLE WOULD BE "HAND". WHAT WILL THE WHOLE BE IF THE PARTS ARE "TWIGS"?

- | | |
|--|--------|
| 1. (Tree, bush, branch) | 1. 0 1 |
| WHAT WILL THE WHOLE BE IF THE PART IS A "CABOOSE"? | |
| 2. (Train, railroad cars) | 2. 0 1 |

IF WE CONSIDER A TABLE AS A WHOLE, THEN THE LEGS WILL BE PART OF THE WHOLE; CAN YOU TELL ME WHAT ARE THE PARTS IF THE WHOLE IS A "WATCH"?

- | | |
|---|--------|
| 3. (Any two parts of a watch. See Manual) | 3. 0 1 |
| TELL ME WHAT ARE THE PARTS IF THE WHOLE IS A "SAW"? | |
| 4. (Handle and/or blade, teeth) | 4. 0 1 |

IF WE START WITH THE GROUP FRUIT, THEN A BANANA WILL BE A MEMBER OF THE GROUP. GIVE ME AN EXAMPLE OF THE GROUP "INSECT".

- | | |
|---|--------|
| 5. (Any insect, except spider also.) | 5. 0 1 |
| GIVE ME AN EXAMPLE OF THE GROUP "SEASON". | |
| 6. (Summer, Fall, Winter, or Spring) | 6. 0 1 |

"HAMBURGER" BELONGS TO THE GROUP OF OBJECTS CALLED FOOD. WHAT GROUP DOES "SPARROW" BELONG TO?

- | | |
|------------------------------------|--------|
| 7. (Birds) | 7. 0 1 |
| WHAT GROUP DOES "DRESS" BELONG TO? | |
| 8. (Clothes) | 8. 0 1 |

FINISH WHAT I SAY WITH ONE WORD. (See Manual)

- | | | |
|--|---|---------|
| A CHAIR, A DRESSER AND A BED ARE ALL: | 9. (furniture) | 9. 0 1 |
| MILK, POTATOES AND HAMBURGER ARE ALL: | 10. (food) | 10. 0 1 |
| AN ELEPHANT IS BIG; A MOUSE IS: | 11. (small) | 11. 0 1 |
| THE SUN IS HOT; ICE IS: | 12. (cold) | 12. 0 1 |
| ICE CREAM AND HOT DOGS ARE BOTH GOOD TO: | 13. (eat) | 13. 0 1 |
| YOU RIDE IN A CAR; YOU ALSO RIDE IN A: | 14. (any acceptable form of transport.) | 14. 0 1 |

D. 0 1 2 3 4 5 6 7
8 9 10 11 12 13 14

SCORE

SUBTEST 37: VISUAL ANALYSIS

FLOOR = 5 CONSECUTIVE CORRECT; 0=CORRECT
 CEILING = 5 CONSECUTIVE ERRORS; 1 OR HIGHEST SCORE=ERROR

Present Card 4-38

LOOK AT THE PICTURE AT THE TOP. SHOW ME A DIFFERENT VIEW
 OF THAT SAME ARRANGEMENT DOWN HERE. (Allow 20 seconds.)

1. (#3) 1. 0 1

Present Appropriate Card.

HERE IS A VIEW OF A HOUSE. LOOK CAREFULLY AND THEN TELL ME WHICH
 OF THESE IS THE OPPOSITE VIEW OF THE SAME HOUSE, THE BACK VIEW.

(Allow 20 seconds per element.)

2. (Card 4-49, #1) 2. 0 1

3. (Card 4-48, #1) 3. 0 1

Present Appropriate Card.

SEE THIS, SHOW ME DOWN HERE WHAT THE BACK OF THIS WOULD LOOK LIKE.
 (Allow 20 seconds per element.)

4. (Card 4-47, #1) 4. 0 1

5. (Card 4-46, #3) 5. 0 1

Present Appropriate Card.

FIND ONE LIKE THIS FROM A DIFFERENT VIEW. (Allow 20 seconds per
 element.)

6. (Card 4-48, #2) 6. 0 1

7. (Card 4-4A, #3) 7. 0 1

Present Appropriate Card.

LOOK AT THE PERSON IN THE PICTURE AT THE TOP. SHOW ME ALL THE
 PICTURES OF THAT SAME PERSON DOWN HERE. (Allow 20 seconds per
 element.)

8. (Card 4-42, #3&6) 8. 0 1 2

9. (Card 4-41, #3&6) 9. 0 1 2

Present Appropriate Card.

SEE THIS, SHOW ME DOWN HERE WHAT THE BACK OF THIS WOULD LOOK LIKE.
 (Allow 20 seconds per element.)

10. (Card 4-45, #1) 10. 0 1

11. (Card 4-44, #3) 11. 0 1

12. (Card 4-43, #1) 12. 0 1

Present Card 4-25.

LOOK AT THIS PAIR. HOW ARE THEY THE SAME/ALIKE AND HOW ARE THEY
 DIFFERENT.

13. (R) 13. 0 1

14. (3) 14. 0 1

15. () 15. 0 1

NEBRASKA NEUROPSYCHOLOGICAL EVALUATION
SUBJECT RESPONSE BOOKLET

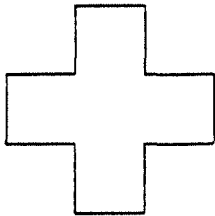
Name: _____ Date: _____ Age: _____
Sex: M F Marital Status: _____ Race: _____
Occupation: _____ Education _____ Hand Dominance: L R
Place of Examination: _____ Examiner: _____

SUBTEST 35, SECTION F

1. WHAT IS YOUR FULL NAME? (If only first name is given, ask - WHAT IS YOUR LAST NAME?) _____ 1. 0 1 2
2. HOW OLD ARE YOU? _____ 2. 0 1
3. WHAT IS YOUR BIRTHDATE? ____/____/____ 3. 0 1 2 3
4. WHERE DO YOU LIVE? (City) _____
(State) _____ 4. 0 1 2
5. WHAT IS YOUR ADDRESS AT HOME? (IF S. Does not know, ask: WHAT STREET DO YOU LIVE ON?) _____ 5. 0 1 2
6. HOW FAR HAVE YOU GONE IN SCHOOL? _____ 6. 0 1
7. WHAT DAY OF THE WEEK IS TODAY? _____ 7. 0 1
8. WHAT IS TODAY'S DATE? (Month) _____ (Date) _____ 8. 0 1 2
9. WHERE ARE YOU NOW? (City) _____
(Location/Bldg) _____ 9. 0 1 2
10. ABOUT WHAT TIME IS IT NOW? _____ 10. 0 1

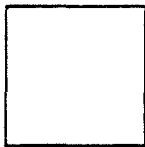
TRANSFER TOTAL NUMBER OF ERRORS TO SUBTEST 35, SECTION F

S6-1



S6-2

S6-3A



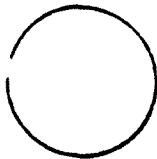
S6-3B

S6-4A



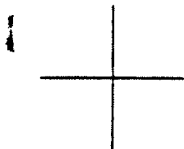
S6-4B

S6-5A



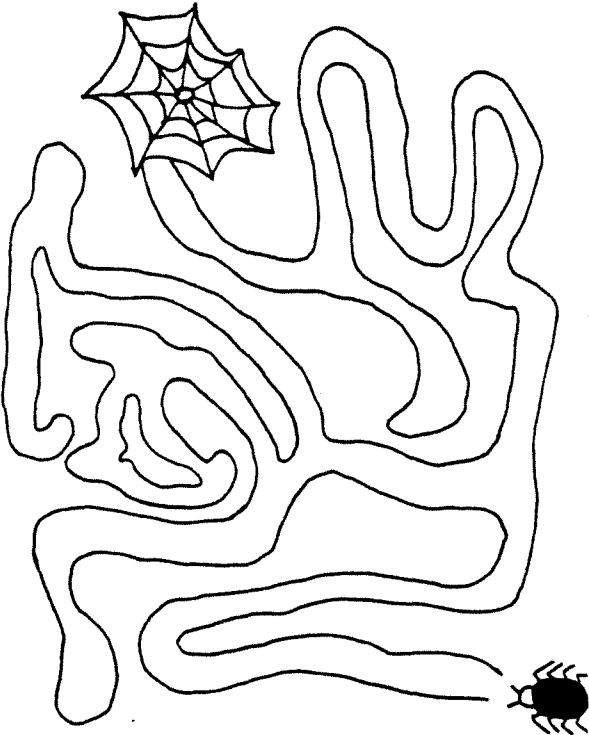
S6-5B

S6-6A

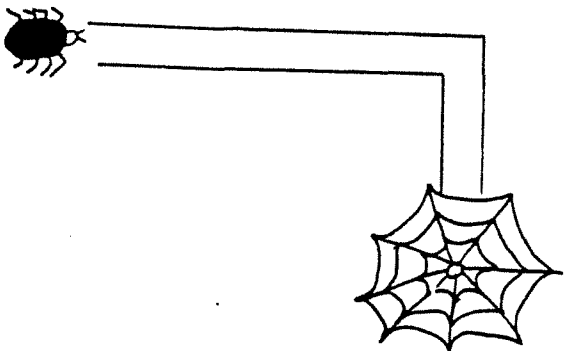


S6-6B

S6-7



S6-8

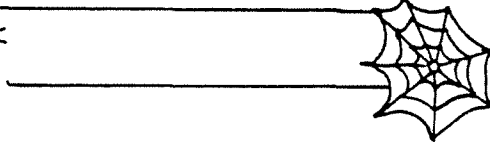


S6-9A

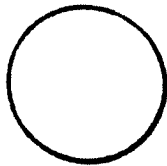
S6-9B



S6-10



S6-11A



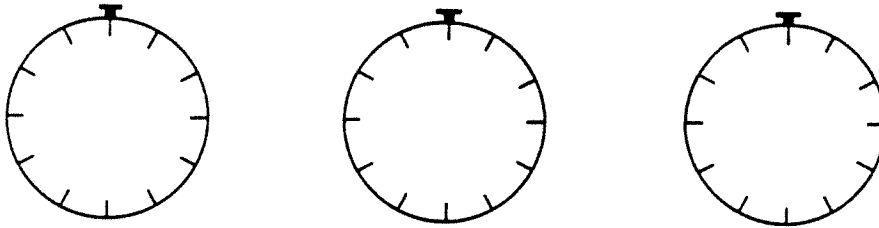
S6-11B



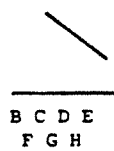
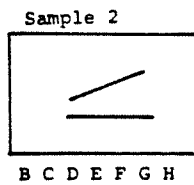
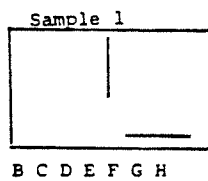
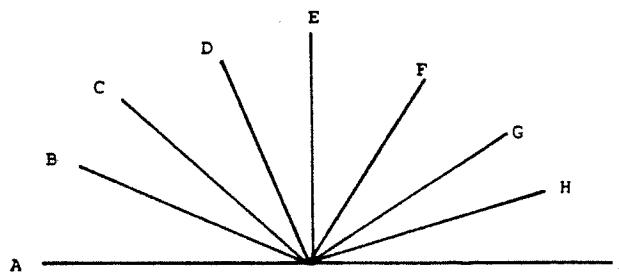
S6-11C



S15: 21-23



S15: 25-34



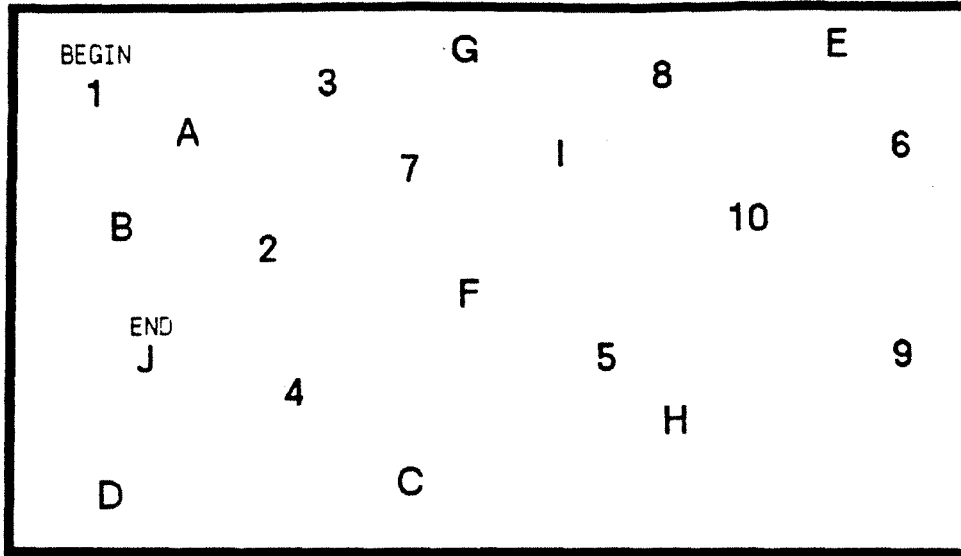
S15; 38-39

1

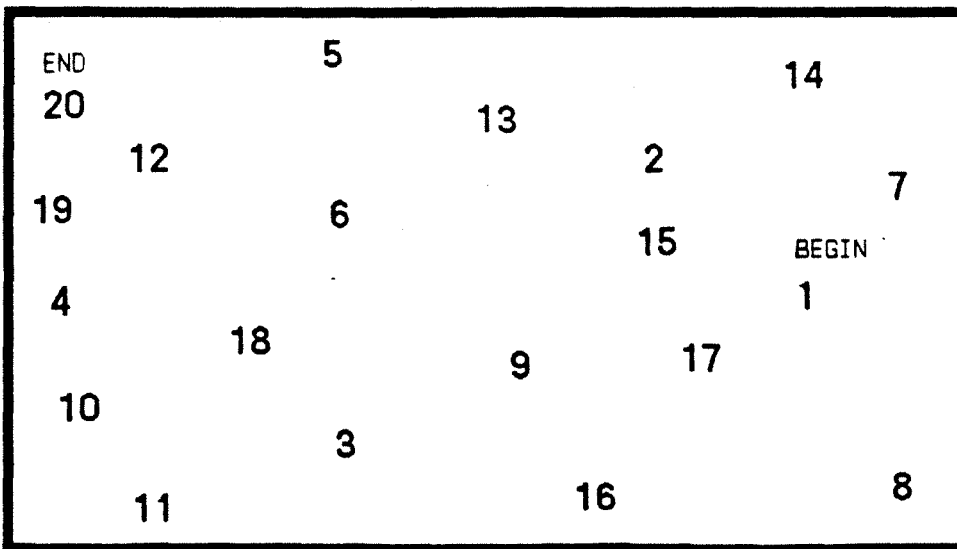
S15-40

1

S 17-1



S 17-2



The NENE 209

S20; 29-30

S26/27 Worksheet

S26/27 Worksheet

S26/27; 21-25

str awk pl th pa

S26/27; 26-30

G R Y R M

S26/27; 31-35

Q	E	S	I	N

S26/27; 36-40

<i>B</i>	<i>X</i>	<i>Z</i>	<i>L</i>	<i>B</i>

S26:41-50

K	𐀀	B	9	S	𐀁	G	𐀂	W	P

S26:51-55

/	\	⊥	7	L

S30:16-33

4	9	2	7	3	7
<u>+5</u>	<u>-3</u>	<u>x4</u>	<u>+6</u>	<u>x9</u>	<u>-2</u>
6	10	39	8	3	17
<u>x2</u>	<u>+13</u>	<u>-16</u>	<u>x6</u>	<u>+8</u>	<u>-6</u>
41	3	15	3	7	18
<u>+ 6</u>	<u>x7</u>	<u>-3</u>	<u>x4</u>	<u>+20</u>	<u>-7</u>

The NENE 212

S30; MATH WORKSHEET

The NENE 213

S31: C1-5

APPENDIX B

Descriptive Statistics of the Sample

	<u>Learning Disabled</u>	<u>Non-Learning Disabled</u>
Subjects	30	30
Age Range	7 - 10	7 - 10
Mean Age	9	9
Grade Range	2 - 4	2 - 4
Mean Grade	3	3

APPENDIX C

Parental Telephone Calls for Initial Consent

Hello.

My name is Georgia Carpenter. I am a graduate student in Clinical Psychology at Western Conservative Baptist Seminary. I am doing a study on a new individually administered test to see if it will differentiate learning disabled children from non-learning disabled. The principal at your child's school has agreed to participate in this study, and I would like your permission to evaluate your child with this test. It will be done during school hours and in the school building.

It is important that I have your written permission as well. Your child will bring a consent slip home with him and a brief questionnaire regarding his developmental history. I would like you to fill it out, sign it, and send it back to the teacher. As soon as the consent is received the teacher and I will arrange a time to evaluate your child.

Thank you.

APPENDIX D

Developmental Questionnaire and Consent Form

Dear Parent:

Thank you for allowing me to evaluate your child and use this information as part of my dissertation data. Your signature at the end of this questionnaire will confirm that permission.

I will appreciate your answering the following questions as accurately as possible and returning this form to your child's teacher. If you have any questions please feel free to call me at 238-3766. Sincerely,

Georgia A. Carpenter, M.A.

Child's name: _____

1. Were there any complications/illness/emotional problems during the course of pregnancy? If so, please specify. _____

2. Were there any specific procedures used during the birth process (induced labor, C-section, instruments utilized, breech birth, etc.). Please specify. _____

3. Gestation (in weeks): _____

4. Length of labor (in hours): _____

5. Birth size: length_____ weight_____

6. Accidents/illnesses during early childhood:_____

7. Age in months at which your child:

sat supported_____ toilet trained_____

walked alone_____ spoke phrases_____

8. Does your child have any chronic medical disorders?

If so, please specify:_____

9. Has your child ever been hospitalized? Please
specify:_____

10. Is your child currently taking any medications? If
so please give name and amount:_____

Parent's signature:_____

Date:_____

Thank you very much for this very important
information.

APPENDIX E

Raw Data

RAW DATA

Key of Raw Data

1 = Subject

2 = Learning Status (1=Learning Disabled; 2=Non-Learning
Disabled)

3 to 39 = Scores for the 37 subtests of the NENE

- 01, 1, 100, 93, 93, 93, 86, 95, 92, 93, 95, 95, 90, 86, 88, 91, 93, 104, 103, 96, 95, 95, 93, 96, 97, 80, 94, 95, 94, 97, 95, 90, 96, 94, 108, 98, 103, 124, 134.
- 02, 2, 104, 105, 103, 92, 79, 103, 91, 93, 104, 107, 112, 116, 112, 93, 100, 98, 113, 96, 96, 101, 98, 98, 105, 80, 102, 93, 98, 95, 100, 90, 98, 97, 90, 102, 101, 101, 88.
- 03, 1, 96, 99, 103, 96, 97, 95, 95, 84, 95, 95, 99, 83, 88, 93, 91, 87, 107, 96, 95, 101, 101, 96, 111, 82, 110, 97, 98, 98, 109, 94, 97, 97, 92, 108, 109, 111, 108.
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- 07, 2, 99, 100, 104, 98, 99, 97, 98, 90, 94, 96, 100, 85, 90, 93, 95, 90, 110, 100, 98, 103, 100, 99, 112, 85, 110, 99, 99, 98, 110, 94, 100, 97, 95, 105, 110, 111, 110.
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- 36, 1, 96, 102, 93, 92, 90, 95, 91, 93, 95, 95, 99, 93, 88, 92, 89, 100, 105, 96, 95, 91, 92, 96, 94, 80, 100, 93, 95, 93, 97, 89, 99, 90, 98, 108, 103, 94, 105.
- 37, 1, 107, 105, 121, 92, 94, 89, 94, 93, 96, 95, 83, 93, 88, 91, 89, 98, 106, 96, 95, 103, 95, 96, 98, 80, 85, 98, 96, 98, 109, 88, 94, 92, 92, 98, 107, 97, 98.
- 38, 1, 100, 102, 99, 94, 90, 91, 91, 95, 95, 95, 86, 90, 88, 92, 103, 100, 96, 96, 95, 93, 96, 96, 99, 80, 105, 100, 97, 105, 109, 110, 89, 94, 90, 108, 110, 100, 108.
- 39, 2, 102, 89, 93, 92, 90, 95, 91, 88, 96, 97, 93, 93, 88, 92, 100, 111, 100, 96, 95, 103, 97, 100, 99, 80, 90, 101, 93, 97, 102, 101, 98, 102, 102, 113, 106, 101, 101.
- 40, 2, 100, 99, 96, 93, 90, 95, 92, 95, 101, 98, 83, 86, 88, 93, 101, 104, 119, 96, 95, 108, 95, 96, 101, 80, 104, 97, 94, 96, 109, 101, 98, 89, 105, 100, 109, 99, 92.
- 41, 1, 105, 103, 101, 98, 94, 89, 100, 100, 98, 95, 99, 90, 88, 92, 103, 111, 105, 96, 95, 109, 99, 100, 107, 80, 112, 98, 97, 107, 97, 113, 91, 104, 98, 108, 113, 108, 105.
- 42, 2, 96, 102, 121, 92, 97, 91, 95, 97, 95, 95, 93, 96, 88, 91, 97, 102, 139, 124, 95, 89, 94, 96, 99, 80, 108, 93, 95, 105, 109, 112, 104, 99, 98, 113, 106, 118, 108.
- 43, 1, 100, 108, 99, 94, 94, 95, 94, 102, 98, 95, 99, 90, 92, 94, 100, 98, 100, 96, 95, 109, 96, 96, 109, 80, 115, 93, 97, 107, 111, 113, 98, 102, 101, 100, 114, 103, 101.
- 44, 2, 90, 105, 99, 93, 90, 91, 96, 102, 95, 95, 93, 83, 88, 92, 89, 100, 119, 96, 95, 108, 95, 96, 99, 80, 108, 93, 97, 104, 111, 106, 90, 102, 105, 108, 110, 118, 88.
- 45, 2, 110, 108, 99, 92, 90, 91, 96, 102, 96, 95, 109, 103, 100, 93, 102, 100, 121, 96, 95, 103, 94, 96, 100, 81, 90, 93, 94, 95, 97, 107, 97, 95, 104, 104, 105, 96, 108.
- 46, 1, 108, 106, 109, 94, 101, 95, 94, 95, 98, 95, 99, 100, 88, 94, 103, 98, 100, 96, 95, 109, 96, 96, 107, 86, 110, 93, 97, 104, 109, 110, 91, 100, 92, 108, 110, 108, 100.
- 47, 2, 102, 105, 103, 93, 90, 95, 95, 95, 96, 97, 96, 83, 92, 93, 88, 96, 126, 96, 95, 97, 94, 96, 102, 80, 98, 100, 97, 99, 107, 106, 94, 97, 101, 106, 107, 99, 98.
- 48, 2, 98, 102, 96, 93, 86, 95, 94, 99, 96, 97, 83, 83, 88, 94, 101, 100, 108, 96, 97, 104, 99, 96, 102, 81, 108, 94, 95, 101, 111, 113, 98, 102, 105, 108, 119, 118, 95.

- 49, 2, 89, 93, 90, 92, 90, 91, 95, 93, 96, 97, 90, 86, 88, 92, 102, 98, 128, 96,
95, 107, 98, 96, 108, 80, 110, 94, 98, 104, 109, 110, 90, 95, 102, 110,
108, 97, 108.
- 50, 1, 96, 108, 99, 98, 101, 95, 94, 95, 95, 97, 86, 90, 88, 92, 103, 102, 96,
96, 95, 109, 96, 96, 99, 80, 98, 100, 97, 107, 111, 112, 89, 102, 87, 108,
114, 99, 105.
- 51, 2, 102, 102, 96, 93, 90, 91, 94, 97, 95, 95, 103, 100, 95, 92, 108, 100,
117, 96, 95, 111, 95, 96, 98, 80, 108, 117, 105, 106, 109, 107, 109, 104,
114, 110, 107, 110, 108.
- 52, 1, 112, 93, 90, 93, 90, 95, 92, 93, 95, 95, 86, 93, 88, 94, 108, 113, 117,
96, 95, 113, 98, 96, 105, 81, 119, 97, 98, 114, 109, 104, 102, 119, 88,
104, 115, 110, 105.
- 53, 2, 102, 99, 99, 93, 86, 91, 92, 93, 95, 95, 83, 83, 88, 92, 94, 96, 122, 96,
95, 105, 95, 96, 99, 82, 104, 97, 94, 101, 109, 106, 99, 102, 114, 100,
107, 99, 105.
- 54, 2, 90, 89, 96, 92, 94, 91, 91, 93, 95, 95, 90, 83, 88, 93, 88, 100, 104, 96,
95, 101, 95, 96, 99, 80, 96, 95, 94, 97, 100, 98, 90, 95, 107, 102, 108,
97, 101.
- 55, 1, 91, 102, 103, 92, 94, 91, 92, 82, 100, 98, 99, 103, 96, 91, 107, 116, 114,
96, 95, 108, 96, 98, 100, 82, 96, 93, 95, 104, 109, 112, 96, 100, 102,
113, 117, 110, 105.
- 56, 2, 103, 108, 106, 92, 94, 91, 94, 95, 95, 95, 99, 100, 92, 91, 102, 91, 123,
96, 95, 100, 95, 96, 98, 81, 106, 93, 96, 97, 95, 109, 95, 100, 102, 93,
109, 103, 95.
- 57, 1, 101, 102, 106, 95, 97, 95, 93, 95, 100, 98, 96, 90, 92, 94, 106, 100,
89, 96, 95, 101, 98, 96, 106, 81, 117, 93, 97, 111, 109, 112, 98, 105,
81, 106, 116, 118, 111.
- 58, 1, 103, 96, 93, 93, 101, 91, 92, 95, 96, 95, 86, 86, 88, 93, 104, 104, 114,
96, 95, 100, 96, 96, 103, 80, 110, 93, 95, 109, 109, 96, 104, 100, 98, 106,
110, 115, 101.
- 59, 1, 90, 93, 87, 92, 94, 95, 92, 84, 95, 95, 93, 83, 88, 92, 102, 100, 102, 96,
95, 104, 96, 96, 105, 81, 110, 94, 97, 106, 109, 112, 99, 109, 98, 100,
110, 110, 108.
- 60, 1, 100, 99, 90, 98, 99, 95, 94, 102, 96, 95, 109, 90, 88, 94, 103, 102, 121,
96, 95, 109, 96, 96, 107, 80, 110, 93, 105, 107, 109, 113, 91, 119, 101,
110, 114, 108, 101.

APPENDIX F

Descriptive Statistics of the Subtest Scores of the
Nebraska Neuropsychological Evaluation

DESCRIPTIVE STATISTICS OF THE SUB-TEST SCORES OF THE
NEBRASKA NEUROPSYCHOLOGICAL EVALUATION

	Mean	Std Dev	Range	Minimum	Maximum	F
Variables						
01 (Bilateral Motor Coordination)	99.07	7.46	34	82	116	11.30**
02 (Right Side Motor Coordination)	99.23	6.31	25	83	108	3.03
03 (Left Side Motor Coordination)	98.13	7.45	37	84	121	1.49
04 (Purposeful Motor Movement)	94.18	6.38	57	82	139	.49
05 (Oral/ Motor Movements)	91.40	6.57	26	79	105	5.71*
06 (Drawing)	92.93	3.16	14	89	103	2.97
07 (Non-Verbal Auditory Processing)	93.37	2.28	10	90	100	6.12*
08 (Non-Verbal Sound Interpretation)	93.15	5.92	22	82	104	4.38*

DESCRIPTIVE STATISTICS OF THE SUB-TEST SCORES OF THE
NEBRASKA NEUROPSYCHOLOGICAL EVALUATION

	Mean	Std Dev	Range	Minimum	Maximum	F
Variables						
09 (Right Tactile Discrimination)	96.40	2.32	10	94	104	.36
10 (Left Tactile Discrimination)	96.47	2.63	14	93	107	.10
11 (Right Complex Tactile Pattern Recognition)	93.20	8.13	29	83	112	.45
12 (Left Complex Tactile Pattern Recognition)	91.98	8.22	33	83	116	.52
13 (Double Tactile Stimulation)	92.78	7.68	36	88	124	6.69*
14 (Visual Identification)	92.52	1.41	8	90	98	2.78
15 (Visual Spatial Analysis)	96.02	6.93	22	86	108	5.79*
16 (Visual Intellectual Analysis)	98.80	7.16	31	85	116	12.60***

DESCRIPTIVE STATISTICS OF THE SUB-TEST SCORES OF THE
NEBRASKA NEUROPSYCHOLOGICAL EVALUATION

	Mean	Std Dev	Range	Minimum	Maximum	F
Variables						
17 (Connecting The Circles)	108.35	12.16	64	79	143	.27
18 (Phonemic Discrimination)	96.45	3.90	33	91	124	.62
19 (Auditory Comprehension)	95.10	1.55	12	89	101	1.85
20 (Complex Auditory Comprehension)	100.62	8.09	48	88	136	1.34
21 (Repetition)	95.57	2.17	9	92	101	3.39
22 (Expressive Naming)	96.33	1.54	10	92	102	.51
23 (Speeded Repetition)	100.73	5.28	20	92	112	
24 (Patterned Expressive Speech)	80.82	1.69	7	79	86	4.24**
25 (Generation of Complex Expression)	99.68	11.30	48	75	123	14.69***

DESCRIPTIVE STATISTICS OF THE SUB-TEST SCORES OF THE
NEBRASKA NEUROPSYCHOLOGICAL EVALUATION

	Mean	Std Dev	Range	Minimum	Maximum	F
Variables						
26 (Motor Writing)	95.88	4.97	29	92	121	.81
27 (Spelling)	95.98	2.46	12	93	105	16.61***
28 (Reading Recognition)	100.25	5.34	23	91	114	28.02***
29 (Reading Comprehension)	102.98	7.77	23	88	111	14.70***
30 (Arithmetic)	101.53	8.90	25	88	113	2.89
31 (Non-Verbal Memory)	94.05	5.94	27	82	109	2.74
32 (Verbal Memory)	96.23	7.85	42	77	119	14.43***
33 (Stroop)	98.43	7.89	33	81	114	.80
34 (Intellectual Analysis and Integration)	103.07	6.99	30	89	119	8.96**
35 (General Intelligence and Orientation)	107.12	6.07	26	93	119	11.21**

DESCRIPTIVE STATISTICS OF THE SUB-TEST SCORES OF THE
NEBRASKA NEUROPSYCHOLOGICAL EVALUATION

	Mean	Std Dev	Range	Minimum	Maximum	F
<hr/>						
Variables						
36 (Analogies and Comparisons)	103.88	7.98	35	89	124	21.79***
37 (Visual Analysis)	102.27	8.32	46	88	134	24.09***

Note. N = 60

* - $p \leq .05$
 ** $p \leq .01$
 *** $p \leq .001$

APPENDIX G

Pooled Within-Groups Covariance Matrix

	SCALE1	SCALE2	SCALE3	SCALE4
SCALE1	48.47368			
SCALE2	24.65263	39.23553		
SCALE3	26.16842	27.87500	52.65000	
SCALE4	5.157895	.1565789	.4828947	56.07237
SCALE5	-1.057895	6.440789	12.30000	4.511842
SCALE6	-3.668421	-5.818421	-3.618421	-2.344737
SCALE7	4.389474	.5473684	4.106579	2.176316
SCALE8	5.984211	3.630263	.2052632	-10.74079
SCALE9	3.889474	1.942105	5.402632	2.321053
SCALE10	2.047368	.6605263	4.650000	.9657895
SCALE11	22.91053	16.60789	19.36447	2.352632
SCALE12	28.66842	23.90526	25.11579	-3.326316
SCALE13	9.600000	13.02763	12.92237	-11.90921
SCALE14	1.173684	-.2776316	1.444737	1.846053
SCALE15	27.04737	9.682895	8.743421	-2.290789
SCALE16	24.05789	-2.456579	-3.432895	7.396053
SCALE17	22.00000	14.19868	19.66842	-8.098684
SCALE18	.2789474	.1250000	3.159211	.9250000
SCALE19	-.2578947	-.2026316	2.631579	.6921053
SCALE20	27.32632	11.65789	17.73553	10.92368
SCALE21	3.221053	.9434211	4.993421	3.232895
SCALE22	.3894737	-1.596053	1.228947	.1697368
SCALE23	10.00526	5.617105	5.347368	3.725000
SCALE24	-1.415789	-.7565789	.5092105	2.159211
SCALE25	32.22632	20.04474	8.721053	2.471053
SCALE26	7.752632	-3.042105	3.730263	4.944737
SCALE27	2.257895	2.936842	3.511842	.9131579
SCALE28	10.18947	7.489474	4.207895	-1.847368
SCALE29	31.02632	14.17763	10.57895	5.296053
SCALE30	34.50526	18.45789	8.448684	5.665789
SCALE31	20.33684	2.290789	9.613158	6.998684
SCALE32	10.71579	1.230263	3.996053	.3039474
SCALE33	3.315789	-16.33158	-5.863158	-12.71053

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	SCALE1	SCALE2	SCALE3	SCALE4
SCALE34	29.56316	11.86974	17.75921	10.36447
SCALE35	22.78947	9.635526	12.53158	2.453947

SCALE36	9.415789	-7.635526	-4.369737	11.45921
SCALE37	6.542105	-10.50526	-7.152632	15.53684

	SCALE5	SCALE6	SCALE7	SCALE8
SCALE5	45.58684			
SCALE6	-3.144737	12.15263		
SCALE7	2.627632	1.200000	5.003947	
SCALE8	-.7631579E-01	-.1078947	.1118421	19.20789
SCALE9	1.581579	3.621053	.8657895	1.355263
SCALE10	2.813158	4.531579	1.321053	.2868421
SCALE11	6.617105	6.242105	6.738158	1.059211
SCALE12	5.415789	4.152632	2.952632	.9473684
SCALE13	-2.464474	3.844737	7.760526	9.914474
SCALE14	1.363158	1.707895	1.648684	.9421053
SCALE15	.4934211	2.944737	3.678947	4.025000
SCALE16	-6.082895	3.113158	2.389474	3.153947
SCALE17	8.455263	-2.155263	5.632895	3.207895
SCALE18	1.140789	2.276316	2.136842	.2881579
SCALE19	-.8421053	3.015789	1.965789	-.2684211
SCALE20	19.60921	1.710526	6.922368	-2.090789
SCALE21	4.296053	2.518421	1.878947	-1.109211
SCALE22	-.9894737	3.413158	1.419737	-.4894737
SCALE23	10.91842	3.444737	3.588158	-1.197368
SCALE24	3.853947	2.092105	1.642105	-.4828947
SCALE25	16.38947	5.115789	7.760526	1.073684
SCALE26	-5.585526	-1.505263	2.232895	-.6539474
SCALE27	3.727632	1.689474	1.919737	-.6184211E-01
SCALE28	6.060526	-1.994737	1.381579	1.860526
SCALE29	-2.302632	-.7236842	3.296053	-1.144737
SCALE30	2.232895	-5.189474	1.461842	-2.635526
SCALE31	5.857895	4.186842	4.569737	-3.526316
SCALE32	12.73553	1.697368	-.2526316	5.503947
SCALE33	-4.963158	.8631579	2.747368	9.821053
SCALE34	6.367105	1.607895	5.265789	-.1592105
SCALE35	-.2657895	1.613158	3.859211	-1.218421
SCALE36	-5.719737	6.255263	4.321053	-6.798684
SCALE37	-1.910526	1.410526	4.973684	-8.878947

	SCALE9	SCALE10	SCALE11	SCALE12
SCALE9	6.984211			
SCALE10	7.084211	9.605263		
SCALE11	8.139474	12.30000	68.32500	
SCALE12	11.00526	14.51579	52.72105	76.35789
SCALE13	7.800000	9.728947	27.12632	34.95263
SCALE14	2.260526	2.486842	3.738158	3.136842
SCALE15	6.389474	5.765789	17.10789	20.98421
SCALE16	3.547368	2.697368	6.555263	6.826316
SCALE17	3.771053	8.981579	48.65395	51.82632
SCALE18	1.163158	1.428947	3.128947	-.5105263
SCALE19	1.478947	1.484211	1.865789	.2789474
SCALE20	5.086842	4.742105	30.40395	27.48421
SCALE21	2.800000	3.402632	5.534211	3.031579
SCALE22	1.334211	1.460526	2.530263	1.094737

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	SCALE9	SCALE10	SCALE11	SCALE12
SCALE23	2.555263	2.428947	16.15658	4.626316
SCALE24	.9052632	.6342105	2.244737	-1.626316
SCALE25	6.142105	5.000000	30.11316	21.47895

SCALE26	.2657895	-.3894737	4.551316	.9421053
SCALE27	1.650000	2.105263	6.832895	3.305263
SCALE28	-1.500000	-1.047368	.9342105	7.631579
SCALE29	.1184211	-1.828947	8.875000	5.421053
SCALE30	2.086842	.5000000	9.153947	22.35263
SCALE31	5.392105	7.492105	26.55395	21.18947
SCALE32	3.431579	5.028947	8.902632	2.584211
SCALE33	.6684211	.1684211	.5736842	-8.942105
SCALE34	5.726316	5.513158	25.74211	16.70526
SCALE35	1.892105	-.1342105	5.501316	7.689474
SCALE36	-.7315789	.3552632	3.971053	-9.115789
SCALE37	-4.605263	-2.905263	5.842105	-3.947368
	SCALE13	SCALE14	SCALE15	SCALE16
SCALE13	68.13553			
SCALE14	3.280263	2.302632		
SCALE15	6.001316	3.827632	34.18289	
SCALE16	-9.038158	2.046053	20.38553	42.88816
SCALE17	14.19868	2.489474	6.725000	9.748684
SCALE18	2.880263	1.680263	2.098684	1.985526
SCALE19	4.781579	1.573684	.9026316	1.660526
SCALE20	-8.492105	3.319737	20.86842	29.67895
SCALE21	-1.575000	1.982895	5.075000	1.814474
SCALE22	2.261842	1.513158	2.588158	3.611842
SCALE23	-7.240789	2.305263	13.01184	4.525000
SCALE24	.7144737	1.209211	1.269737	-.2236842E-01
SCALE25	7.076316	1.894737	34.51842	15.48684
SCALE26	-8.628947	2.214474	6.615789	8.494737
SCALE27	3.860526	1.217105	3.778947	.3684211
SCALE28	-.9210526	-.2631579E-02	7.673684	6.389474
SCALE29	-14.24342	1.052632	22.09868	20.08553
SCALE30	-3.992105	2.006579	31.69474	23.55263
SCALE31	4.227632	2.207895	19.00132	14.27763
SCALE32	-10.40395	2.432895	10.59868	13.88553
SCALE33	-.9894737	2.100000	-1.752632	10.85789
SCALE34	.9828947	4.427632	27.86974	24.30921
SCALE35	-7.627632	2.573684	20.18816	17.36447
SCALE36	-10.94868	.4605263E-01	9.996053	14.15132
SCALE37	-.4473684	-1.047368	6.547368	4.273684
	SCALE17	SCALE18	SCALE19	SCALE20
SCALE17	132.3026			
SCALE18	1.746053	3.288158		
SCALE19	1.110526	2.855263	3.452632	
SCALE20	30.00395	1.757895	.6710526	69.34079
SCALE21	3.859211	1.348684	1.418421	7.973684
SCALE22	1.231579	2.488158	2.852632	1.827632
SCALE23	12.01842	2.448684	1.100000	17.56447
SCALE24	-2.067105	1.622368	1.486842	1.621053
SCALE25	7.700000	.5026316	-.6631579	43.86579
SCALE26	.1934211	1.631579	1.607895	7.756579
SCALE27	.2381579	1.336842	1.155263	4.617105

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	SCALE17	SCALE18	SCALE19	SCALE20
SCALE28	9.623684	-.7210526	-.6736842	12.33947
SCALE29	19.90789	1.519737	.2631579	26.86184
SCALE30	5.643421	-1.231579	-.7342105	29.76447
SCALE31	24.67895	1.511842	-.1000000E+00	20.98816

SCALE32	13.02500	1.240789	-.1973684	11.83158
SCALE33	27.13158	2.757895	3.384211	-1.494737
SCALE34	4.214474	4.359211	2.492105	31.84474
SCALE35	2.460526	1.461842	1.278947	27.70921
SCALE36	2.132895	1.448684	1.576316	12.61053
SCALE37	.7526316	1.994737	.8736842	-2.494737

	SCALE21	SCALE22	SCALE23	SCALE24
SCALE21	5.382895			
SCALE22	1.790789	3.144737		
SCALE23	6.377632	1.626316	25.41842	
SCALE24	1.625000	1.575000	4.325000	3.119737
SCALE25	10.79211	.2894737	23.22632	2.597368
SCALE26	2.926316	1.985526	2.648684	1.184211
SCALE27	2.152632	1.019737	5.093421	1.673684
SCALE28	1.915789	-.5342105	4.250000	-.6263158
SCALE29	6.032895	1.000000	21.19737	1.032895
SCALE30	4.294737	-.4802632	9.103947	-2.147368
SCALE31	4.582895	1.939474	8.015789	1.267105
SCALE32	7.138158	2.114474	12.89079	1.738158
SCALE33	1.136842	3.957895	-4.931579	.9105263
SCALE34	7.582895	3.414474	12.67500	1.567105
SCALE35	5.827632	1.563158	10.39737	.8118421
SCALE36	4.382895	2.559211	9.540789	1.693421
SCALE37	-2.331579	1.489474	-1.447368	.1210526

	SCALE25	SCALE26	SCALE27	SCALE28
SCALE25	94.78947			
SCALE26	-1.607895	22.54079		
SCALE27	7.934211	.4328947	2.782895	
SCALE28	13.87895	.4657895	.6236842	11.59474
SCALE29	36.34211	9.309211	3.111842	10.22368
SCALE30	35.53947	6.264474	1.703947	17.32368
SCALE31	29.95789	4.325000	2.801316	-.6710526
SCALE32	11.57105	1.657895	2.989474	5.531579
SCALE33	-5.084211	10.96842	-1.594737	-2.773684
SCALE34	37.98684	9.976316	3.986842	5.436842
SCALE35	28.94211	6.198684	1.885526	9.476316
SCALE36	20.51316	1.847368	1.342105	3.636842
SCALE37	5.952632	4.621053	-1.326316	-2.478947

	SCALE29	SCALE30	SCALE31	SCALE32
SCALE29	49.14474			
SCALE30	31.48026	65.46711		
SCALE31	14.42105	9.396053	32.89211	
SCALE32	8.572368	7.378947	8.543421	30.64605
SCALE33	-1.236842	-11.82632	4.800000	8.463158
SCALE34	23.83553	29.64474	22.10132	12.92237
SCALE35	26.61842	32.96974	9.378947	5.140789
SCALE36	11.55921	8.921053	14.10395	9.496053
SCALE37	-1.578947	.9052632	18.21053	-5.800000

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	SCALE33	SCALE34	SCALE35	SCALE36
SCALE33	60.21053			
SCALE34	1.268421	46.44079		
SCALE35	-5.552632	24.05132	28.98684	
SCALE36	5.589474	9.125000	9.911842	38.41447
SCALE37	6.310526	6.336842	-2.084211	28.54211

	SCALE37
SCALE37	55.85263

APPENDIX H

Pooled Within-Groups Correlation Matrix

	SCALE1	SCALE2	SCALE3	SCALE4	SCALE5	SCALE6	SCALE7
SCALE1	1.00000						
SCALE2	.56529	1.00000					
SCALE3	.51799	.61330	1.00000				
SCALE4	.09893	.00334	.00889	1.00000			
SCALE5	-.02250	.15229	.25106	.08924	1.00000		
SCALE6	-.15114	-.26646	-.14305	-.08982	-.13361	1.00000	
SCALE7	.28184	.03906	.25300	.12992	.17398	.15388	1.00000
SCALE8	.19612	.13224	.00645	-.32728	-.00258	-.00706	.01141
SCALE9	.21139	.11732	.28174	.11729	.08864	.39304	.14645
SCALE10	.09488	.03402	.20678	.04162	.13444	.41943	.19055
SCALE11	.39810	.32076	.32286	.03801	.11857	.21662	.36441
SCALE12	.47122	.43674	.39611	-.05083	.09179	.13632	.15105
SCALE13	.16704	.25196	.21575	-.19267	-.04422	.13361	.42029
SCALE14	.11109	-.02921	.13121	.16246	.13305	.32286	.48570
SCALE15	.66446	.26440	.20610	-.05232	.01250	.14448	.28130
SCALE16	.52764	-.05989	-.07224	.15082	-.13757	.13636	.16311
SCALE17	.27472	.19707	.23566	-.09403	.10887	-.05375	.21892
SCALE18	.02209	.01101	.24011	.06812	.09318	.36010	.52679
SCALE19	-.01993	-.01741	.19518	.04974	-.06712	.46558	.47294
SCALE20	.47134	.22350	.29353	.17519	.34878	.05893	.37162
SCALE21	.19941	.06492	.29661	.18608	.27425	.31138	.36203
SCALE22	.03155	-.14369	.09551	.01278	-.08264	.55211	.35790
SCALE23	.28504	.17787	.14617	.09867	.32075	.19600	.31816
SCALE24	-.11513	-.06838	.03973	.16325	.32317	.33977	.41561
SCALE25	.47542	.32869	.12345	.03389	.24932	.15073	.35633
SCALE26	.23454	-.10229	.10828	.13909	-.17424	-.09095	.21025
SCALE27	.19440	.28106	.29013	.07310	.33095	.29051	.51444
SCALE28	.42980	.35114	.17031	-.07245	.26361	-.16804	.18138
SCALE29	.63568	.32287	.20797	.10089	-.04865	-.02961	.21018
SCALE30	.61252	.36419	.14391	.09351	.04087	-.18398	.08077
SCALE31	.50931	.06377	.23100	.16297	.15128	.20941	.35620
SCALE32	.27803	.03548	.09948	.00733	.34073	.08795	-.02040
SCALE33	.06138	-.33601	-.10413	-.21875	-.09473	.03191	.15828
SCALE34	.62309	.27807	.35915	.20311	.13838	.06768	.34543
SCALE35	.60797	.28572	.32078	.06087	-.00731	.08595	.32044
SCALE36	.21820	-.19668	-.09716	.24691	-.13668	.28951	.31166
SCALE37	.12573	-.22441	-.13190	.27763	-.03786	.05414	.29751

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	SCALE8	SCALE9	SCALE10	SCALE11	SCALE12	SCALE13	SCALE14
SCALE8	1.00000						
SCALE9	.11701	1.00000					
SCALE10	.02112	.86492	1.00000				
SCALE11	.02924	.37260	.48013	1.00000			
SCALE12	.02474	.47656	.53599	.72991	1.00000		
SCALE13	.27406	.35756	.38030	.39757	.48458	1.00000	
SCALE14	.14166	.56369	.52879	.29803	.23657	.26188	1.00000
SCALE15	.15708	.41353	.31820	.35400	.41073	.12435	.43143
SCALE16	.10989	.20496	.13290	.12110	.11929	-.16720	.20589
SCALE17	.06363	.12406	.25195	.51173	.51563	.14955	.14263
SCALE18	.03626	.24272	.25426	.20875	-.03222	.19243	.61064
SCALE19	-.03296	.30118	.25773	.12148	.01718	.31175	.55812

SCALE20	-.05729	.23115	.18375	.44172	.37771	-.12355	.26272
SCALE21	-.10909	.45666	.47321	.28857	.14953	-.08224	.56322
SCALE22	-.06298	.28469	.26574	.17262	.07065	.15452	.56232
SCALE23	-.05419	.19178	.15545	.38769	.10501	-.17399	.30132
SCALE24	-.06238	.19394	.11586	.15375	-.10537	.04901	.45116
SCALE25	.02516	.23871	.16570	.37419	.25247	.08805	.12825
SCALE26	-.03143	.02118	-.02647	.11597	.02271	-.22018	.30738
SCALE27	-.00846	.37426	.40720	.49553	.22674	.28036	.48080
SCALE28	.12467	-.16669	-.09925	.03319	.25648	-.03277	-.00051
SCALE29	-.03726	.00639	-.08418	.15316	.08849	-.24614	.09895
SCALE30	-.07432	.09759	.01994	.13687	.31615	-.05977	.16343
SCALE31	-.14029	.35576	.42151	.56014	.42281	.08930	.25370
SCALE32	.22685	.23456	.29311	.19455	.05342	-.22768	.28962
SCALE33	.28879	.03260	.00700	.00894	-.13188	-.01545	.17835
SCALE34	-.00533	.31796	.26103	.45699	.28053	.01747	.42816
SCALE35	-.05164	.13298	-.00804	.12362	.16344	-.17163	.31502
SCALE36	-.25029	-.04466	.01849	.07751	-.16831	-.21401	.00490
SCALE37	-.27108	-.23317	-.12543	.09457	-.06044	-.00725	-.09236

	SCALE15	SCALE16	SCALE17	SCALE18	SCALE19	SCALE20	SCALE21
SCALE15	1.00000						
SCALE16	.53241	1.00000					
SCALE17	.10000	.12942	1.00000				
SCALE18	.19795	.16720	.08371	1.00000			
SCALE19	.08309	.13646	.05196	.84741	1.00000		
SCALE20	.42864	.54423	.31326	.11642	.04337	1.00000	
SCALE21	.37413	.11942	.14461	.32057	.32902	.41272	1.00000
SCALE22	.24963	.31101	.06038	.77377	.86572	.12377	.43526
SCALE23	.44143	.13705	.20725	.26784	.11742	.41838	.54523
SCALE24	.12296	-.00193	-.10175	.50654	.45303	.11022	.39654
SCALE25	.60641	.24289	.06876	.02847	-.03666	.54107	.47777
SCALE26	.23834	.27321	.00354	.18952	.18226	.19620	.26566
SCALE27	.38745	.03372	.01241	.44193	.37270	.33237	.55618
SCALE28	.38545	.28653	.24571	-.11678	-.10648	.43518	.24250
SCALE29	.53917	.43750	.24689	.11955	.02020	.46015	.37092
SCALE30	.66999	.44449	.06064	-.08394	-.04884	.44177	.22878
SCALE31	.56667	.38014	.37411	.14537	-.00938	.43947	.34442
SCALE32	.32746	.38301	.20455	.12360	-.01919	.25666	.55576
SCALE33	-.03863	.21367	.30399	.19600	.23472	-.02313	.06315
SCALE34	.69949	.54469	.05377	.35276	.19681	.56117	.47960
SCALE35	.64135	.49248	.03973	.14974	.12784	.61806	.46653
SCALE36	.27585	.34864	.02992	.12890	.13687	.24434	.30479
SCALE37	.14984	.08732	.00876	.14719	.06292	-.04009	-.13447

	SCALE22	SCALE23	SCALE24	SCALE25	SCALE26	SCALE27	SCALE28
SCALE22	1.00000						
SCALE23	.18190	1.00000					
SCALE24	.50284	.48568	1.00000				
SCALE25	.01677	.47318	.15104	1.00000			
SCALE26	.23583	.11066	.14122	-.03479	1.00000		
SCALE27	.34470	.60560	.56802	.48851	.05466	1.00000	
SCALE28	-.08847	.24756	-.10414	.41865	.02881	.10980	1.00000
SCALE29	.08044	.59975	.08342	.53247	.27970	.26609	.42829
SCALE30	-.03347	.22317	-.15026	.45115	.16308	.12624	.62878
SCALE31	.19070	.27722	.12509	.53652	.15884	.29280	-.03436
SCALE32	.21539	.46187	.17776	.21469	.06308	.32371	.29345
SCALE33	.28763	-.12606	.06644	-.06730	.29773	-.12320	-.10498
SCALE34	.28254	.36891	.13019	.57254	.30834	.35070	.23430

SCALE35	.16372	.38304	.08537	.55214	.24250	.20993	.51690
SCALE36	.23284	.30533	.15469	.33994	.06278	.12980	.17232
SCALE37	.11239	-.03841	.00917	.08181	.13024	-.10638	-.09741

	SCALE29	SCALE30	SCALE31	SCALE32	SCALE33	SCALE34	SCALE35
SCALE29	1.00000						
SCALE30	.55499	1.00000					
SCALE31	.35868	.20248	1.00000				
SCALE32	.22089	.16474	.26909	1.00000			
SCALE33	-.02274	-.18837	.10786	.19702	1.00000		
SCALE34	.49893	.53763	.56549	.34254	.02399	1.00000	
SCALE35	.70525	.75684	.30374	.17248	-.13291	.65552	1.00000
SCALE36	.26604	.17789	.39678	.27676	.11622	.21604	.29703
SCALE37	-.03014	.01497	.42487	-.14019	.10882	.12442	-.05180

	SCALE36	SCALE37
SCALE36	1.00000	
SCALE37	.61619	1.00000

APPENDIX I

Vita

Georgia A. Carpenter
6451 S.E. Morrison Ct.
Portland, OR 97215
503-238-3766

Educational Background

Doctoral Candidate in Clinical Psychology, Western
Conservative Baptist Seminary, Portland, Oregon.

M.A. in Clinical Psychology (June, 1983). Western
Conservative Baptist Seminary, Portland, Oregon.

B.A. in English (June, 1968). Loma Linda University,
Riverside, California.

Counseling Background

1985/86: Western Psychological Counseling Services
Center, Portland, Oregon. Half-time internship in out-
patient counseling center serving adult, family, and
child populations. Approximately 1000 hours.

1984/85: Portland Adventist Medical Center, Portland,
Oregon. Half-time internship on in-patient psychiatric
unit. Experience on locked and open units as well as
eating disorders unit. 1560 hours.

1982/83: Various supervised practicum settings in the
Portland, Oregon area. Experience with geriatric,
adolescent and child, as well as adult clients. 832
hours.

Vocational Background

1985/86: Western Conservative Baptist Seminary.
Graduate Assistant supervising Masters level practicum
students.

1980/82: Portland Adventist Medical Center. Office
manager and forms analyst.

1976/79: Modern Cleaners/Drapery Magic. Owner and operator.

1971/76: Loma Linda University Medical Center. Unit manager and department secretary.

1968/70: Riverside California and Pottstown Pennsylvania school districts. High school English teacher.

Psychometric Background

Beery Developmental Test of Visual Motor Integration
Bender Gestalt Test for Young Children
Children's Apperception Test
Edwards Personal Preference Schedule
Frostig Developmental Test of Visual Perception
Frostig Movement Skills Test Battery
Illinois Test of Psycholinguistic Abilities
Interpersonal Behavior Survey
Luria Nebraska Neuropsychological Battery, Forms I, II
Luria Nebraska Neuropsychological Battery for Children
Minnesota Multiphasic Personality Inventory
Nebraska Neuropsychological Evaluation
Personality Inventory for Children
Rorschach
Spache Diagnostic Reading Scales
Stanford Binet Intelligence Scale
Thematic Apperception Test
Wechsler Adults Intelligence Scale - Revised
Wechsler Intelligence Scale for Children - Revised
Wechsler Preschool and Primary Scale of Intelligence
Wide Range Achievement Test

Currently receiving instruction in the Halstead- Reitan Neuropsychological Battery.