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ABSTRACT

A study examined the identification of distinct subgroups of learning-disabled young adults based on their ability to generate written language. Two subgroups of learning-disabled college students, the language strong/visually weak (N=22) and the visually strong/language weak (N=10), were identified based on evaluation of 32 essays. Subjects were then given the Wechsler Adult Intelligence Scale-Revised (WAIS-R) and the Test of Adolescent Language (TOAL). Analysis indicated that the visually strong/language weak subjects earned significantly higher scores in such areas as object assembly, visual motor spatial, visualizing the whole, and sequencing; the language strong/visually weak subjects earned significantly higher scores in the areas of information, vocabulary, comprehension, speaking, writing, expressive language, and concept score. For the language strong/visually weak subgroup there was almost a two-point difference between the vocabulary and grammar subtest scores on the TOAL, indicating the language strength of this group is in semantics. The visually strong/language weak subgroup earned scores at the mean or above on all non-language subtests of the WAIS-R; on language subtests these subjects scored below the mean. Suggestions for further study are offered. Data and statistical analyses are provided in an appendix. Contains 60 references. (RM)

SUBGROUPS OF THE LEARNING DISABLED COLLEGE STUDENT - AN ANALYSIS OF WRITTEN LANGUAGE AND TESTING

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Introduction

Statement of the Problem

Since the beginning of human history it has been the task of one generation of humans to attempt to transmit its acquired knowledge and experience to another generation. This has taken place in the family, the tribe, the community. As various societies have become larger and more complex specific social institutions have been created (schools) to carry out this task. Regardless of where this process of learning and teaching has taken place, it has been noted that some learners (students) appear to acquire the knowledge and experience easier than others. Historically, this phenomenon was attributed to differences in intelligence.

In this century, with the development of more sophisticated instruments we have come to question any easy correlation between learning and intelligence. A group of learners who are not doing well in the regular school setting, but who seem intelligent have been identified. This group has great difficulty maintaining interest in and carrying out tasks that require reading, writing, listening or speaking.

These learners are often told that they are "lazy", "unmotivated", "uncooperative", "unresponsive" or even worse, "stupid". The list of negative and damaging terms is extensive. The message to these people is clear--they should be doing better.

These students are not "lazy", "unmotivated" or "stupid". What their parents and teachers observe is their difficulties learning, not their inability to think or desire to learn. In other words, they are learning disabled.

The area of education that seeks to serve this group of people (among others) is called Special Education. This area has become a major focus of public discussion, legislative action, research, and concern by parents and teachers over the past twenty years. More specifically, much recent interest has been centered upon the understanding of and remediation of individuals with "specific learning disabilities". It is in this area of education that this study seeks to explore.

From the observation that there are intelligent, motivated students who have problems learning has come a standard definition of learning disabilities. The National Advisory Committee on Handicapped Children (Lerner, 1971) defines the learning disabled individual as a person who:

> exhibits a disorder in understanding or using spoken or written language. These may be manifested in disorders of listening, thinking, talking, reading, writing, spelling or arithmetic. They include conditions which have been referred to as perceptual handicaps, brain injury, minimal brain dysfunction, dyslexia, developmental aphasia, etc. They do not include learning problems which are due primarily to mental retardation, emotional disturbance or to environmental disadvantage.

The above definition appears to be a definition by exclusion. By this it is meant that those individuals who are learning disabled are those who do <u>not</u> fit into other categories describing the handicapped. The definition then allows for the possibility that the learning disabled are a heterogeneous group. It is the purpose of this study to try to delineate specific subgroups of this population. Identifying subgroups

can assist the language learning disabled individual to understand himself/ herself as a learner and to provide educators with a framework to address specific needs.

When we discuss the notion of a learning disability we are not talking about differences in learning style. The exciting research of people such as Rita Dunne (1981), Howard Gardner (1983), B. McCarthy (1981) and Gertrude Webb (1983) are demonstrating that people develop different learning preferences or learning styles. Learning style means that an individual may prefer to learn in a certain way (i.e., verbally), but when necessary, he/she can learn in another style (i.e, visually). This flexibility is what the learning disabled individual does not have. For the learning disabled person, when the information is not presented though the preferred channel(s), he/she experiences great difficulty learning.

While there are important differences between types of learning disabled persons, they all share a common problem, namely, a problem with written and/or spoken language. As we move more and more into what is now called the "information age", it is more important to understand one of humanity's chief means of dealing with information--language. This stress on the importance of language begins in our schools. "Those who have left-brain language competencies currently fare better in our schools; that the left brain is the preferred brain in school learning." (Webb, 1983).

Society demands greater and greater proficiency in oral and written language. The reason for this may be more than just bureaucratic. The observations of Alexander Luria (1982) acquire more and more relevance:

> Written language is an important device in

thought processes. Written speech becomes a useful means for clarifying thinking because it involves conscious operations with linguistic categories. These can be carried out at a far slower rate of processing than is possible in oral speech, and one can go over the product several times.

It is therefore obvious why we often utilize written speech not only to convey prepared information, but also to process and clarify our thinking. The idea that it is often best to put things down in writing in order to make oneself clear is completely sound. This is precisely why written speech is of enormous significance for processing thought. It represents work performed on the mode and form of an utterance. . . . . it is a complex form of analytical activity, in which the logical structure of thought itself is the basic object.

Since problems with language (especially written language) characterize the learning disabled, and since language appears to be intimately related to our thinking processes; it seemed relevant to look at the writing of the learning disabled population in order to obtain a greater understanding of the nature of the learning disability. To be able to delineate particular patterns (subgroups) of thinking or learning based on evaluation of written language could be an important part of trying to understand the learning disabled person and to find effective means of addressing his/he educational, social, and counseling needs. This was the rationale behind this study.

The focus of this study was on identifying distinct subgroups of learning disabled young adults based on their ability to generate written language.

Review of the Literature

Once an individual is determined not to be performing up to an appropriate level (usually in school)
he/she is referred for further evaluation. Central to determining if a learning disability is present, is determining the person's level of intellectual functioning. The learning disabled person (by definition) possesses at least average intelligence. This is a critical delineating factor which helps to identify the learning disabled from other disabled persons (i.e., mentally retarded, educationally deprived). In addition, the instrument used to determine the person's level of intellectual functioning is often used to determine the existence of a learning disability itself.

The Stanford-Binet is one of the earliest tests of intelligence. It was used on many groups but became the test used to measure Strauss Syndrome--the brain injured population. Strauss (together with Lehtinen) made clear his definition of brain injury. "A brain injured child is a child who before, during, or after birth has received injury to or suffered an infection of the brain." He further indicated that this child may show disturbances in perception which prevent or impede normal learning processes so that special educational methods are needed.

In Alan O. Ross' book, Learning Disability, the author notes that Strauss' statement was "turned on its head such that perceptual problems were viewed as brain injury. One of the suggestions from Strauss, Kephart and Lehtinen was to give brain-injured children perception-motor exercises to help their visual perceptual difficulties. The logic was that if brain damage interfered with perception, then perceptual training would benefit the child.

When the Wechsler Scales (WAIS-R, WISC-R) became popular, they, too, were used to identify the brain-injured population or Strauss Syndrome group. From the term "brain injured" evolved the terms "minimal brain injured", "minimal brain dysfunction" and, finally, "learning disabled". Some psycho-educational reports still use these other terms.

While it may seem clear why the Wechsler Scales were used to determine if the individual possessed at least average intellectual functioning, it is not clear how the test results became used to determine the existence of a specific learning disability. The following excerpts from psychological reports were submitted by psychologists and learning disabilities specialists in hospitals, counseling centers and private practice. In their reports on students who are applying to the Curry College program for learning disabled college students indicate they use the results of the WISC-R or WAIS-R in this way.

Summary I:

> Although M's performance was within the average range for both scales and the scales are essentially identical, there is a great deal of sub-test scatter and both the scatter and the nature of the errors made reflect the presence of a specific learning disability. Her lowest scores were on the subtests which are related to her dyslexia. On Information she had difficulty with questions involving numbers and direction, but did well when reasoning (dark/light clothes, yeast), curriculum (Shakespeare) or people involved. On Arithmetic she had difficulty visualizing the numerical information and doing the mental computation without benefit of paper, but until the final items understood the process involved. On Object Assembly she identified each object within seconds but manipulating the pieces slowed her and perseveration on the final item stymied her.

Her poor fine motor control also slowed her on Digit Symbol. She worked accurately but slowly. After the test she commented that she had to double check so that she would not draw the symbols backwards or upside own. On the recall test of Digit Symbol she flipped two figures, although she was able to match numbers and symbols. On Vocabulary M had difficulty defining some words, although she could use them in a sentence. Her definitions were often circuitous. Although her performance of Digit Span was average, she transposed number when seven were given forward and five backward.

Summary II:

N appeared to be a highly motivated, attentive and eager learner. The discrepancy in his verbal and performance IQs and the wide scatter in his scores (ranging from a scaled score of 6, Arithmetic, to 17, Block Design) would attest to the problems attendant to a youngster with a learning disability. His positive attitude to overcome his deficiencies will go far in helping him maximize his intellectual potential.

Summary III:

On the WAIS-R, with a chronological age of 18 years, 5 months, C demonstrated a relatively even pattern of learning. He obtained a Verbal IQ of 101, a Performance IQ of 100, and a Full Scale IQ of 102 which is in the average range. Some questions arise, however, as to the quality of his performance. It is the impression of this examiner that despite the lack of a discrepancy between C's Verbal and Performance scores there seem to be a particular area of weakness in his cognitive functioning. His significantly lower subtest scores in Block Design, Digit Symbol, and his poor backward recall of digits suggest weakness in visual perception. Such a weakness would require careful planning of his course work in college and possible supplemental support for

learning. Anxiety may further intrude upon C's capacity to function when confronted with visual perceptual tasks.

Underlying the use of a standardized IQ test such as the WAIS-R are the assumptions one holds about intelligence itself. This is an area of much research and debate in Psychology and Education. Much of this debate centers around the understanding of whether intelligence is a general or global ability of which an individual possess varying levels; or rather, there exists intelligences which an individual has that explains human ability, learning style or learning disability. David Wechsler represents the first view of intelligence and Howard Gardner represents the second.

While it is certainly not within the scope of this study to resolve this debate, it is important to note the assumptions that are underlying the testing instruments used. As David Wechsler (developer of the WAIS-R) assumes:

> Intelligence is multifaceted as well as multi-determined. What is always called for is not a particular ability but an overall competency or global capacity, which in one way or another enables an individual to comprehend the world and to deal effectively with its challenges. Intelligence is a function of the personality as a whole and is responsive to other factors beside those included under the concept of cognitive abilities. Intelligence tests inevitably measure these factors as well. (Wechsler, 1975)

With this understanding of intelligence being assumed, it would seem clear why the WAIS could be used to determine the basic global ability of the person as

well as being able to indentify some of the factors that come together to make up this ability.

The same understanding that a person could be intelligent, but possess some form of disability is implied by Howard Gardner who ascribes to a more multiple view of intelligence. Rather than a series of skills, components and processes that in various ways integrate together to form a global sense of intelligence, Gardner sees individuals who possess a particular "intelligence." He describes seven basic intelligences: Linguistic, Musical, Logical-mathematical, Spatial, Bodily-Kinesthetic and the Personal ones (Intrapersonal and Interpersonal). Even with this understanding of intelligence, Gardner is aware that there are individuals who are of normal intelligence but who possess some type of disability. As he notes:

> Even as certain individuals appear blessed with at least one core component of logical-mathematical aptitude, those of otherwise normal abilities show selective weakness in the numerical realm. Some of these may well have a selective numerical difficulty, akin to the difficulties exhibited by many children with written language (dyslexics) and by a far smaller number, with spoken language (dysphasics). (Gardner, 1983)

The existence of the learning disabled as a population and the existence of subgroups within that population cannot not be explained by one's view of intelligence. To ascribe to a global or a multiple view of intelligence does not exclude the possibility that there are individuals who are intelligent, but who cannot seem to produce work on the level of their ability. Furthermore, in many instances it is inaccurate and unfair to explain this gap between

ability and performance in terms of personality dysfunction or lack of desire to learn. Thus, the category of learning disabled persons has been identified.

Almost from the beginning, psychologists and educators have attempted to come up with a more precise description of the population. Proceeding from the basic view that all learning disabled individuals possess average and above average intelligence and are experiencing significant difficulty in school related tasks; these professionals have continuously sought ways to identify and describe subgroups within this population.

Perhaps the first piece of research was that of Kinsbourne and Warrington (1963) at the National Hospital in London. They divided into two groups children who had been referred to them for reading backwards. They divided the children based on their results on the WISC and WAIS. One group (A) had a 20 point difference between the Verbal and Performance scores with the Verbal score being higher. The other group (B) had score in which the Performance IQ was 20 points higher.

The results showed that there was a clear difference between both groups other than the difference in Verbal/Performance IQ. Group A exhibited delays in speech acquisition, verbal comprehension and verbal expression. The B group exhibited finger agnosia, significant retardation in right-left orientation and difficulties in arithmetic. As Kinsbourne and Warrington noted (1963):

> Insofar as the acquisition of reading and writing skill is a complex procedure, involving a variety of cerebral functions, it is not surprising to find that retarded development of one or other of the

functions subserved by the cerebral hemisphere may delay this acquisition, and do so in different ways, depending upon the exact nature of the function which is insufficiently developed.

Johnson and Myklbust (1967) in their research identified two distinct dyslexic subgroups. They described one group as Auditory Dyslexics who experience difficulty in remembering auditory symbols and in stringing them together into sequences. The other group they named Visual Dyslexics characterized by deficits in perception and memory with subsequent visual discrimination problems leading to confusion of letters and words that look the same. These dyslexics seem to make discriminations, but they make them slowly.

Another contribution to delineating subgroups of individuals with learning problems was that of Elena Boder (1970, 1971, 1973a, 1973b). Her hypothesis was that one could identify subgroups of dyslexic readers in terms of reading-spelling performance. She utilized the Stanford-Binet intelligence test, the Wide Range Achievement Test (WRAT) as well as a measure of the percentage of correct spelling of sight vocabulary the individual could produce.

Boder identified three subgroups of dyslexics using this approach. The first group she called the Dysphonetic Dyslexia group. This group reflected a primary deficit in letter-sound integration as well as the ability to develop phonetic skills. One of their most striking errors is what would be called semantic substitutions such as *funny* for *laugh*.

The second group she called the Dyseidetic Dyslexia group. She characterized this group as having a primary deficit in their ability to perceive whole words as gestalts. These children can read

phonetically and their misspellings are phonetic, such as *laf* for *laugh*.

The third group that Boder noted she called the Alexia group. The primary deficit of this group consisted in the ability not only to develop phonetic-word analysis, but also had difficulty in perceiving letters and whole words as visual gestalts. This group she contended is the most severely handicapped.

Mattis and his colleagues (Mattis, 1978, Mattis, et. al., 1975) have also carried out research which has elaborated various subgroups of dyslexics. In the research three distinct groups were identified. One group was called the Language Disorder group, the second, the Articulatory and Graphomoter Dyscoordination group, and thirdly, the Visual-Spatial Perceptual Disorder group.

Standardized instruments were used to identify each of the subgroups. A 10 point Wechsler Verbal IQ higher than Performance IQ was used to partially delineate the Visual-Spatial Perceptual group. In the follow-up study in 1978 done by Mattis, this time using a larger and younger population which was also Black and Hispanic, he identified the same three distinct sub- groups.

Pirozzolo (1979, 1981) also conducted research in which he established the existence of subgroups of dyslexic individuals. His research identified two distinct groups defined as follows:

Auditory-Linguistic Group

1. Average to above Average WISC IQ
2. Low Verbal WISC IQ (relative to Performance IQ)
3. Devlopmentally delayed language onset.
4. Expressive speech defects
5. Anomia, object-naming, or color-naming defects
6. Agrammatism

7. Reading errors mainly inovlving the phonological aspects of language
8. Spelling errors characteristic of poor phoneme-to grapheme correspondence
9. Letter-by letter decoding strategy
10. Normal eye movements
11. Relatively intact visual-spatial abilities.

Visual-Spatial Group

1. Average to above average WISC Verbal IQ
2 Low Performance WISC IQ (relative to Verbal IQ)
3. Right-left disorientation
4. Early evidence of preference for mirror or inverted writing.
5. finger agnosia
6. Spatial dysgraphia (poor handwriting, poor use space)
7. Reading errors involving visual aspects.
8. Spelling errors characteristic of letter and word reversals, omissions, etc.
9. Using of a phonetic decoding strategy
10. Faulty eye movements during reading
11. Oral language abilities relatively normal

Pirozzolo's work represents an attempt to evaluate learning disabled individuals in a comprehensive manner. His work included an analysis not only using the WISC-R, the Raven Progressive Matrices, but also a full neurolinguistic analysis of reading and writing errors.

In a recent study (Holcomb, Mardesty, Adams, & Ponder, 1987) the WISC-R profiles of 119 children from five separate learning disabilities programs were placed in six homogeneous groups using a statistical cluster analysis. Along with the WISC-R scores achievement test scores [Peabody Individual Achievement Test (PIAT) and the Comprehensive Tests of Basic Skills (CTBS)] were also included. The resulting groups are summarized as follows:

Type A. children obtained the lowest scores of all types on all achievement tests but especially in reading comprehension (PIAT) and math computation (CTBS). This pattern of scores may indicate the presence of some type of aphasia or reading disability.

Type B children, in contrast have slightly higher scores on verbal subtests (Mean = 7.5) compared to performance (Mean = 7.2) In terms of Bannatyne's recategorizaton, this group scored high in verbal comprehension but lowest in spatial abiltity. The especially low scores on Block Design and Object Assembly might suggest the presence of a deficit in visual imaging or apraxia. The relatively high verbal comprehension scores enable these children to accurately assess their inability to keep up with their peers and thus they may be high risks for emotional problems as a result of their learning problems. . . .

Type C subjects have slightly above average WISC-R scores on both the verbal (Mean = 10.3) and performance (Mean = 11.4) subtests. Bannatyne's recategorization scores show these children to be most skilled in spatial ability, with lowest scores in sequencing ability and acquired knowledge. . . .These profiles, however, resemble the ACID pattern (lower scores on Arithmetic, Coding, and Information, with the Digit Span missing) as described by Kaufman (1979) and may represent a group of sequencing and attentional deficit children.

Type D children have below average scaled scores on both verbal (Mean = 8.5) and preformance (Mean = 8.5) subtests. Their lowest scores are Picture Arrangement, Block Design, and Arithmetic, which could indicate poor visual-imaging capacity. . . .In general, their achievement scores seem to be consistent with their low intelletual functioning.

Type E subjects have below average scores for both verbal (Mean = 8.5) and performance (Mean = 9.4) subtests. According to Bannatyne's recategorization scores, they are most skilled at spatial ability and least capable in sequencing ability, as indicated by their very low score on Coding. Their verbal comprehension is also low. These

> individuals are most likely to have difficulties in verbal activities but may function quite well in motor or mechanical skills where novel complex sequencing is not required. . . . These children seem to have below average IQ scores and achievement consistent with abilities. A classification of these children as LD may not be accurate.
>
> Type F profiles have WISC-R scores in the bright normal range of mental abilitiy with verbal scores (Mean = 13.3) higher than performance scores (Mean = 10.6). These children have high scores in all of Bannatyne's categories with verbal comprehension being the highest. They score above average on almost all of the achievement tests. . . . Type F profiles seem to be similar to WISC-R patterns of LD children with superior intelligence. Schiff, Kaufman, and Kaufman (1981) describe these children as having excellent verbal comprehension and expression skills but evidencing relative weaknesses in sequencing and motor coordination activities.

Schiff, Kaufman, and Kaufman (1981), while not attempting to delineate subgroups, carried out a WISC-R analysis on thirty children who "evidenced superior intelligence on the verbal and /or nonverbal spheres but who manifested learning difficulties and demonstrated the behavioral and clinical characteristics associated with the minimal brain dysfunction syndrome." These children exhibited extremely strong skills in verbal comprehension, expression, and conceptualization. On the other hand, these children demonstrated marked deficiencies in the area that has been defined as Sequencing (Bannatyne Score) and distractability (ACID). The pattern of strengths and weakness found by Schiff, Kaufman and Kaufman could be seen to be characteristic of a particular subgroup of the LD population.

Cordoni, O'Donnell, Ramaniah, Kurtz, and Rosenshein, 1981) compared the WAIS profiles of 57 young adults in a special college learning disabilites

program with a control of non LD young adults. Their results indicated that the LD students differed from the control group in that the LD students consistently had significantly lower scores than the control group on the Information, Digit Span, and Digit Symbol (Coding) subtests. Furthermore, "Bannatyne's Sequential factor also discriminates between these groups." One could see in these results the subtest scores that could identify not only the LD population in general, but the characteristics of a particular LD subgroup.

An ERIC search, both educational and psychological, showed that there was no research studying the relationship between written language and the subtests scores of the WAIS-R. It appeared that the only learning disabled groups researched were reading disabled and these were compared with the mentally retarded, physically handicapped, physically brain injured, veterans, and psychiatric cases. It was decided that that type of data was not particually relevant to the population that is the focus of this study.

This review has established three points. First, standardized measures of intelligence have been used not only to determine cognitive abilities, but to indicate the presence of learning disabilities. Secondly, the presence of a learning disabled population and subgroups within it cannot be explained by one's view of intelligence. Thirdly, there exists research which sought to identify subgroups of the learning disabled.

Most of these studies have made use of measures of intelligence-usually the WISC-R or WAIS-R.

In all of the studies reviewed, measures of intelligence, standard measures of reading and spelling were used to identify the subgroups. In none of the

studies was a writing sample used to establish the subgroups. Being able to generate language in written form is considered an important abilitiy in our schools and in our society. It is also a skill with which most of the learning disabled have a great deal of difficulty. If at least two distinct groups of learning disabled can be identified by their writing, then an analysis of the formal testing of each of these groups could identify learning strengths and weaknesses characteristic of each group.

This type of information will be of great practical value to those who assist the learning disabled. Such information can be useful to learning disabilities specialists and classroom teachers efforts to develop specific techniques to improve the written language ability of the learning disabled.

Hypotheses I

1. The use of the WAIS-R and TOAL will identify subgroups of the learning disabled population.

The WAIS-R not only measures global ability, but also identifies and measures processes, skills and components of the learning process. Differences in these processes will identify each of the subgroups.The TOAL is an instrument used to measure an individual's ability in language. If, by definition, a learning disability affects the individual's ability with language, then an instrument that measures strengths and weaknesses in language would also assist in the identification of distinctive LD subgroups.

The study to be reported was an attempt to provide evidence supporting the belief that among the learning disabled there are at least two subgroups.

Method

Sample Source

Students were selected for this study from a college with a program that services the learning disabled. These students all have been determined to have average or above average thinking skills and some specific learning problem. The WAIS-R measure of intelligence is an instrument used to assess thinking skills. This is usually administered during the student's senior year of high school. The Test of Adolescent Language (TOAL) was administered during the summer after high school graduation and before the beginning of the freshman year of participation in the college remedial program.

Establishing the Sample Groups

The sample groups were established by evaluating essays. The students had been asked to write an essay the length of at least one side of a sheet of lined paper. The students were asked to describe an experience or a hobby they enjoyed.

Two instructors who work with college age learning disabled students evaluated 39 essays using the following criteria:

1. Length of essay (total number of words)
2. Number of sentences(total number)
3. Variety of words (type-token test)
4. Organization (paragraphing more than once in the essay, relationship of ideas within paragraphs.

Both instructors categorized 32 of the 39 students' essays the same way (i.e., 82% inter judge agreement).

Two groups were established. One group was identified as the the Language Strong/Visually Weak group and the other was identified as the Visually Strong/Language Weak group. Three students were not assigned to either group. It appeared that these students had both areas of difficulty.

The group called the Language Strong/Visually Weak (22) had more words and sentences as well as a greater variety of words. Despite the quantity of language expressed, essays were disorganized.

This group has little trouble generating written language but great trouble organizing, i.e., paragraphing, connecting, and ordering ideas. This group is often described as " lazy" and "unmotivated". Their laziness is supposed to show itself in the disorganized way they approach their work, especially their writing.

The other group's essays, Language Weak/Visually Strong(10), contained fewer words, fewer sentences and fewer paragraphs. .This group also had less variety of words. The Visually Strong /Language Weak group has extreme difficulty generating written language. Individuals in this group usually do not talk or write a great deal. When they do write, their ideas may follow an order, but these ideas are not elaborated. Rather than perceiving these individuals as "slow" or even "stupid", it is hypothesized that this group of people approach the learning process in another way.

The following are the specific averages of each group:

Table I

Language Strong/	Visually Strong/

	Visually Weak	Language Weak
Number of words.	276	146
Number of sentences.	16.5	9.3
Number of paragraphs.	3.8	2.4
Type token test*	276/103	146/52.5

*The type taken test is a measure of the variety of words in a given piece of writing. It is expressed often as a fraction in which the numerator is the token (total number of words used) and the denominator is the type (or the number of different words used).

The following is an <u>excerpt</u> from an essay in the Language Strong/Visually Weak group in which the person describes the experience of being learning disabled:

> I am dyslexic and this effects many academic areas. Because I have diffeculty with reading I try to avoid it and most things that you need to learn inovlve reading. I have diffeculty expressing myself and this is very frustating. Due of the areas I hope to work on this year are my organizational and time management skills. I have diffeculty judging how long an assignment will take because I am constenlly rushing to do things. My strengths as a dylexic student gives me enough courge to overcome most of

my weeknesses. I have converdense in what ever I do and I realize that I'll be abie to accompiesh aii my goais as a student. I can control my anger like most dyslexic dy excelling in otheraspects. for example sports and music, However, I am a level headed man and can except my falts by trying to overlook them in a sencahummor. . . . .

The above excerpt contains a large number and variety of words. What can be noted is the frequent shifts in focus as the essay proceeds. He begins by talking about the fact that being dyslexic affects academic areas. In the next sentence he is talking about reading. Next, he is talking about expressing himself. These shifts of ideas within the piece are what is meant here by disorganization.

Note also that in the section presented there are at least three main ideas, but they are contained in one paragraph. Thus, the separation of the essay into main points with their supporting details into distinct paragraphs also reflects the disorganization of the this person's written language.

Another student from the same Language Strong/Visually Weak group concludes his description of his experience skiing as follows:

Once I it haffway however, I cought an edge at one of the gates. A blurr of snow flew up into the air and with a flailing of arms and skis I emerged amazingly with out missing a gate. I would however have to act quickly in order to stay in the course. I took a deep breath and edged hard to the left. With some chattering a cloud of snow I barlly got both skis around the gate From then on out my timing was compleately off. I never did regain the smoth side to side action that I had at the top of the run and consequently had to slow down and consequently had to slow down. After a terribly slow second half I came to the last gate and began skating towards the finish line. Once I was accross the finish line I stopped looked back and saw that I was a good

fifteen seconds behind the leaders. I slowly shook my head and ducked under the boundry rope - by the time i went down thre were no people at the bottom - and headed for the ski lodge. Thank heaven I finished my first and last ski race.

In the above essay, like the one before it, there is abundant and expressive language. Being a narrative which is from the person's own experience there is more connection between the ideas. This is like the first essay a lack of paragraphing that indicates the lack of organization of the written language.

The following are the responses of two students to the same question who were placed the the Language Weak/Visually Strong group. What follows is the <u>complete</u> essay of each while the preceding examples were <u>excerpts</u> from their essays.

The first example:

I've always enjoyed any form of music.

For many years, I've taken dancing classes from a very large professional school of dance. I especially enjoy peerforming in the year end recital.

I've participated in many music groups. I'm a menber of the M.A. S. concert choir which performs many concerts during the school year, especially over the Christmas season. Concert choir also presents a Christmas musical and a spring pops concert.

M.H.S. Drama club also presents a spring musical eachyear.I have had parts in such plays as "South Pacific" and "Guys & Dolls).

For several years, I belonged to the folk group at my church.

The above essay reflects the sparcity of language of the Visually Strong/Language Weak group. There are fewer overall words in the essay. There is also less variety in the words that are used.

The second example of the Visually Strong /Language Weak group follows:

The royal blue curtain open my heart was pounding. My mind flashed back memories of hard work I had done to make this performance run smoothly. Do to a busy schedule at school I decided to manage Orchesis a Jazz dance group, two days a week instead of dancing with the group five c ys. I didn't realize I would have to put in alot more time.

I had to find out aobut printing programs, tickets, advertizing, costumes, budjeting money. I had no experience with putting on a production but I learned fast. I think the hardest thing to do is making people work for me. The simplest thing like have students get money in on time would make a difference. I learned alot about people not just student but people in business. When the royal blue curtain closed I was so proud off the students and myself. All my hard work payed off.

This essay like the previous essay reflects a typical written language piece from the Visually Strong/Language Weak group. This essay is a bit more descriptive ("royal blue curtain", listing the tasks to be done, more expression of emotion "proud"), but there is still not the richness of expression and the amount of language of the Language Strong/Visually Weak group. Like the previous example, there is an attempt to paragraph the essay.

Once two groups were established, the following hypotheses were developed.

Hypotheses

1. The use of the WAIS-R and TOAL will identify subgroups of the learning disabled popuiation.

The WAIS-R not only measures global ability, but also identifies and measures processes, skills and components of the learning process. Differences in these processes will identify each of the subgroups.The

TOAL is an instrument used to measure an individual's ability in language. If, by definition, a learning disability affects the individual's ability with language, then an instrument that measures strengths and weaknesses in language would also assist in the identification of distinctive LD subgroups.

2. The WAIS-R Picture Arrangement and Digit Span scores for the Language Strong/Visually Weak group will be lower than the Language Weak/Visually Strong group. It would be assumed that PA and DS measure visual and auditory sequencing. This process is important in one's ability to organize which the Language Rich group appeared to have difficulty doing.

3. The TOAL Syntax (Grammar) score will be lower for the Language Strong/Visually Weak group than for the Visually Strong/Language Weak group. This would be assumed to be true since syntax requires an ability to sequence and ability to organize words into meaningful units.

4. The TOAL Expressive Language score, which is a general score measuring overall language production, will be higher for the Language Strong/Visually Weak group than for the Visually Strong/Language Weak group. Since the Language Strong/Visually Weak group can generate more language on paper than the Visually Strong/Language Weak group, it would be assumed that the Language Strong/Visually Weak group's ability to generate language in speaking, listening and reading would also be greater.

5. The Visually Strong/Language Weak group will have higher scores on the WAIS-R Digit Span subtest since this subtest measures skills and processes in organizing.

6. The Visually Strong/Language Weak group will have a WAIS-R Vocabulary score that will be lower

than the Language Strong/Visually Weak group, since the ability to generate language depends on vocabulary.

7. The Visually Strong/Language Weak group will have a lower score in the TOAL Semantics (vocabulary) than the Language Strong/Visually Weak group for the same reason as given in 6.

Factors Analyzed

The factors that were analyzed in this study were derived from two standardized tests. One was the Wechsler Adult Intelligence Test - Revised and the other was the Test of Adolescent Language.

The Wechsler Adult Intelligence Scale, Revised (WAIS-R) is a commonly used measure of intellectual ability which consists of eleven subtests which are grouped into six Verbal subests (Information, Digit Span, Vocabulary, Arithmetic, Comprehension, Similarities) and five Performance subtests (Picture Completion, Picture Arrangement, Block Design, Object Assembly, and Digit Symbol or Coding).

The Information subtest is an "index of one's exposure and ability to grasp information regarding general life experience and school learning. Additional factors are wealth of available information one possesses, alertness towards the social environment, and utilization of memory." (Tardor, 1983) The person is asked 29 questions verbally and is expected to respond verbally. Memory and language are major components that are measured here.

The Digit Span subtest requires the individual to repeat digits (lists of 3 to 9 digits) in the order that have been orally presented. The person first does them in exact order, then does another set of digits in reverse order presented. It is considered to be an "index of immediate recall reflecting one's attention

and retention span. This subtest also measures the individual's memory and the capacity to retain several elements that have no logical relatinship to each other. In addition, this is a measure of attention, concentratin, short term memory, and sequential mental responsiveness." (Tardor, 1983) The fundamental process that appears to be addressed in this subtest involves the ability to chunk and order auditory input without any linguistic support.

The Vocabulary subtest is a list of 40 words of increasing difficulty that are orally presented to the person. The examinee is expected to orally define the word. It is considered an "index of one's basic verbal development and ability in self expression. Highly dependent on the wealth of early educational experience, and the following factors: fund of verbal information, richness of ideas, word knowledge, memory, concept formation, language development, educatinal environment and experience." (Tardor, 1983)

The Arithmetic subtest is a series of 14 verbal arithmetic problems which are read to the person and which must be done by him/her without pencil or paper. It is an "index of numnerical reasoning and acuity, reflecting one's ability to concentrate and attend. Measures learned arithmetic skills, mental alertness, concentration, memory, and demands utilization skills that have been obtained during the educational process." (Tardor, 1983) It should be noted that the arithmetic problems are linguisticly presented and would also be reflective of the language strength of person. It would also require some ability to order and sequence information without any visual support.

The Comprehension subtest requires the examiner to present a series of 14 situations or "sayings". The person is then expected to explain how to resolve the situation or what the saying means. Comprehension is

an "index of comon sense and solution of practical social situations. Also a measure of cultural awareness, practical information, judgment, social probem solving, and the extensiveness of cultural opportunities and development of conscience and social mores." (Tardor, 1983). While the above is measured by this subtest, the examiner is receiving an indication of the person's expressive language capability. The person not only has to problem solve, but must develop a relatively elaborate and organized linguistic response rather than a simple one word answer or definition. With the sayings, the person has be able to move from literal meanings of words to more figurative meanings and abstract truth as well as express it in a linguistic form.

The Similarities subtest is a series of 13 word pairs that are presented to the individual. With each pair the person is asked how they are alike or similar. Similarities is an "index of verbal concept formation and abstract reasoning ability. Additional factors are language and word knowledge, perception of common elements of terms, comparison of the two elements and ability to recognize their relationship in a single concept." (Tardor, 1983). While the individual is asked to form language based concept it should be noted that an acceptable response need not be linguistically elaborate (more than on or two words).

In the Picture Completion Completion subtest the person is presented with a series of 21 cards that have an object or scene sketched on them. The person is then asked to identify what is missing but should be there in the picture. Picture Completion is an "index of visual concentration involving alertness to sort relevant from irrelevant details, and the basic perceptual and conceptual abilities which are involved in the visual recognition and identification of familiar

objects and forms. In addition this subtest measures concentration and visual alertness, visual organization, visual memory, perception, cognition and judgment." (Tardor, 1983)

The Picture Arrangement subtest requires the examiner to present to the person 8 series of pictures ranging from three in the series to six. Each series can be ordered, one after the other into a sequence of actions that tell a story--much like a cartoon strip. The person is given the frames in an incorrect order and he/she is asked to put the in the correct order. it is a timed task and extra points are given for speed. Picture Arrangement is an "index of visual organization involving sequential thinking and non-verbal reasoning. This subtest measures the capacity to anticipate, judge and understand the possible antecedents and consequences of events that are important in providing meaningful continuity in everyday experiences." (Tardor, 1983) The ability to visually sequence parts into a meaningful linear whole without any linguistic support is an important process measured by this subtest.

In the Block Design subtest the individual given first four blocks and later nine blocks. Each block is diagonally divided into a red half and white half on each side of the block. The person is then presented 11 designs made up of arrangements of the blocks. The first few designs consist of four blocks and the rest of nine blocks. The person is asked to look at the design and reproduce it with the blocks he/she has been given. It is a timed subtest and extra points are given for speed. Block Design is an "index of visual motor coordination, primarily dependent upon perceptual organizatin, manipulations, and perceptual speed. This subtest is also an indication of persistence, ability to integrate, perceive and analyze pattern. In addition it

is a test of ability to analyze the whole into its component parts, the perception of intricate relationshps. It is also a measure of the reproductive aspect of visual motor coordination." (Tardor, 1983) Thus, in order to be successful at Block Design, the person must be able to form a visual concept of the whole design (perception), break it down into its parts (visual analysis) and carry out (motor coordination) with the blocks a duplication of the design.

The Object Assembly requires the examiner to present to the person (in a designated arrangement) parts of 4 figures. He/she is then asked to rearrange the pieces into a whole figure--much like putting together a jigsaw puzzle. The task is also timed with extra points being awarded for speed. Object Assembly is an "index of perceptual motor integration. Although somewhat similar to Block Design, spuriously high scores may be obtained by trial and error. In addition, this subtest measures the understanding of the relationship of parts to the whole, persistence, visual motor coordination, the ability to grasp total patterns by anticipating the relationship among the individual parts." (Tardor, 1983). Thus, for a person to be successful in this subtest, he/she must not only be able to perceive the parts, but also develop a perception of the whole figure in order to carry out the rearragement of the pieces (visual-motor synthesis).

The Digit Symbol (also called Coding) subtest is a version of the code-substitution test which has often been included in nonlanguage intelligence scales. The key contains 9 symbols paired with the 9 digits. With this key before the person, he/she has 90 seconds to fill in as many symbols as he/she can under the numbers on the answer sheet. (Anastasi, 1976). Digit Symbol is an "index of visual-motor dexterity, coordination and acuity. Also, [it is] a measure of a

person's ability to learn and perservere at a repetitive and unfamiliar task.

Visual memory, symbol substitution, rote recall and visual-motor skills are also measured." (Tardor, 1983). In addition to the above, it should be noted that Digit Symbol is a measure of the person's ability to carry out a linear sequence of visual operations.

WAIS-R Recategorization Analysis

The WAIS-R subtests have been grouped into the Verbal and Performance categories. As evaluation and research has been conducted the subtests have been further recategorized and used to indicate learning skills, processes or abilities that can be useful to understand the person's learning. The following are 18 recategorizations that were used in this study. The first 14 recategorizations are more conceptually based. This means that empirical studies cannot be found to support them. The last 4 recategorizations are called the Bannatyne Scores which are empirically based (Henry & Wittman, 1981).

1. Visual Perception (Picture Completion & Picture Arrangement).
2. Visual-motor Spatial (Block Design & Object Assembly).
3. Attention (Digit Span & Picture Completion)
4. Attention and Concentration (Arithmetic, Picture Arrangement and Digit Symbol)
5. Concept Formation (Information, Comprehension, Similarities, Vocabulary, Picture Arrangement, & Block Design)
6. Abstract Thinking (Similarities, Vocabulary.and Block Design). Verbal & Non-verbal.

7. Visual Sequencing (Picture Arrangement & Digit Symbol).
8. School-like Tasks (Arithmetic and Digit Symbol).
9. Visualizing the Whole (Picture Arrangement and Object Assembly).
10. Auditory Immediate Memory (Arithmetic, Digit Span).
11. Remote Language Memory (Information, Comprehension, Similarities, and Vocabulary).
12. Attention to Visual Details (Picture Completion, Picture Arrangement and Object Assembly).
13. Environmental Experience (Information, Comprehension, Vocabulary, and Picture Completion). Strongly language based.
14. Auditory sequential memory (Digit Span).

"Bannatyne (1968) on the basis of factor analytic studies, suggested a formalized and empirically based system for interpreting subtest scatter on the WISC." (Henry & Wittman, 1981). He recategorized the WISC into the following abilities:

1. *Spatial Score.* This measures the ability to manipulate objects on three-demensional space. (Picture Completion, Block Design, Object Assembly).
2. *Conceptual Score.* This measures the ability to utilize concepts and engage in abstract reasoning. This category also contains subtests
that require a great deal of language ability. (Comprehension, Similarities, Vocabulary).
3. *Sequencing Score.* This measures the ability to retain and reproduce sequences of visually and

auditorily presented stimuli. (Digit Span, Picture
Arrangement, Coding).

Bannatyne (1968) noted:

> By comparing a child's Spatial Score with his Conceptualizing and Sequencing Score(s), one can obtain just that much more information as to where the child's deficits lie. Many Genetic Dyslexic children will obtrain a good spatial score and a poor sequencing score when these are compared with their over all ability, their deficit being more in auditory closure and sequencing.

Later on, Bannatyne (1974) suggested a fourth category:

4. *Acquired Knowledge Score.* This was to measure information that would have had to have been taught more formally to the person and seems to be related to his/her abilty with language.(Information,Arithmetic, Vocabulary).

The Test of Adolescent Language (TOAL) is an instrument used to evaluate a person's language ability which is a "highly reliable, multidimensional, nationally standardized, and experimentally validated." (Hammil, et. al., 1984) As the manual states, the TOAL has fourfold purpose:

1. to identify those students who are significantly below their peers in language proficiency and who as a result may profit from supplemental help.
2. to determine the particular kinds of language strengths and weaknesses that

individual students might possess.

3. to document students' progress in language as a consequence of special intervention programs.
4. to serve as a measurement device in investigations where researchers are studying the language behavior of adolescents.

The TOAL consists of eight subtests. These subtests measure the four basic modalities of language use: Listening, Speaking, Reading and Writing. Each modality has two subtests, one in Semantics and the other in Syntax. Built into the instrument are 10 recategorizations to further assess the students abilities.

Listening/vocabulary consists of 28 items and is a variation of the popular "point-to-the-picture-of-the-word-I-say" technique. The person has to select two pictures that mean the same as the word given from the four presented.

Listening/grammar consists of 35 items. The person is read three sentences and he/she is asked to select the two which express the same thought.

Speaking/vocabulary consists of 20 items. The individual is given a word and he/she is asked to make up a sentence using the word. The examiner writes down the sentence.

Speaking/grammar consists of 25 items. The person is read a sentence and is then asked to repeat the sentence word for word. It is a measure of the person's ability to syntactically chuck the sentence when listening to it.

Reading/vocabulary consists of 25 items. It is based on the notion that reading is involved primarily with constructed and relational meaning (Hammil, et.al. 1984). The person first reads three stimulus words which are related to a common concept. Second, from a list of four possible responses, the person then selects

the two words that are associated with the three stimuius words.

Reading/grammar consists of 20 items. It measures the individual's ability to recognize meaningfully similar but syntactically different sentence structures. (Hammil, et.al., 1984). The student is given five sentences to read. He/she then selects the two
sentences that most closely have the same meaning.

Writing/vocabulary consists of 24 items. The person has the word in front of him/her. He/she then writes a sentence using the word correctly. Like Speaking Vocabulary, the test focuses less on word definition (like the WAIS-R Vocabulary subtest) and more on the person's awareness of word classes.

Writing/grammar consists of 25 items. Its purpose is to "measure how well students utilize English syntax in their writing." (Hammill, et.al., 1984). It involves basicly a sentence combination process. The person is given a list of sentences, is told to formulate one complete and correct sentence with all the important elements of the list of sentences.

TOAL Recategorizations (Hammill, et.al., 1984)

1. Listening (listening/vocabulary & listening/ grammar). The ability to understand the spoken language.
2. Speaking (speaking/vocabulary and speaking/ grammar). The ability to express ones ideas vocally.
3. Reading (reading/vocabulary and reading/ grammar). The ability to comprehend graphic messages.
4. Writing (writing/vocabulary and writing/ grammar). The ability to to express thought in graphic form.

5. Spoken language (listening/vocabulary, listening/ grammar, speaking/vocabulary, speaking/grammar). The ability to understand and use speech as a means of communication.

6. Written language (reading/vocabulary, reading/ grammar, writing/vocabulary and writing grammar). The ability to read and write.

7. Vocabulary (listening/vocabulary, speaking/ vocabulary, reading/vocabulary and writing/vocabulary).

8. Grammar (listening/grammar, speaking/ grammar, reading/grammar and writing/grammar). The ability to
to understand and generate syntactic (and morphological) structures.

9. Receptive language (listening/grammar, listening/ vocabulary, reading/grammar, and reading vocabulary). The ability to comprehend both written and
spoken language.

10. Expressive language (speaking/vocabulary, speaking/grammar, writing/vocabulary, and writing/ grammar). The ability to use written and spoken language to communicate with others.

Results

Statistical Analysis

An analysis of variance (ANOVA) between both groups were conducted on WAIS-R and TOAL subtests and the recategorizations. All results are based on the standard significance level ($p = .05$ or less).

The following are the results of the analysis of the data on the Language Strong/Visually Weak group and the Visually Strong/Language Weak group. The listing of the raw data as well as the summary table of the statistical calculations are in Appendix A.

Visually Strong/Language Weak.

Significantly higher scores were found in the following:

1. Object Assembly (WAIS-R). F(df) = 4.75; p = .03.
2. Visual Motor Spatial (WAIS-R Recategorization). F(df) = 4.70; p = .03.
3. Attention and Concentrtion (WAIS-R Recategorization). F(df) = 4.59; p = .03.
4. Visual Sequencing (WAIS-R Recategorization). F(df) = 5.91; p = .02.
5. Visualizing the Whole (WAIS-R Recategorization). F(df) = 5.75; p = .02.
6. Sequencing (Bannantyne Recategorization). F(df) = 8.80; p = .005.

Language Strong/Visually Weak

Significantly higher scores by the Visually Strong /Language Weak group were found in the following:

1. Information (WAIS-R). F(df) = 6.64; p = .01.
2. Vocabulary (WAIS-R). F(df) = 5.59; p = .02.
3. Comprehension(WAIS-R). F(df) = 18.42; p = .0004.
4. Speaking Vocabulary (TOAL). F(df) = 9.86; p = .004.
5. Writing Vocabulary (TOAL) F(df) = 11.16; p = .002.

6. Speaking (TOAL). F(df) = 5.97; p = .01.
7. Writing (TOAL). F(df) = 4.72; p = .03.
8. Vocabulary (TOAL). F(df) = 7.54; p = .009.
9. Expressive Language (TOAL). F(df) = 7.30; p = .01.
10. School Acquired Information (Bannatyne Recategorization). F(df) = 5.05; p =.03.
11. Remote Memory (WAIS-R Recategorization). F(df) = 12.04; p = .001.
12. Enviromental Experience (WAIS-R Recategorization). F(df) = 11.30; p = .002.
13. Concept Score (Bannantyne Recategorization). F(df) = 11.11; p = .002.

Unexpected Results

1. The difference between Attention as measured by Digit Span and Picture Completion and Attention and Concentration as measured by Arithmetic, Digit Symbol and Picture Arrangement. Attention was not significantly different between both groups, whereas, Attention and Concentration was significant with the Visually Strong/Language Weak group having a significantly higher score. The Attention and Concentration recategorization contains 2 of the 3 subtests that are in the Bannatyne Sequencing Score.

2. The Object Assembly subtest score was the only WAIS-R Performance score that showed any significant difference between the groups. In this subtest, the Visually Strong/Language Weak group's score was significantly higher. (See Suggestions for Future Study)

3. There was a .170 (not significant) difference between both groups on the TOAL Receptive Language score.

Language Strong/Visually Weak - - 9.33

Language Weak/Visually Strong -- 8.94

It might be assumed that since the Language Strong/Visually Weak group has such strength in the language area that this strength would extend to the Receptive Language area as well. Receptive language ability requires the person to be able to pick out the organization of another person's language and process that organization. The organizing difficulties (particularily sequencing) that characterize this group might account for this.

However, there was a significant difference in the TOAL Expressive Language Score.

Language Strong/Visually Weak -- 12.09
Visually Strong/Language Weak -- 10. 25

This difference was hypothesized in this study but what was not expected is that there would be such a difference between the Receptive Language Score and the Expressive Language Score within each group. This may give some indication of the difficulties in inputing information that both groups appear to have.

Discussion

The results of this study support the argument for using the written language of learning disabled students as a means to establish distinct subgroups. More than establishing the two distinct subgroups, the study suggests ways that the groups go about the learning process. The "description" of each group will involve taking a closer look at the Bannatyne Scores and the results of the TOAL.

When the four Bannatyne Scores are used to compare the two groups one sees significant differences in three of the four areas. The Language

Strong/Visually Weak group was singificantly higher in the Conceptual Score and the Acquired Knowledge Score. Both of these measures reflect a strong language component and reflect the strengthes of this group.

The Language Strong/Visually Weak group score that was significantly lower than Visually Strong/Language Weak group was in the Sequencing. It was not only lower but it was slightly below the mean (10). Since Sequencing showed to be a clear strength with the Visually Strong/Language Weak group, the sequencing process may account for the significant difference between the two groups with these measures. The hierarchy of Bannatyne Scores for the Language Strong/Visually Weak group going from high to low is as follows: Conceptual (11.80) > Spatial (10.55) > Acquired Knowledge (10.08) > Sequencing (9.42).

The TOAL scores of the Language Strong/Visually Weak group were also higher across the board. In a test of language, this would be expected. Six of the nineteen areas measured were significantly higher than the Visually Strong/LanguageWeak Group.

The most interesting findings are in the Vocabulary and Expressive language areas. There was not a significant difference between the two groups in the Grammar area. However, in the Language Strong /Visually Weak group, there is almost a 2 point difference between the Vocabulary and Grammar Scores. This difference would seem to indicatethat the real language strength with this group is in the area of semantics. The difference would explain the amount of language that group can generate.

On the other hand, as stated earlier, grammar requires an awareness of the chunking and sequencing of the various words of the language. The difficulty in

sequencing that the Language Strong/Visually Weak group has may also be reflected in their syntactical ability. The gap between the group's syntactical ability and its semantic ability might explain the disorganization found in expressive language, especially in writing. It indicates that if material is presented in a clearly ordered way, and these students are taught tactics in the sequencing area; then they will more effectively organize their written language.

Likewise, insight can be gained into the way the Visually Strong/LanguageWeak group operates as well. In terms of the WAIS-R, all the subtests that did not require the use of language were at the mean or above. On the other hand, all the subtests that required the use of language were
below the mean. Those in this group seem to think and learn through the visual- motor system rather than the language system.

The Bannatyne recategorizations support this view. The hierarchy of results for the Visually Strong/LanguageWeak group are as follows: Spatial (11.63) > Sequential (11.43) > Conceptual (9.40) > Acquired Knowledge (8.47). The type of processes that this group appears to possess as a strength are usually not respected in regular classrooms. As students, they are expected to listen to someone talk (words), read books (words), make presentations (words), and take tests (words). Also, while the students are doing this, they should not keep looking around, and they should keep movement to a minimum. Thus, they are often not allowed to use the very skills and processes that are their strengths.

As would be expected, most of the subtest scores on the TOAL were below the norm (11 out of 19). None were above the norm (10). Like the Language Strong/Visually Weak group their receptive language

was weaker than their expressive language. What was different was the fact that the Grammar score was higher than the Vocabulary Score. The superior Sequencing Score of this group appears to be reflected in their ability to perceive the order in which the language is organized. The more integrated language experience (i.e., being able to see and/or move things and simultaneously talk about what they are doing) that this group receives, the more effectively these abilites would develop.

The area of language that is especially problematical for the Visually Strong/Language Weak group is in the area of semantics. Learning approaches that allow these individuals to utilize their spatial and sequencing ability and then model the language as they are doing it might facilitate the integration of the language into a more active lexicon of operational vocabulary. The Speaking Score on the TOAL is at the mean and is almost a strength.

Students in the Visually Strong/LanguageWeak group have to talk, which is what they are least likely to do. This may be so, because they are so easily overpowered by the language strong type of student that they rarely receive attention in a group situation. As a mater of fact, the group situation might be frightening to the Visually Strong/LanguageWeak person. They can quickly pick up a person's nonverbal cues that indicate that he/she is losing patience with them when they cannot find the words or get them out quickly enough. This only makes it more difficult to find the words.

For the learning disabled population itself, for those who teach and work with the learning disabled as well as for the community at large, research that seeks to understand learning disabilities is crucial. One understanding that is trying to be established by

many psychologists and educators and certainly in this study as well, is that one cannot view people with learning disabilites as one monolithic group. While they share, by definition, a common ability to think; they may go about the thinking process in different ways as well as possess different difficulties in developing and expressing abilitites. The way in which these difficulties are manifested are varied indeed!

The difficulties of the learning disabled often lead people to perceive them as "slow learners", "stupid" or "lazy". This is a message that most learning disabled individuals have received most of their educational lives. They have received it from teachers, peers, and even from their families. This creates an even heavier burden to be carried as these men and women struggle to realize their talents and their dreams.

Thus, developing a clearer picture of specific subgroups of learning disabled persons is a practical necessity. If people who teach and support learning disabled individuals can identify the particlar strengths and weaknesses of individual learners, then they will be more able to address their needs in a positive and effective way. This will enable teachers to teach the information that the individual needs to know in a way that the information is best received, processed and expressed. This enables us all to recognize the person's strengths, encourage their development as well as address ways to improve the weaknesses that are present. As this process continues, the flexibility of moving from one style of learning to another which is so difficult for the learning disabled person to do can begin to happen. As a result, the learning disabled student can experience success as a learner and greater self-respect as a person. This type of experience, hopefully, will also change the perception of others as well.

Furthermore, if learning disabled persons can understand their own pattern of strengths and weaknesses, then they have an important means to develop specific learning processes, skills and strategies that will enable them to grow as learners and as persons. This consciousness also gives them control over their learning process with its resulting interdependence, rather than dependence. This area is sometimes referred to as metacognitive learning.

There also are some implications for psychologists and counselors as well. As the literature indicates, because of the frustrations that learning disabled persons experience, they often seek or are referred to therapists and counselors. If these professionals have an understanding of how the learning disabled process information it may assist the therapist or counselor to find approaches that are more effective. For example, to use a classical psychoanalytic technique in which the therapist talks little, but expects the client to talk a great deal, would be very counterproductive with the Visually Strong/LanguageWeak group. Proceeding in that way would lead to needless frustration and misinterpretation on both sides.

As the "regular" educational and "special educational communities are more and more able to address the needs of the learning disabled, it can be hoped that doing so can have some positive effects on the community at large. One effect hopefully would be the acceptance of the fact that the learning disabled are <u>not</u> retarded.

Another effect hopefully might be that the learning disabled will not have to be perceived (by themselves as well as others) as people who are dependent. Rather than being defined by their disabilities, they can be defined by their abilities and, as a result, are in a

better position to make significant contributions to the society in which they live.

Suggestions for Further Study

One question that would seem to require further exploration is in regard to the difference between the two groups' Object Assembly score on the WAIS-R. It was the only score that was significantly different between both groups. The processes being measured by that subtest as it affects an individual's thought processes and language ability might be a rich area for further research. It would seem that in order to do the task involved in the Object Assembly subtest the person would have to have some organizatonal strategies that would lead him/her to a gestalt of the puzzle.

Is it the ability to do the task in the Object Assembly subtest that is the issue or how well those processes are integrated with others? This was clearly a strength for the Visually Strong/LanguageWeak group. Could there be processes in this area that might be helpful to this particular group of individuals that enable them to move toward greater success in the language areas?

Another area for further investigation suggested by this study is in the area of language itself. It is interesting to note that this study indicated that there was no significant difference between the LanguageStrong/Visually Weak group and the Visually Strong/LanguageWeak group in terms of receptive language as measured by the TOAL. On the other hand, there was a significant difference between both groups (Language Strong/Visually Weak being higher than the Visually Strong/Language Weak group) in terms of their expressive language--particularly in the areas of

speaking and writing vocabulary. This result on the TOAL seemed to be supported by both groups' results on the WAIS-R Vocabulary subtest. Further study might be productive in attempting to understand the semantic difficulties that the Visually Strong/LanguageWeak group of students appear to be having.

Since our understanding of the learning process itself in under such intense research and refinement, the understanding of learning disability (which is already somewhat ambiguous) is also undergoing further and further clarification. Human beings and their learning seem to be be of a dynamic nature, our understandings appear, at best, to be tentative. Thus, carving our definitions in stone and absolutizing them must continually be avoided.

Another area for future investigation must also be in the area of remediation. Care must always be present in designing goals, objectives, curricula and strategies for all students, but especially for those who are experiencing difficulties in the learning process.

As Feshbach (1971) concludes: ". . . a given youngster's success or failure in school is a function of the interaction between his strengths, weaknesses, and limitations and the specific classroom situational factors he encounters, including individual differences among teachers and differing approaches to instruction. Not to continue to match our growing understanding of learning with change in the way education is carried out would seem to be a tragic waste.

If future research defines more subgroups within the learning disabled population, then there are practical implications as well. To know the different patterns of each subgroup enables the teacher to develop different tactics and differing sequencess of

instruction that best suit the needs of the students. Thus, while the content may be somewhat the same, the ordering and tactics used to present the information have to be adjusted to the way the student learns.

As these type of questions are investigated and the efforts of the medical researchers are shared with the work of the speech and language experts, reading specialists, learning disabilities practitioners, psychologists and regular classroom teachers, and professors,

we might not only develop a greater understanding of the nature of learning disabilites, but of the learning process itself. This certainly would not only be of benefit to the learning disabled individual, but to all persons who seek to learn, teach and counsel effectively.

Appendix A

Data and Statistical Analyses

LANGUAGE STRONG/VISUALLY WEAK

Similarities	Pict. Comp.	Pict. Arreng	Block D.	Obj. Assem.	Digit Sym.	List. Voc.
15	11	12	15	14	16	16
15	9	14	7	9	5	14
14	5	7	7	7	5	8
9	9	7	11	10	7	16
11	13	15	13	11	7	12
10	17	9	8	14	7	16
10	11	9	9	10	8	8
9	9	7	11	10	7	11
8	7	6	8	8	10	5
14	14	8	10	11	6	14
15	12	14	11	13	11	12
13	11	8	9	9	12	8
12	12	14	15	10	11	7
10	11	11	7	9	9	7
12	10	9	10	9	8	7
10	12	12	9	11	6	18
15	10	11	16	12	16	11
15	14	15	12	10	8	14
10	12	10	9	4	16	11
6	9	10	8	12	9	4
5	10	13	12	10	12	7
12	16	14	12	10	3	11
11.36	11.09	10.68	10.41	10.14	9.05	10.77

VISUALLY STRONG/LANGUAGE WEAK

Similarities	Pict. Comp.	Pict. Arreng	Block D.	Obj. Assem.	Digit Sym.	List. Voc.
13	10	15	10	11	13	11
10	11	12	16	14	10	8
8	9	13	12	13	14	7
11	8	10	8	8	12	9
9	8	10	10	9	9	8
10	12	13	15	15	17	8
13	13	11	12	14	9	14
11	9	17	14	11	10	7
9	11	11	9	12	7	14
6	17	12	15	13	15	8
10	10.8	12.4	12.1	12	11.6	9.4

Similarities	Pict. Comp.	Pict. Arreng	Block D.	Obj. Assem.	Digit Sym.	List. Voc.
11.36	11.09	10.68	10.41	10.14	9.05	10.77
10.00	10.80	12.40	12.10	12.00	11.60	9.40
1.36	0.29	1.72	1.69	1.86	2.55	1.37

LANGUAGE STRONG/VISUALLY WEAK

List. Gram.	Speak. Voc.	Speak. Gram	Reading Voc.	Read. Gram	Writ. Voc.	Writ. Gram
12	15	19	10	15	13	11
4	15	12	12	8	17	9
11	15	11	16	9	17	10
12	15	8	10	10	17	11
9	15	12	1	2	9	8
12	15	17	16	15	17	13
9	15	8	10	15	17	15
8	9	12	7	10	11	11
4	9	9	8	5	14	11
12	8	12	10	8	7	10
10	13	14	12	10	13	9
6	9	15	9	15	10	9
8	15	7	9	8	10	10
6	12	9	4	5	9	5
7	15	9	6	11	12	9
8	15	8	8	7	11	15
13	15	13	9	11	16	12
11	15	11	11	13	17	18
5	12	12	12	6	10	10
7	12	12	5	3	13	9
8	15	11	9	6	10	9
5	15	13	5	8	16	9
8.50	13.36	11.55	9.05	9.09	13.00	10.59

VISUALLY STRONG/LANGUAGE WEAK

List. Gram.	Speak. Voc.	Speak. Gram	Reading Voc.	Read. Gram	Writ. Voc.	Writ. Gram
14	10	14	12	10	11	13
8	15	13	5	8	13	10
12	9	17	2	7	7	9
9	8	10	4	8	9	9
9	9	8	10	8	7	9
4	9	5	8	7	8	8
15	12	11	8	10	8	11
10	13	10	12	15	11	15
10	12	12	10	11	11	11
4	9	5	8	7	8	8
9.5	10.6	10.5	7.9	9.1	9.3	10.3

List. Gram.	Speak. Voc.	Speak. Gram	Reading Voc.	Reading Grar	Writ. Voc.	Writ. Gram
8.50	13.36	11.55	9.05	9.09	13.00	10.59
9.50	10.60	10.50	7.90	9.10	9.30	10.30
1.00	2.76	1.05	1.15	0.01	3.70	0.29

LANGUAGE STRONG/VISUALLY WEAK

Listening	Speaking	Reading	Writing	Spok. Lang.	Writ. Lang.	Vocabulary
14	17	12.5	12	15.5	12.25	13.5
9	13.5	10	13	11.25	11.5	14.5
9.5	13	12.5	13.5	11.25	13	14
14	11.5	10	14	12.75	12	14.5
10.5	13.5	1.5	8.5	12	5	9.25
14	16	15.5	15	15	15.25	16
8.5	11.5	12.5	16	10	14.25	12.5
9.5	10.5	8.5	11	10	9.75	9.5
4.5	9	6.5	12.5	6.75	9.5	9
13	10	9	8.5	11.5	8.75	9.75
11	13.5	11	11	12.25	11	12.5
7	12	12	9.5	9.5	10.75	9
7.5	11	8.5	10	9.25	9.25	10.25
6.5	10.5	4.5	7	8.5	5.75	8
7	12	8.5	10.5	9.5	9.5	10
13	11.5	7.5	13	12.25	10.25	13
12	14	10	14	13	12	12.75
12.5	13	12	17.5	12.75	14.75	14.25
8	12	9	10	10	9.5	11.25
5.5	12	4	11	8.75	7.5	8.5
7.5	13	7.5	9.5	10.25	8.5	10.25
8	14	6.5	12.5	11	9.5	11.75
9.64	12.45	9.07	11.80	11.05	10.43	11.55

VISUALLY STRONG/LANGUAGE WEAK

Listening	Speaking	Reading	Writing	Spok. Lang.	Writ. Lang.	Vocabulary
12.5	12	11	12	12.25	11.5	11
8	14	6.5	11.5	11	9	10.25
9.5	13	4.5	8	11.25	6.25	6.25
9	9	6	9	9	7.5	7.5
8.5	8.5	9	8	8.5	8.5	8.5
6	7	7.5	8	6.5	7.75	8.25
14.5	11.5	9	9.5	13	9.25	10.5
8.5	11.5	13.5	13	10	13.25	10.75
12	12	10.5	11	12	10.75	11.75
6	7	7.5	8	6.5	7.75	8.25
9.45	10.55	8.5	9.8	10	9.15	9.3

Listening	Speaking	Reading	Writing	Spok. Lang.	Writ. Lang.	Vocabulary
9.64	12.45	9.07	11.80	11.05	10.43	11.55
9.45	10.55	8.50	9.80	10.00	9.15	9.30
0.19	1.90	0.57	2.00	1.05	1.28	2.25

LANGUAGE STRONG/VISUALLY WEAK

Student	Information	D Span	Vocabulary	Arithmetic	Comprehen.
1	13	12	14	11	17
2	13	7	16	8	13
3	15	10	13	11	13
4	9	13	11	11	16
5	1	7	13	8	18
6	13	13	15	13	12
7	13	6	13	10	14
8	9	13	11	11	16
9	10	9	11	9	13
10	10	8	7	10	10
11	12	10	13	11	12
12	8	14	10	6	14
13	13	9	11	6	11
14	7	8	8	7	12
15	10	8	10	7	13
16	10	7	7	7	10
17	9	7	11	10	15
18	5	6	12	6	11
19	10	5	8	8	14
20	7	9	7	9	10
21	7	11	10	11	12
22	12	12	8	10	14
Mean	10.27	9.27	10.86	9.09	13.18

VISUALLY STRONG/LANGUAGE WEAK

Student	Information	D Span	Vocabulary	Arithmetic	Comprehen.
23	8	9	8	10	11
24	6	18	10	8	10
25	6	10	8	7	8
26	9	11	8	9	6
27	8	9	10	6	9
28	7	11	6	6	6
29	11	10	11	14	13
30	10	7	10	10	11
31	8	12	10	7	10
32	7	6	6	10	11
Mean	8	10.3	8.7	8.7	9.5

Student	Information	D Span	Vocabulary	Arithmetic	Comprehen.
Vis.-Per. Dis	10.27	9.27	10.86	9.09	13.18
Lang Dis.	8.00	10.30	8.70	8.70	9.50
Variance	2.27	1.03	2.16	0.39	3.68

LANGUAGE STRONG/VISUALLY WEAK

Grammar	Rec. Lang.	Exp. Lang.	A. L. Q.
14.25	13.25	14.5	13.875
8.25	9.5	13.25	11.375
10.25	11	13.25	12.125
10.25	12	12.75	12.375
7.75	6	11	8.5
14.25	14.75	15.5	15.125
11.75	10.5	13.75	12.125
10.25	9	10.75	9.875
7.25	5.5	10.75	8.125
10.5	11	9.25	10.125
10.75	11	12.25	11.625
11.25	9.5	10.75	10.125
8.25	8	10.5	9.25
6.25	5.5	8.75	7.125
9	7.75	11.25	9.5
9.5	10.25	12.25	11.25
12.25	11	14	12.5
13.25	12.25	15.25	13.75
8.25	8.5	11	9.75
7.75	4.75	11.5	8.125
9.5	7.5	11.25	9.375
8.75	7.25	13.25	10.25
9.93	9.35	12.13	10.74

VISUALLY STRONG/LANGUAGE WEAK

Grammar	Rec. Lang.	Exp. Lang.	A. L. Q.
12.75	11.75	12	11.875
9.75	7.25	12.75	10
11.25	7	10.5	8.75
9	7.5	9	8.25
8.5	8.75	8.25	8.5
6	6.75	7.5	7.125
11.75	11.75	10.5	11.125
12.5	11	12.25	11.625
11	11.25	11.5	11.375
6	6.75	7.5	7.125
9.85	8.975	10.175	9.575

Grammar	Rec. Lang.	Exp. Lang.	A. L. Q.
9.93	9.35	12.13	10.74
9.85	8.98	10.18	9.56
0.08	0.38	1.95	1.16

Fi: Statfast Disk 1:Joe size: 32 * 48 MISS= -9999. LL= 1 UL= 22

DESCRIPTIVE STATISTICS LANGUAGE STRONG

VARIABLE	MEAN	ST.DEVIATION	N	ST.ERROR	SKEWNESS	KURTOSIS
1	10.273	2.548	22	.543	-.143	-.902
2	9.273	2.658	22	.567	.257	-1.292
3	10.864	2.624	22	.559	.081	-1.042
4	9.091	2.022	22	.431	-.085	-1.227
5	13.182	2.239	22	.477	.391	-.737
6	11.364	2.969	22	.633	-.360	-.862
7	11.091	2.741	22	.584	.108	-.025
8	10.682	2.901	22	.619	.034	-1.476
9	10.409	2.667	22	.569	.542	-.795
10	10.136	2.232	22	.476	-.506	.813
11	9.045	3.645	22	.777	.591	-.600
12	10.773	3.951	22	.842	.095	-1.228
13	8.500	2.824	22	.602	-.018	-1.355
14	13.500	2.483	22	.529	-1.175	-.333
15	11.455	3.097	22	.660	.519	-.191
16	9.273	3.397	22	.724	-.112	.334
17	9.227	3.766	22	.803	.046	-.860
18	13.045	3.244	22	.692	-.031	-1.485
19	10.818	2.462	22	.525	1.406	1.255
[illegible]	9.659	2.876	22	.613	.134	-1.271
[illegible]	12.455	1.927	22	.411	.457	-.268
22	8.955	3.154	22	.673	-.383	-.207
23	11.636	2.331	22	.497	-.065	-.970
24	11.018	2.053	22	.438	.138	-.470
25	10.286	2.468	22	.526	-.170	-.284
26	11.445	2.263	22	.483	.221	-1.241
27	9.840	2.135	22	.455	.407	-.744
28	9.336	2.650	22	.565	.005	-.914
29	12.091	1.825	22	.389	.147	-.905
30	10.695	2.065	22	.440	.313	-.788
~~31~~	~~1.000~~	~~.000~~	~~22~~	~~.000~~	~~.000~~	~~-3.000~~
32	10.886	2.410	22	.514	-.261	-.704
33	10.273	2.051	22	.437	.122	-.544
34	10.182	1.912	22	.408	.821	.097
35	9.606	1.572	22	.335	.782	-.752
36	11.129	1.599	22	.341	.152	-.880
37	10.076	1.874	22	.400	.295	-1.135
38	10.879	1.951	22	.416	.076	-.814
39	9.864	2.371	22	.506	.208	-1.307
40	9.068	2.037	22	.434	.668	-.590
41	10.409	2.051	22	.437	-.295	-1.276
42	9.182	2.009	22	.428	.238	-1.285
43	11.420	1.838	22	.392	-.169	-.631
44	10.636	2.010	22	.429	-.381	-.825
45	11.477	1.531	22	.326	-.553	-.328
[illegible]	10.546	1.904	22	.406	-.343	-.899
[illegible]	11.803	1.910	22	.407	-.223	-.592
48	9.666	1.603	22	.342	.463	-.690

WAIS-R

TOTAL

WAIS Factor Analysis

Te: Statfast Disk 1:Joe size: 32 * 48 MISS= -9999. LL= 23 UL= 32

DESCRIPTIVE STATISTICS - LANGUAGE WEAK

ARIABLE	MEAN	ST.DEVIATION	N	ST.ERROR	SKEWNESS	KURTOSIS
1	8.000	1.633	10	.516	.413	-1.144
2	10.300	3.268	10	1.033	.981	.500
3	8.900	1.792	10	.567	-.596	-1.356
4	8.700	2.452	10	.775	.719	-.451
5	9.500	2.273	10	.719	-.307	-1.237
6	10.000	2.160	10	.683	-.179	-.989
7	10.800	2.741	10	.867	.946	-.080
8	12.400	2.221	10	.702	.749	-.667
9	12.100	2.807	10	.888	-.010	-1.711
10	12.000	2.261	10	.715	-.415	-1.262
11	11.600	3.134	10	.991	.236	-1.369
12	9.400	2.675	10	.846	.836	-1.079
13	9.500	3.659	10	1.157	-.129	-1.215
14	10.600	2.271	10	.718	.601	-1.165
15	10.500	3.808	10	1.204	-.022	-1.169
16	7.900	3.348	10	1.059	-.354	-1.315
17	9.100	2.514	10	.795	1.144	.224
18	9.300	2.058	10	.651	.395	.454
19	10.300	2.263	10	.716	.804	-.690
20	9.450	2.773	10	.877	.407	-1.194
21	10.550	2.488	10	.787	-.248	-1.620
22	8.450	2.629	10	.831	.352	-.920
23	9.800	1.918	10	.606	.371	-1.661
24	9.995	2.315	10	.732	-.324	-1.500
25	9.055	2.072	10	.655	.613	-.771
26	9.220	1.756	10	.555	-.177	-1.440
27	9.830	2.448	10	.774	-.422	-1.411
28	8.940	2.200	10	.696	.228	-1.983
29	10.140	1.960	10	.620	-.177	-1.759
30	9.540	1.843	10	.583	-.057	-1.827
31	2.000	.000	10	.000	.000	-3.000
32	11.600	1.713	10	.542	-.138	-1.053
33	12.050	2.362	10	.747	-.233	-1.428
34	10.550	1.921	10	.608	.513	-.723
35	10.899	1.603	10	.507	-.529	-1.376
36	10.151	1.216	10	.385	.477	-1.516
37	8.533	1.612	10	.510	.719	-.345
38	10.333	1.238	10	.391	.259	-1.837
39	12.000	2.134	10	.675	-.077	-1.794
40	10.150	1.811	10	.573	-.521	-1.234
41	12.200	1.719	10	.544	-.778	-.934
42	9.500	1.764	10	.558	.806	-.797
43	9.100	1.537	10	.486	.417	-1.149
44	11.733	1.712	10	.541	-.643	-.931
45	9.575	1.364	10	.431	.680	-.443
46	11.633	2.258	10	.714	-.060	-1.436
47	9.466	1.656	10	.524	.258	-1.418
48	11.432	1.457	10	.461	.136	-1.510

WAIS-R

TOTAL

WAIS Factor Analysis

		Lang Strong	Lang. Weak		
Categories	Factors	Vis. - Per.	Lang. Dis.	Mean	Variance
Visu. Percept. 1	PC/PA	10.89	11.60	10	0.71
Vis. Mot. Sp. 2	BD/OA	10.27	12.05	10	1.78
Attention 3	DS/PC	10.18	10.55	10	0.37
Attn and Cont. 4	A/COD/PA	9.61	10.90	10	1.29
Concept Form. 5	I/S/C/V/PA/PD	11.13	10.12	10	1.01
Sch. Acq. Know. 6	I/V/A	10.08	8.47	10	1.61
Abs. Thought 7	S/V/BD	10.88	10.27	10	0.61
Vis. Sequ. 8	PA/COD	9.86	12.00	10	2.14
Sch. Like Tsk. 9	A/COD	9.07	10.15	10	1.08
Vis. Wholes 10	PA/OA	10.41	12.20	10	1.79
Aud. Imm. Mem 11	A/DS	9.61	10.35	10	0.74
Rem. Mem. 12	I/S/C/V	11.42	9.05	10	2.37
Attn. To Det. 13	PC/PA/OA	10.64	11.73	10	1.10
Envir. Exp 14	I/V/C/PC	11.35	9.25	10	2.10
Aud. Seq. Mem 15	DS	9.27	10.30	10	1.03
Spat. Score 16	PC/BD/OA	10.55	11.63	10	1.09
Concept. Score 17	C/S/V	11.60	9.40	10	2.40
Sequ. Score 18	DS/PA/COD	9.67	11.43	10	1.77

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