DEVELOPMENT OF

A LEARNING DISABILITIES SCREENING TEST FOR ADULTS

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by

CATHERINE M. SMITH

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Abstract

This thesis describes two related studies devoted to developing and establishing the validity of a learning disabilities screening test for adults.

In the first study a questionnaire was constructed based on a literature review and input from adults known to have learning disabilities. It was administered to 150 college and university students, and adults referred to a psychoeducational clinic for assessment or treatment related to learning disabilities. Factor analysis supported a one-factor model which included items related to eight indicators of learning disabilities: organizational skills deficits, poor impulse control, low self-esteem, social skills deficits, language processing deficits, reading disabilities, arithmetic disabilities, and memory deficits.

The purpose of the second study was to assess the reliability and validity of the learning disabilities screen. The screen was administered to 82 participants representing a clinic sample of individuals with learning disabilities and a comparison group of unemployed individuals without learning disabilities, a sample of college students with learning disabilities and a comparison group of college students without learning disabilities, and a sample of university students with learning disabilities and a comparison group of university students without learning disabilities. Scores on the learning disabilities screening test were compared with scores on psychometric tests traditionally used in the assessment of learning disabilities.

The results indicated that the learning disabilities screening test does have internal consistency and good test-retest reliability, as well as criterion validity. There was a significant difference in the screen scores between those with and without learning disabilities in the three groups studied: Clinic; College; and University.

Cross tabulation categorical analyses were conducted to establish the best cut-off score on the learning disabilities screening test for predicting whether individuals have learning disabilities. Overall, a cut-off score of

4 out of a possible score of 11 was found to produce the least false negatives and false positives.

No differences were found in scores on the learning disabilities screen between learning disabilities subgroups of adults with reading disabilities only, arithmetic disabilities only, or reading and arithmetic disabilities.

The learning disabilities screening test developed herein may be effective as an instrument to identify adults who are at risk for learning disabilities and should be referred for psychoeducational assessments.

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CHAPTER I

Introduction

The phenomenon of persons who, despite having IQ scores within the average range or higher, exhibit specific areas of cognitive dysfunction, usually manifested by severe difficulty in learning basic academic skills, is the central concern of the field of learning disabilities. In recent years, attention in the field of learning disabilities has broadened from a focus on the problems associated with school-aged children to include adults with learning disabilities (Brinckerhoff, Shaw, and McGuire, 1992; Bruck, 1985, 1993; Dowdy, Smith, and Nowell, 1992; Fourqurean, Meisgeier, Swank, and Williams, 1991; Gerber, 1994; Gregg, Hoy, King, Moreland, and Jagota, 1992; Houck, Asselin, Troutman, and Arrington, 1992; Karpinski, Neubert, and Graham, 1992; Katz, Goldstein, Rudisin, and Bailey, 1993; Kronick, 1981; Lewandowski and Arcangelo, 1994; McCue, Shelly, and Goldstein, 1986; Nelson, Dodd, and Smith, 1990; Patton and Polloway, 1992; Raskind, 1993; Reisman and Reisman, 1993; Shafrir and Siegel, 1994a, 1994b; Spillane, McGuire, and Norlander, 1992; Spreen and Haaf, 1986; Vogel and Adelman, 1993; White, 1992).

By comparing indicators of learning disabilities which individuals who have learning disabilities perceive to be functional limitations of the syndrome (Johnson and Blalock, 1987; Reiff, Gerber, and Ginsberg, 1993; Smith, 1991) with the reports of professionals (e.g. Benezra, Crealock, and Fiedorowicz, 1993; Bruck, 1985, 1993; Gerber and Kelley, 1984; Kronick, 1981; Lehtinen-Rogan and Hartman, 1976; Lewandowski and Arcangelo, 1994; McCue, Shelly, and Goldstein, 1986; Saracoglu, Minden, and Wilchesky, 1989; Shessel, 1995) it is possible to compile a common list of learning disabilities indicators in adults. The list includes the following indicators: language processing deficits (including reading, spelling, and writing deficits), calculation deficits, organizational skills deficits, social skills deficits, frustration/anxiety and difficulty handling complexity/pressure (integration deficits), low self-esteem, reasoning deficits, attention deficits, memory deficits, coordination problems, spatial orientation deficits, poor impulse control, and memory deficits.

This thesis includes two related studies concerned with the identification of learning disabilities in adults. The purpose of Study 1 was to develop a screening test for learning disabilities in adults, based on the

set of learning disabilities indicators noted above. The purpose of Study 2 was to examine the reliability and validity of the learning disabilities screening test and to assess its effectiveness in correctly identifying adults with learning disabilities.

A screening differs from an assessment. A screening is normally administered to a large group of individuals in order to identify those individuals who are considered to be "at risk", and therefore are selected to receive a thorough assessment, or some intervention. For practical purposes, then, a screening questionnaire could be used in many situations prior to a traditional assessment which includes intellectual testing as well as academic testing. The screening questionnaire would address all of the indicators of learning disabilities included in a definition of learning disabilities.

There are several reasons why a screening instrument would be useful. First, there are many situations in which an assessment, including IQ tests, memory tests, academic tests, and neurological tests, may not be necessary. For example, a student in a community college may have had problems with learning all through elementary and high school and know that he or she has poor reading comprehension, yet understands what he or she hears. Accommodation could be provided in the form of texts on tape and orally presented exams and tests, without the time and expense involved in a full assessment. An indication of learning disabilities based on a screening test for learning disabilities could be used as the rationale for providing the service. Given constraints on resources for providing special services in the public sector, if the learning disabilities screening test were to be used for such a purpose, false positive classifications could pose a problem. However, if the individual is aware of specific limitations, such as reading comprehension problems, the screening test results could be followed by academic testing only in that specific area, and accommodations based on the latter results. In this way, a full psychoeducational assessment might be avoided, thus saving time and money for the student as well as the service provider.

Second, adults who hear about learning disabilities, but who have never been 'diagnosed', often want to know if they have learning disabilities for their own peace of mind. A screening instrument would be an inexpensive way to determine whether the question should be pursued further, without the time and expense involved in a full psychoeducational assessment. In this case, it would be important to reduce the number of

false negative classifications so that individuals who actually do have learning disabilities would not be misled and possibly denied needed services. It would also be important to reduce false positive results so that individuals who do not have learning disabilities would not face the possible trauma of believing that he or she had learning disabilities, nor the time, expense, and possible stress of having a psychoeducational assessment.

Third, a negative result on a learning disabilities screening test in an employee who is experiencing difficulties on the job might lead to a search for, and identification of, alternative reasons for the problems. Thus false negative classification on the basis of a learning disabilities screening test could be a problem in such instances, as individuals so misclassified could be denied needed accommodations, and their employment might be terminated.

Fourth, social service agencies work with individuals who are having difficulty with some aspect of successful adaptation to the demands of society. The reasons for lack of successful adaptation could include physical illness, disability or injury, emotional dysfunction, psychiatric illness, intellectual limitation, motivational limitation, moral deficiency, or learning disabilities, to name a few. A screening test which could identify learning disabilities would assist professionals to determine where their resources could be used most effectively in providing services to individuals with learning disabilities, and in looking elsewhere for the roots of problems in persons who do not have learning disabilities on the basis of the instrument. Eliminating false negative classification on the basis of a learning disabilities screening test would be most important for the interests of clients, so that all those who actually had learning disabilities would receive further psychoeducational assessments.

Development of a learning disabilities screening test would therefore seem to be a useful and important undertaking. For most effective resource management, reducing false positive learning disabilities classification according to screening test scores would be important; for least disservice to individuals who have learning disabilities, reducing false negative learning disabilities classification according to screening test scores would also be important.

CHAPTER II

Literature Review

The literature reviewed herein provides the theoretical framework within which the learning disabilities screen was developed. Various theories and definitions of learning disabilities are examined and synthesized into a new proposed definition. Literature focusing on adults with learning disabilities is examined next, and similarities with general learning disabilities literature are drawn. A brief overview is provided regarding attempts to identify subtypes within the population of individuals with learning disabilities. Finally, two assumptions on which the learning disabilities screen was based are discussed.

The term "learning disabilities" was first used by Dr. Samuel A. Kirk in 1963 (Kirk, 1963) in order to put a name to a group of young people who were failing to make academic progress despite having IQ scores within or above the average range. He did so at a meeting of parents who had come together in Chicago, Illinois, in order to organize an effective lobby group to represent their children on a national basis in the United States. The term was adopted and came into wide use following formal organization of the Associations for Children with Learning Disabilities in the United States and Canada. Since that time there have been several attempts to write a definition of learning disabilities which would describe precisely the condition and be accepted as THE definition by parents, professionals and consumers[1] (e.g. The National Advisory Committee on Handicapped Children Definition, 1968; The 1976 U. S. Office of Education (USOE) Definition, 1976; The 1977 U. S. Office of Education Definition (USOE), 1977; The National Joint Committee on Learning Disabilities (NJCLD) Definition, 1988; The Learning Disabilities Association of America Definition (ACLD), 1986; The Interagency Committee on Learning Disabilities Definition (ICLD) 1987).

In 1984 William Cruickshank, one of the pioneers in the field, wrote a paper reviewing the work that had been concluded prior to that time in describing and defining learning disabilities. In that paper Cruickshank made a distinction between children and youth who have learning problems due to environmental factors described as events in children's or youth's lives, and learning disabilities which are due to neurologically-based

[1]The term 'consumer' has recently come into use to refer to persons who have disabilities in order to distinguish them from those who act on behalf of persons with disabilities.

psychological processing deficits. Regarding the former, Cruickshank wrote: "These are children who may have had a difficult mother-child separation at the time of initial school entrance. These are the children whose parents may have been undergoing a divorce when the child was in Grade One or Grade Two at a time when basic skills should have been acquired. For each of these there may have developed deficiencies in school achievement, learning problems, and often emotional disturbances related to school and school activities....In this group, the deficits are not chronic, but respond to education or treatment regimens." Regarding the latter, Cruickshank wrote: "All children with learning disabilities have chronic special needs, but they present a very special type of school, home, and community learning problem" (Cruickshank, 1984, p.8.).

Cruickshank viewed learning disabilities as a condition based on neurological perceptual processing deficits. He articulated a precise definition of neurologically-based psychological processing deficits as follows: "As is all learning, perception is neurological. Perception is an inherent function of the neurological function of the organism. Perception is not something separate and apart from the organism, but is the direct reflection of the capacity of the neurological system to receive stimuli, to transform them into neuro-electrical energy, to transport this energy to appropriate portions of the central nervous system, to provide a mechanism or mechanisms whereby experience, judgment, symbolization, the organization of symbols in linguistic structure, intelligence and other forms of higher intellectual function can be related to the energizing forces, and ultimately to achieve efferent nerves (output) so that appropriate motor responses in the form of movement, speech, listening, viewing or feeling can be experienced. Perception is a process through which the steps we have just delineated are accomplished and by which the individual accommodates or adjusts to its environment. Socially acceptable responses are those which are perceived and processed within the standards recognized by society. Reading, writing, acquisition of number concepts, as well as overt forms of more gross behaviour, constitute such responses." (Cruickshank, 1984, p.8).

Cruickshank provided several examples of perceptual processing deficits which relate specifically to school or vocational functioning. These included discrimination, memory, sequencing, figure-background discrimination, time and space orientation, closure, sensory integration, perceptual-motor function, association, attention, rate of processing, perseveration, and language and communication. He suggested that many children

who had been diagnosed as hyperactive and/or emotionally disturbed might actually be children with learning disabilities who had no ability to inhibit reactions to stimuli which produce a motor response. He also explained why early definitions of learning disabilities excluded children with mental retardation, based on selective understanding of Kirk's address referred to earlier, and noted that it is more accurate to say that learning disabilities can be present in persons who function at any level of intellectual functioning.

Historical Overview of Theories of Learning Disabilities

Poplin (1988) reviewed the progress of the field as it attempted to come to an understanding of the phenomenon of learning disabilities and develop effective treatments for persons with learning disabilities. She described the four approaches which emerged in the field of learning disabilities:

1. **The medical model** used in the 1950s where the emphasis was on testing and treating neurological symptoms. Diagnosis was accomplished with a battery of neurological tests, often including an electroencephalogram, and medications were frequently used in treatment. Assessment in clinical classrooms was anecdotal, with some academic testing. Treatment provided children motoric and other forms of neurological training in sterile environments which lacked any form of stimulation that might interfere with the child's attention to a specific learning task. Goals of treatment were to promote adaptive functioning in the community. (e.g. Strauss and Kephart, 1955; Cruickshank, 1955);

2. **The psychological processing model** of the 1960s where the emphasis was on the prerequisite skills for academic success. Assessment focussed on identifying psychological processing deficits with some examination of academic skills, treatment involved psychological process training, medication, sensory integration and/or modality training. The goals of treatment were successful functioning in schools (e.g. Frostig, Maslow, Lefevre, and Whittlesey, 1963; Kirk, 1962).

3. **The behavioural model** of the 1970s where the emphasis was on academic product or consequent behaviour. Assessment emphasized testing of student behaviour against task analysis of skills and examination of reinforcement contingencies, and treatment typically involved direct instruction using task analysis of skills and

reinforcement. The goals of treatment were almost exclusively related to academic success in regular classes, with some attention to social functioning. (e.g. Bateman, 1971; Lovitt, 1975a, 1975b);

4. **The cognitive learning strategies model** of the 1980s, where the emphasis was on information processing and metacognition for academic success. Assessment emphasized testing of student behaviour and processing against known cognitive and/or learning strategies used by successful learners, and treatment involved direct instruction in strategies used by successful students and self-management, including self-talk. The goals of treatment were successful functioning in the academic mainstream. (e.g. Alley and Deshler, 1979; Deshler, Schumaker, and Lenz, 1984; Meichenbaum, 1980).

Poplin described these stages, not as absolutes found in special education practice, but as developmental threads seen in professional literature and research. In reality, she suggested, elements of all of the approaches could be found in most assessment procedures and special education classrooms or programs.

Definitions of Learning Disabilities

Swanson (1991) presented an overview of operational definitions of learning disabilities in which he focused on the commonality of conceptual issues that emerged in attempts to operationalize a definition of learning disabilities. He noted several of the identifying indicators that have been used to describe students with learning disabilities such as poor self-monitoring of learning (Wong, 1991), deficits in phonological processing in students with reading disabilities (Siegel and Ryan, 1988), poor metacognitive skills (Palincsar and Brown, 1987), and deficits in social skills (Bryan, 1991; Vaughn, Zaragoza, Hogan and Walker, 1993). He also described the difficulty that clinicians experienced related to lack of valid and reliable instruments available to measure these indicators. Swanson concluded that operational definitions must have conceptual meaning, measures selected to establish discrepancies must be re-evaluated (see Siegel, 1988, 1989a, 1989b; Stanovich, 1991), patterns of continuity must be considered in research results rather than restrictions placed on definitions, and more attention must be paid to intrinsic differences in processing information.

Hammill (1990) reviewed the definitional issue from a conceptual point of view. In making a

distinction between operational and conceptual definitions he claimed that a conceptual definition describes learning disabilities theoretically. He wrote, "As such, it is a first step toward the development of an operational definition that can be used in everyday situations to identify people who have learning disabilities. Conceptual definitions are important because one must have a clear idea of what learning disabilities are before one can identify them in individuals." (Hammill, 1990, p.74). He traced the development of thinking in a series of definitions published from 1962 to 1988, with the notable exclusion of the definition adopted in 1981 by the Canadian Association for Children with Learning Disabilities (CACLD), now the Learning Disabilities Association of Canada (LDAC). (The eleven published definitions Hammill reported on were: 1. Kirk, 1962, p.263; 2. Bateman, 1965, p.220; 3. The National Advisory Committee on Handicapped Children Definition (NACHC), 1968, p.34; 4. Kass and Mykelbust, 1969, p.378-379; 5. Siegel and Gold, 1982, p.14; 6. Wepman et al., 1975, p.306; 7. The 1976 U. S. Office of Education (USOE) Definition, 1976, p.52405; 8. The 1977 U. S. Office of Education Definition (USOE), 1977, p.65083; 9. The National Joint Committee on Learning Disabilities (NJCLD) Definition , 1988, p.1; 10. The Learning Disabilities Association of America Definition (ACLD), 1986, p.15; 11. The Interagency Committee on Learning Disabilities Definition (ICLD) 1987, p.222) (See Appendix A for definitions).

Hammill compared these eleven definitions on nine elements and concluded that, "Considerable agreement exists today among the definitions and definers", and that, "Of the current viable definitions, the one by the NJCLD is probably the best descriptive statement about the nature of learning disabilities". (Hammill, 1990, p.82). It reads:

> Learning disabilities is a general term that refers to a heterogeneous group of disorders manifested by significant difficulties in the acquisition of listening, speaking, reading, writing, reasoning, or mathematical abilities. These disorders are intrinsic to the individual, presumed to be due to central nervous system dysfunction, and may occur across the life span. Problems in self-regulatory behaviours, social perception and social interaction may exist with learning disabilities but do not by themselves constitute a learning disability. Although learning disabilities may occur concomitantly with other handicapping conditions (for example, sensory impairment, mental retardation, serious emotional

disturbance) or with extrinsic influences (such as cultural differences, insufficient or inappropriate instruction), they are not the result of those conditions or influences. (NJCLD, 1988, p.1)

NJCLD is composed of representatives of eight U.S. national organizations concerned with learning disabilities. Member organizations are: the American Speech-Language-Hearing Association (ASHA); the Council for Learning Disabilities (CLD); the Division for Children with Communication Disorders (DCCD); the Division for Learning Disabilities (DLD); the International Reading Association (IRA); the Learning Disabilities Association of America (LDA); the National Association of School Psychologists (NASP); the Orton Dyslexia Association (ODS). Six member associations have voted to adopt the definition. The ACLD has voted not to adopt it, and DLD has voted to abstain from voting on the issue. One of the main differences between the NJCLD and ACLD definitions is the decision of NJCLD to remove social skills deficits as one of the indicators of learning disabilities from its earlier definition. LDA and the Interagency Committee on Learning Disabilities have maintained the position that social skills is one of the deficit areas of learning disabilities. The ICLD and ACLD definitions are two of the four definitions Hammill referred to as most frequently mentioned in the 28 texts he reviewed for his article, and two of the only four of the 11 reviewed which he maintained continue to be professionally viable (i.e., the 1977 USOE, NJCLD, ACLD, and ICLD definitions). He claimed that the remaining seven definitions he reviewed have historical significance only. The lack of clear consensus on the issue of social skills deficits as one of the manifestations of learning disabilities suggests the need for further examination of this question.

The definition adopted by the Canadian Association for Children and Adults with Learning Disabilities, now the Learning Disabilities Association of Canada (LDAC), differs in five significant ways from the 1988 NJCLD definition. The LDAC definition includes social competence, memory, coordination, attention, and emotional maturation as deficit areas of learning disabilities, and the NJCLD definition does not. Cruickshank (1985) cited the LDAC definition as one of the best definitions in use. He described the years of careful study that went into the formulation of the definition from 1977 until its unanimous adoption by the CACLD Board of Directors in 1981, and wrote, "...an historically accurate definition is based on neurophysiological dysfunction,

as it should be, and makes the definition applicable to children and youth of any intellectual level. It is probably as accurate a statement as can be prepared under the circumstances of today's knowledge" (Cruickshank, 1984, p.576). Cruickshank's view is not surprising, as he was one of the experts consulted by the association when it was attempting to reach consensus on a definition. The LDAC definition reads:

> Learning Disabilities is a generic term that refers to a heterogeneous group of disorders due to identifiable or inferred central nervous system dysfunction. Such disorders may be manifested by delays in early development and/or difficulties in any of the following areas: attention, memory, reasoning, coordination, communicating, reading, writing, spelling, calculation, social competence, and emotional maturation.
>
> Learning disabilities are intrinsic to the individual and may affect learning and behaviour in any individual, including those with potentially average, average, or above average intelligence.
>
> Learning disabilities are not due primarily to visual, hearing, or motor handicaps; to mental retardation, emotional disturbance, or environmental disadvantage; although they may occur concurrently with any of these. Learning disabilities may arise from genetic variation, bio-chemical factors, events in the pre- to post-natal period, or any other subsequent events resulting in neurological impairment. (LDAC, 1987).

Analysis of Definitions

Inspection of the eleven published definitions commented on by Hammill, plus the LDAC definition (Appendix B) produces 32 elements referred to in the definitions. Table 1 shows the numbers of the definitions which referred to each of the elements.

Table 1

Elements of Learning Disabilities Occurring in Published Definitions of Learning Disabilities

Elements	Numbers of Definitions in which Elements Appear
1. retardation, delay, or disorder in the process of speech	1, 3, 4, 7, 8, 9, 11
2. retardation, delay, or disorder in the process of language	1, 3, 4, 8
communication	12
3. retardation, delay, or disorder in the process of school subjects	1
4. retardation, delay, or disorder in the process of reading	1, 3, 4, 8, 9, 11, 12
comprehension	7
5. retardation, delay, or disorder in the process of writing	1, 3, 4, 7, 8, 9, 11, 12
6. retardation, delay, or disorder in the process of arithmetic	1, 3, 4, 7, 8, 9, 11, 12
7. delay or disorder in the process of spelling	3, 7, 8, 12
8. retardation, delay, or disorder in spatial orientation	4
9. delay or disorder in the process of listening	3, 8, 9, 11
comprehension	7
10. delay or disorder in the process of thinking/reasoning	3, 9, 11, 12
11. delay or disorder in the process of attention	12
12. delay or disorder in the process of memory	12
13. delay or disorder in coordination	12
14. delay or difficulty in social competence	12
15. delay or difficulty in emotional maturation	12
16. educationally significant discrepancy between estimated intellectual	
potential and actual levels of performance	2, 4, 7
17. basic disorders in psychological learning processes	2, 3, 4, 5, 8
includes perceptual handicaps	3, 5, 6, 8
includes integration deficits (verbal & non-verbal)	4, 10, 5
includes expressive deficits (verbal & non-verbal)	4, 5
18. caused by possible cerebral dysfunction	1, 2 (or not), 3
includes central nervous system dysfunction	5
neurological processing deficiency	6
includes minimal brain dysfunction, presumed CNS dysfunction	9, 11
presumed neurological origin	10
identifiable or inferred CNS dysfunction	12
includes brain injury	3, 8
19. not caused by emotional disturbance	1
20. not caused by behavioral disturbance	1
21. may arise from genetic variation	12
22. may arise from bio-chemical factors	12
23. not result of mental retardation	1, 2, 3, 4, 5, 8, 9, 11, 12.
24. not result of sensory deprivation	1, 2, 3, 4, 5, 8, 9, 11, 12.
25. not result of cultural factors	1, 2, 3
cultural/environmental/economic	8, 9, 11, 12
26. not result of instructional factors	1, 3, 4, 7, 9, 11
not result of, though may co-exist with attention deficit disorder	11
27. not caused by severe emotional disturbance	2, 3, 4, 5, 8, 9, 11, 12
28. intrinsic to the individual	9, 11, 12
29. can affect self esteem	10
30. can affect vocation	10
31. can affect socialization	10, 11
32. can affect daily living activities	10

According to Hammill (1990), a conceptual definition which gives people a clear idea of what learning disabilities is, is necessary before an operational definition can be developed. Using these 12 published conceptual definitions as a theoretical base, I developed a conceptual definition as follows: I have removed from the list of 32 elements (found in Table 1) numbers 18 to 27. These elements do not belong in a definition because they relate to what does or does not, or what may, cause learning disabilities.

The list was then consolidated by combining elements which fit together. Elements 1, 2, and 9 were combined to form one element, retardation, delay, or disorder in language processing. Elements 3, 4, 5, 6, and 7 were combined into one element, retardation, delay, or disorder in the acquisition of one or more basic academic skills (reading, writing, spelling, calculation). The result of this consolidation process is a list of 16 elements (Table 2).

The list in Table 2 may be further refined by subsuming element 11 from Table 2 (Basic disorders in psychological learning processes, including perceptual handicaps, verbal and non-verbal deficits, integration deficits, expressive deficits (verbal and non-verbal)) in elements 1 through 7 as follows: "Basic disorders in psychological learning processes" is included in element 2 in Table 2, "...disorder in the acquisition of basic academic skills"; "Includes perceptual handicaps" can be assumed to be included in element 1 in Table 2 referring to "language processing" (auditory perception), element 2, "writing and spelling processing" (auditory and visual perception), element 3, "spatial orientation" (spatial perception), and element 7, "coordination" (perceptual-motor problems). Verbal and non-verbal deficits are included in element 1, "language processing" and element 7, "coordination deficits". "Includes expressive deficits" (verbal and non-verbal) can be assumed to be included in element 1, "language processing deficits", and element 7, "coordination deficits". The remaining portion of element 11 in Table 2, "includes integration deficits", does not fit into any other element, but refers to a deficit in the ability to integrate information coming in through more than one sensory channel, or to integrate two or more systems in order to produce output, for example auditory/visual/motor systems integration necessary for writing, or auditory/motor systems integration necessary for dancing. This portion of element 11 in Table 2 is retained, as it is not included in any other element. This consolidation process has left us with eleven elements (Table 3) which could be included in a new definition of learning disabilities. The definition

Table 2

Revised List of Elements of Learning Disabilities Occurring in Published Definitions of Learning Disabilities

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1. Retardation, delay or disorder in language processing
2. Retardation, delay or disorder in the acquisition of one or more basic academic skills
3. Retardation, delay or disorder in spatial orientation
4. Delay or disorder in the process of thinking
5. Delay or disorder in the process of attention
6. Delay or disorder in the process of memory
7. Delay or disorder in coordination
8. Delay or difficulty in social competence
9. Delay or difficulty in emotional maturation
10. Educationally significant discrepancy between estimated intellectual potential and actual levels of performance
11. Basic disorders in psychological learning processes, including perceptual handicaps, verbal and nonverbal deficits, integration deficits, expressive deficits (verbal and nonverbal)
12. Intrinsic to the individual
13. Can affect self-esteem
14. Can affect vocation
15. Can affect socialization
16. Can affect daily living activities

Table 3

Consolidated List of Elements of Learning Disabilities Occurring in Published Definitions of Learning Disabilities

---

1. Retardation, delay or disorder in language processing
2. Retardation, delay or disorder in the acquisition of one or more basic academic skills
3. Retardation, delay or disorder in spatial orientation
4. Delay or disorder in the process of thinking
5. Delay or disorder in the process of attention
6. Delay or disorder in the process of memory
7. Delay or disorder in coordination
8. Delay or difficulty in social competence
9. Delay or difficulty in emotional maturation
10. Integration deficits (verbal and non-verbal)
11. Educationally significant discrepancy between estimated intellectual potential and actual levels of performance

arrived at in this manner would very closely resemble the first two paragraphs of the LDAC definition, which read:

> Learning disabilities is a generic term that refers to a heterogeneous group of disorders due to identifiable or inferred central nervous system dysfunction. Such disorders may be manifested by delays in early development and/or difficulties in any of the following areas: attention, memory, reasoning, coordination, communicating, reading, writing, spelling, calculation, social competence, and emotional maturation.
>
> Learning disabilities are intrinsic to the individual, and may affect learning and behaviour in any individual, including those with potentially average, average, or above average intelligence.

The only element from Table 3 not included in the LDAC definition is, "retardation, delay, or disorder in spatial orientation". While spatial orientation is often closely associated with coordination, they may not necessarily refer to the same psychological process, and therefore I would retain reference to spatial orientation deficits. A new conceptual definition, retaining all of the elements referred to in the literature reviewed herein would read:

> Learning disabilities is a generic term that refers to a heterogeneous group of disorders due to identifiable or inferred central nervous system dysfunction. Such disorders may be manifested by delays in early development and/or difficulties in any of the following areas: attention, memory, reasoning, coordination, communicating, reading, writing, spelling, calculation, social competence, spatial orientation, and emotional maturation.
>
> These specific deficits may occur in individuals of any intellectual ability level, but are referred to as specific learning disabilities when they occur in individuals who do not display pervasive limitations in cognitive ability.
>
> Learning disabilities can affect self-esteem, education, vocation, socialization, and daily living activities.

Adults with Learning Disabilities

Johnson and Blalock (1987), Reiff, Gerber and Ginsberg (1993) and Smith (1991) have reported on the beliefs and attitudes of adults who have learning disabilities. Adults with learning disabilities referred to the following, which they believed to be indicators of learning disabilities: language processing deficits; math deficits; organizational skills deficits; difficulty handling complexity/pressure; social skills deficits; frustration/anxiety; emotional lability; low self-esteem; reasoning deficits; attention deficits; memory deficits; coordination problems; discrepancy between specific areas of deficit and areas of intact functioning; poor impulse control; hyperactivity; sense of humour; and creativity (Smith, 1991).

A review of the literature about adults with learning disabilities shows that many of these elements have been recognized by professionals in the field of learning disabilities. Elements so noted include language disorders (Blalock and Johnson, 1987, p.33; ACLD, 1986; McCue, Shelly, and Goldstein, 1986); phonological processing (Bruck, 1993); coordination (Blalock and Johnson, 1987, p.33), abnormal activity (Blalock and Johnson, 1987, p.33; Patton and Polloway, 1981), attention (Barkley, 1990; Blalock and Johnson, 1987, p.33; McCue, Shelly, and Goldstein, 1986), poor impulse control (Blalock and Johnson, 1987, p.33; Patton and Polloway, 1981), organizational deficits (Blalock and Johnson, 1987, p.38; Patton and Polloway, 1981), difficulty handling complexity/pressure (Kronick, 1981) emotional lability (Blalock and Johnson, 1987; Kronick, 1981) social skills deficits (Blalock and Johnson, 1987; ACLD, 1982; Kronick, 1981; Gerber and Kelley, 1984; Lehtinen-Rogan and Hartman, 1976; Patton and Polloway, 1981), visual-spatial disorders (Blalock and Johnson, 1987, p.44) visual-motor disorders (Blalock and Johnson, 1987, p.44), vocational problems (Blalock and Johnson, 1987, p.45; ACLD, 1986), frustration/anxiety (Blalock and Johnson, 1987, p. 41; Lehtinen-Rogan and Hartman, 1976; Patton and Polloway, 1981), low self-esteem (Blalock and Johnson, 1987, p.38; ACLD, 1982; Lehtinen-Rogan and Hartman, 1976; Patton and Polloway, 1981; Saracoglu, Minden, and Wilchesky, 1989), motoric awkwardness (McCue, Shelly, and Goldstein, 1986); executive function (Denckla, 1994).

Creativity and humour do not appear in any of the literature about adults with learning disabilities,

except in the list of indicators generated by adults with learning disabilities in For You: Adults with Learning Disabilities (Smith, 1991). They are not recognized as indicators of learning disabilities, but were included in this study for two reasons. First, questions on the screening instrument about these indicators may draw emphasis away from the areas of deficit, thus increasing the comfort level of individuals answering the questions. Second, if some adults with learning disabilities believe humour and creativity to be indicators, or at least characteristics, of adults with learning disabilities, including those elements in this study may lead to the rejection of them as indicators of learning disabilities, or may suggest that those are characteristics of a particular group of adults with learning disabilities. Such a group could include, for example, those adults with learning disabilities who do not have low self-esteem or social skills deficits.

Diagnostic Assessment of Learning Disabilities

Learning disabilities has traditionally been diagnosed by a battery of psychometric tests administered by trained professionals. Individuals were classified as having learning disabilities if their scores on academic achievement tests were lower than would be expected for their measured (or assumed) intellectual potential. The practice of using an IQ/achievement discrepancy in order to diagnose learning disabilities had its origins in early definitions which stated that learning disabilities were found in children who did not have generalized mental retardation, but who nevertheless experienced significant difficulties in learning to read, write, spell, or compute (Bateman, 1965; Kirk, 1962).

School systems have developed specific discrepancy formulas for use in determining learning disabilities classification (Freeman, Hutchinson, and Porter, 1991; Lewandowski and Arcangelo, 1994; Shaywitz, Fletcher, Holahan, and Shaywitz, 1992; Vaughan, Schumm, and Kouzekanani, 1993; Wetzel, 1996; Wilson, Majsterek, and Simmons, 1996). While this approach is consistent with learning disabilities theory (Lyon, 1989), it has not led to consistently applied criteria in the identification of individuals with learning disabilities, as the questions of how much discrepancy is enough, and on what specific tests it should be calculated have not been clearly answered. The result of this dilemma is that the same students can actually be

classified as learning disabled in one school district, and not in another.

Siegel (1988; 1989a; 1989b; 1992) has put forward an argument for removing the IQ test as an essential component of an assessment for learning disabilities. She showed that students with dyslexia and garden variety poor readers (i.e. poor readers who do not have an IQ/achievement discrepancy) had similar deficits in phonological processing, verbal memory, and syntactic awareness regardless of their IQ scores. In other words, those with "dyslexia" on the basis of a discrepancy between IQ scores and reading scores had the same problems in reading skills as poor readers who had lower IQ scores. Thus it may be that dyslexia can be diagnosed without reference to IQ. If this is so, then one might possibly presume that the deficits associated with acquisition of the other basic skills (spelling, writing and arithmetic) could also be identified without reference to IQ. Her argument may be a valid one. She contends that a learning disability should refer to a significant difficulty in achievement in school-related basic skills, regardless of scores on intelligence tests.

Diagnosing learning disabilities solely on the basis of academic deficits may prove to be an effective way to identify learning disabilities in school-age students, but it does not address the many additional areas of daily functioning, such as attention, memory, and executive function, in which individuals with learning disabilities encounter difficulty arising from their learning disabilities, whether at home, at school, at church, in social situations, or at work. Because assessment is normally conducted in order to understand the nature of difficulties experienced by individuals, and to form the basis for treatment or accommodation where possible, assessment for possible learning disabilities should address all of the indicators in a definition of learning disabilities. Such an assessment would provide evidence of an individual's strengths and weaknesses in several areas so that intervention could be focused on utilizing strengths and minimizing the impact of weaknesses. For example, an individual may have adequate reading and spelling skills, and below average arithmetic skills. This information by itself has limited usefulness in planning intervention if the individual is seeking assistance due to his inability to retain employment. A full assessment which indicates overall IQ at the bottom of the average range, the presence of significant visual/spatial deficits relative to verbal skills, superior vocabulary development relative to abstract reasoning skills, a history of problems with social interaction, and significant manual dexterity and processing speed deficits as measured by vocational aptitude testing would provide much guidance

for the establishment of a vocational plan. A vocational plan and intervention strategies would be quite different for an individual with similar reading, spelling and arithmetic scores, but overall IQ in the Superior range, mild impairment in visual/spatial functioning, excellent verbal memory and attention, and good executive function skills (such as the ability to develop and maintain an appropriate problem-solving strategy across changing stimulus conditions in order to achieve a goal, strategic planning, organized searching, utilizing environmental feedback to shift cognitive sets, directing behaviour toward achieving a goal, and modulating impulsive responding) (Heaton, chelune, Talley, Kay, and Curtiss, 1993). Thus, even if it were not necessary to use an IQ/achievement discrepancy to diagnose learning disabilities, it may still be useful to conduct an intelligence test when considering the presence of learning disabilities, just as it is useful to test eyesight and hearing. Although an IQ score, as is the case with eyesight and hearing, may not be relevant to a diagnosis of learning disabilities, IQ, vision, and hearing testing may be useful to either rule out or identify other areas of functioning which may require attention.

Many do not agree with Siegel's position that IQ is irrelevant to the definition and diagnosis of learning disabilities (Graham and Harris, 1989; Lyon, 1989; Torgesen, 1989). While the application of IQ scores to the process of classifying individuals with learning disabilities is far from an exact science (Algozzine and Ysseldyke, 1987), there may be reason to question the elimination of IQ testing from the assessment of learning disabilities. Rispens, Yperen, and van Duijn (1991) found that IQ had a very limited effect on the classification of children with learning disabilities. However, fewer high IQ children were identified as having learning disabilities when IQ discrepancy was not used to diagnose learning disabilities. If, in fact, children who have high IQ scores and low average reading scores do have learning disabilities, leaving an IQ/reading ability discrepancy out of the diagnostic process may leave high IQ individuals who do have learning disabilities without appropriate identification, and resulting services, understanding of the nature of their difficulties by significant others in their lives, and most importantly, self-understanding. Bruck (1985) found that, although adults with learning disabilities continue to exhibit the same types of problems they had as children, and continue to perform significantly worse than a peer control group on standardized tests of basic academic skills, those who were in a post-secondary environment at the time of retesting performed better than their peers with

learning disabilities who were employed. Those who had completed a university degree program outperformed those who were still in university. It seemed that the LD (learning disabled) students' superior (but still significantly poorer than their non-LD (without learning disabilities) controls' performance on tests of academic skills was a result of continued exposure and practice of basic skills in a highly demanding literary environment. It may be possible, therefore, that using an IQ/achievement discrepancy as a possible LD indicator and conducting a full assessment to identify other areas of LD-related deficits might identify learning disabilities in post-secondary students who may have been able to improve basic academic skills to above a specific cutoff score (e.g. the 25th percentile), but who continue to experience difficulty as a result of learning disabilities in areas such as organizational skills deficits, attention deficits, and memory problems.

Learning Disabilities Subtypes

Attempts have been made to identify different subtypes of learning disabilities based on differences in patterns of cognitive or academic functioning. The most common approach to subtyping is to select for study a subset of individuals with learning disabilities who share specific academic deficits, often in reading (Bruck, 1993; Douglas and Benezra, 1990; Fawcett and Nicolson, 1994; Hynd, Semrud-Clikeman, Lorys, Novey, and Eliopulos, 1990; Kulak, 1993; Rourke, 1993; Shaywitz, Fletcher, Holahan, and Shaywitz, 1992; Torgesen, Wagner, and Rashotte, 1994) or arithmetic (Badian, 1983; Derr, 1985; Geary, 1993; Newman, 1984; Rourke, 1993; Shalev and Gross-Tsur, 1993; Zentall and Ferkis. 1993). The attempt in these studies is not specifically to identify subtypes of learning disabilities. Rather, the studies begin with groups of individuals identified on the basis of a common deficit area, and attempts are then made to identify cognitive correlates or evaluate treatments related to those deficit areas. One of the subtypes identified in this way is dyslexia. This is a specific type of reading learning disability in which there is a deficit in phonolological processing. The deficit underlies the reading disability and persists into adulthood (Bruck, 1993; Shafrir and Siegel, 1994; Siegel and Ryan, 1988).

A different approach to subtyping is to compare individuals with different manifestations of learning disabilities in an attempt to identify homogeneous groups with shared cognitive, behavioural, and academic

characteristics (Casey, Rourke, and Picard, 1991; Humphries and Bone, 1993; Ozols and Rourke, 1985; Rourke and Finlayson, 1978; Rourke and Strang, 1978; Shafrir and Siegel, 1994a, 1994b; Shafrir and Siegel, 1994b; Shafrir, Siegel, and Chee, 1990; Spreen and Haaf, 1986). In a literature review Siegel and Heaven (1986) identified three subtypes of learning disabilities in children which they believed to account for almost all children with learning disabilities. The three learning disabilities subtypes were: (1) reading, (2) arithmetic and written work, and (3) attention deficit disorder. Humphries and Bone (1993) found very few cognitive or academic patterns other than the low verbal, high performance IQ profile according to which their groups were initially established in their study. Shafrir and Siegel (1994b) found differences in the approaches to reading tasks between adults with learning disabilities and normally achieving (reading) adults. Adults with reading disabilities and adults with learning disabilities who did not report reading disabilities used similar strategies. Spreen and Haaf (1986) found that tests for differences between derived clusters of learning disabilities subtypes in neurological impairment as assessed in childhood proved significant only between control and LD clusters; a similar analysis with adult neurological categories showed significant trends related to severity; and tracing individual subjects from childhood to adult clusters showed only a moderate degree of persistence.

Nonverbal learning disabilities (NLD) is a subtype researched by Rourke and his colleagues over the past twenty years (see Rourke, 1989 for a review of studies; and Little, 1993 for a review of recent literature). NLD is a syndrome identified by the pattern of scores on IQ and academic tests, rather than by absolute scores. It is possible for an individual to be classified as having NLD without having any academic achievement scores below the average range. The key characteristics are performance IQ at least 10 standard score points below verbal IQ, and Wide Range Arithmetic Test Arithmetic score at least 10 points below WRAT Reading and Spelling scores. There are other spatial, social, temporal, attention, memory, and motor deficits which are also characteristic of the syndrome (Harnadek and Rourke, 1994). It appears to affect only about five percent of individuals who have learning disabilities (Rourke, 1989), to become evident in mid-childhood years (Casey, Rourke, and Picard, 1991), and to worsen through the teen years and into adulthood, often being associated with social isolation, depression, and even suicide (Rourke, Young, and Leenaars, 1989). The understanding of NLD as a manifestation of right hemisphere dysfunction or damage is supported by Semrud-Clikeman and

Hynd (1990), Weintraub and Mesulam (1983), and Voeller (1986).

Identification of other subtypes would assist in the correct identification of individuals with learning disabilities, and potentially lead to the most appropriate intervention for each subtype.

Assumptions Underlying the Development of the Learning Disabilities Screen

Two specific assumptions were made in the development of the learning disabilities screen. These are discussed below with reference to the literature.

1. **Adults with learning disabilities have psychological processing deficits.**

There is evidence that adults with learning disabilities continue to experience deficits in psychological processing. Based on the literature about learning disabilities in adults and medical diagnostic criteria in the Diagnostic and Statistical Manual of the American Psychiatric Association 3rd Edition, Mccue (1994) presented a list of domains that should be evaluated in an assessment for potential learning disabilities. The list includes attention, language functions, memory, functional literacy, reasoning and problem solving, perceptual motor skills, and executive functions. In addition, he suggests that neuropsychological assessment may be particularly important when learning disabilities problems fall primarily out of the range of specific academic deficits. He stresses the requirement for clinical judgment in the interpretation of test findings, personal, educational and social history, and observations throughout the assessment process. Reiff and Gerber (1994) listed problems with social perception/social skills, visual-spatial deficits, language-based deficits, and organization as some of the issues that have significant impact on the quality of life for adults with learning disabilities. Similarly, Minskoff (1994) and Raskind (1994) listed deficits in psychological processing abilities such as attention, reasoning, perception, and memory, deficits in language processing, academic achievement deficits, and social skills deficits as domains in which adults with learning disabilities experience difficulties leading to vocational

failure. The executive function deficits described by Denkla (1994) are among the deficits germane to the nonverbal learning disabilities syndrome which has serious implications for adults (Little, 1993; Rourke, Young, and Leenars, 1989; Voeller, 1986; Weintraub and Mesulam, 1983).

2. **Adults with learning disabilities are aware of their deficits, and are reliable reporters about the nature of their problems.**

There is a paucity of research in this area. There is some evidence that students with learning disabilities are able to describe their areas of developmental dysfunction (Cohen, 1983; Levine, Clark, and Farb, 1981). Reiff, Gerber, and Ginsberg (1993), found that many adults with learning disabilities were able to describe their deficit areas, and these generally agreed with the research about learning disabilities. The successful adults with learning disabilities Reiff, Gerber, and Ginsberg (1993) interviewed described processing deficits, functional limitations such as spoken language, academic deficits, conceptual deficits, and underachievement relative to potential in educational, social, and emotional domains. Interestingly, several of their subjects preferred to describe learning disabilities as a difference in the way one learns, or as teaching disabilities. They found that, although the respondents did identify central issues found in many definitions of learning disabilities, some of their insights were restricted and technically erroneous, while still providing useful insights into the reality of living with learning disabilities. It was assumed, therefore, that adults with learning disabilities are reliable describers of their functioning if asked specific and appropriate questions grounded in learning disabilities theory and literature, and thus make a self-report learning disabilities screening test useful.

Collins-Williams (1996) found that the Wender Utah Rating Scale was effective in identifying attention deficit hyperactivity disorder (ADHD) in adults when results were compared with psychometric measures of ADHD. The scale is a retrospective questionnaire about childhood experiences related to the symptoms of ADHD. Its efficacy indicates that adults with ADHD are reliable self-reporters regarding their ADHD. Given

the close association of learning disabilities and ADHD, and indeed frequent overlap, one might assume that adults with learning disabilities would similarly be able to describe their deficit areas.

Brown (1994), Corcoran (1994), Druck (1994), and Wiig (1994) have eloquently described their own experiences with learning disabilities which are consistent with literature about learning disabilities in adults. It seems clear that at least some adults with learning disabilities are reliable in their self-reports about their learning disabilities.

In a review and meta-analysis of the validity of self-evaluation of ability, Maybe and West (1982) determined that adults are moderately effective in evaluating their abilities. They identified three criteria that positively affect the reliability of self-evaluations: making testees aware that their results will be compared with criterion measures; guaranteeing the anonymity of responses; and providing instructions that the testees are to compare themselves with others. These criteria were implemented in the administration of the learning disabilities screening test in this study.

CHAPTER III

Study 1: Development of the Smith Learning Disabilities Screen

The purpose of Study 1 was twofold: (a) to determine whether there is a set of indicators which apply to all adults with learning disabilities; (b) to develop a screening tool which could be used by adult special needs professionals to identify potential adults with learning disabilities.

The process used in this study was similar to that used by Stake (1994) and Sherer et al. (1982), in the development of self-concept and self-efficacy scales for adults respectively. Both began by developing a pool of questions, then administering the resulting questionnaire to large samples and analyzing the results through factor analysis. The refined questionnaires were then administered to research subjects, and results compared with viable measures thought to correlate well with the content of the questionnaires under study.

The initial set of items in the questionnaire developed for this study was taken from an instrument I have used clinically. This was developed on the basis of: (a) published definitions of learning disabilities; (b) published clinical descriptions/case studies of adults with learning disabilities (Johnson and Blalock, 1987; Kronick, 1981; Reiff, Gerber, and Ginsberg, 1993; Rourke, 1989); (c) ten years of personal clinical experience working with adults with learning disabilities; and (d) discussions with adults with learning disabilities with whom I worked on a project initiated by the Learning Disabilities Association of Canada in 1991.

The project, funded by the Disabled Persons Participation Program, Secretary of State, Canada, brought together twelve adults with learning disabilities from across Canada. The adults identified ten indicators of learning disabilities which they all agreed they were affected by to some degree. Eight of these indicators have been reported in the literature about adults with learning disabilities as previously discussed: organizational skills deficits; low frustration tolerance; Attention Deficit Hyperactivity Disorder; low self-esteem; social skills deficits; language processing deficits; poor impulse control (including coordination deficits); and memory deficits. The remaining two were humour and creativity. The latter two were not considered to be indicators of learning disabilities for the purpose of this study as discussed previously. Two additional indicators of learning disabilities were included to reflect the central concept of learning disabilities contained in all published

definitions (Hammill, 1990): disabilities in reading/spelling, and arithmetic. Questions continued to be added, deleted, or revised on the basis of input from adults with diagnosed learning disabilities over a two-year period. It was this process that led to the response possibilities of "Yes", "No", and "Used To", as several adults with learning disabilities spontaneously gave "Used To" as an answer when asked to respond to "Yes" or "No".

In the study reported below analyses were carried out to describe the factor structure of the instrument and to identify items which were most likely to be endorsed by adults with learning disabilities.

Method

Participants

Research participants were 150 individuals including student volunteers from two community colleges and two universities in a major metropolitan area, and several volunteers representing a clinic population of individuals referred for assessment and/or treatment of learning disabilities. The participants were recruited by four college/university professors and the researcher. Table 4 provides a summary of demographic information for the sample. While there were approximately twice as many males as females in the sample, this was not considered problematic as males outnumber females at a ratio of three or four to one (Hallahan, Kaufman, and Lloyd, 1996) in the learning disabilities population.

Measures

Learning Disabilities Questionnaire: A questionnaire was developed (Appendix C) which consisted of five questions related to each of the following ten indicators of learning disabilities:

1. Organizational skills deficits
2. Low frustration tolerance
3. Attention Deficit
4. Low self-esteem
5. Social skills deficits
6. Language processing deficits
7. Poor impulse control (including coordination deficits)
8. Reading disabilities
9. Arithmetic disabilities
10. Memory deficits

Nineteen neutral items were added, including items related to humour and creativity. Participants

responded to each item by circling Yes, No, or Used To. Yes was circled if the item applied to the participant, No if the item did not apply to the participant, and Used To if the item referred to something that had previously been a problem for the individual, but no longer was a problem at the time of completing the questionnaire.

Socioeconomic Status (SES) was calculated according to the Blishen Scale (Blishen, Carroll, and Moore, 1987). The Scale is a composite of the prevailing income and education levels in each occupation, and provides codes based on full-time employment only. For students 25 years old or younger the SES of the supporting or higher-scoring parent was used. For students 26 years old or older their own occupation prior to returning to formal studies was used. For the clinic group SES according to the Blishen Scale was used if the individuals held jobs. In all other cases, including individuals on Social Assistance, Family Benefits Allowance, and Unemployment Insurance, SES was coded as 20.00, consistent with the lowest codes on the scale (e.g., service station attendants, 21.47; food and beverage serving occupations, 23.31; lodging cleaners, 21.37; childcare occupations, 23.70; elemental workers, 21.24; trapping and related occupations, 19.02; fish canning, curing, and packing, 20.38).

Procedure

Questionnaires were distributed to the students by professors and the researcher during classes and willing participants were given time to complete the questionnaire in class, or following classes. They were informed that the questionnaire was to be used in a study about learning in adults. They were not asked to provide their names unless they agreed to participate in a follow-up study. They were assured that all responses would be kept confidential. Adults in the Clinic sample were asked during the course of treatment if they were willing to participate in the study. Participants were requested to complete the questionnaire by circling the response which best described them. They also completed a form to provide demographic information regarding gender, employment status of self, father, and mother, and first language spoken. Participants indicated whether they believed they had learning disabilities. They were also asked to provide their names and telephone numbers if they were willing to participate in a follow-up study.

Table 4

Demographic Information for Study 1 Sample

		Clinic	College	University
Gender	M	5	70	18
	F	3	39	15
Age	x	35.50	23.25	30.68
	SD	15.50	6.43	9.90
SES	x	51.08	50.41	57.12
	SD	9.02	12.56	12.24

Completed questionnaires were returned to the researcher for scoring. Responses were coded as positive or negative, with Yes and Used To scored as positive responses. Each positive response received one point.

Data Analysis

The number of factors to be used in the model was initially determined by principle components analysis. Items indicated as important to the model were further examined according to the frequency with which they were endorsed by individuals who reported that they believed they had or did not have learning disabilities. Those items with greater endorsement by those who believed they had learning disabilities than by those who did not believe they had learning disabilities were included in a revised questionnaire. All analyses were conducted using the SPSS 6.1 for Windows computer statistical package.

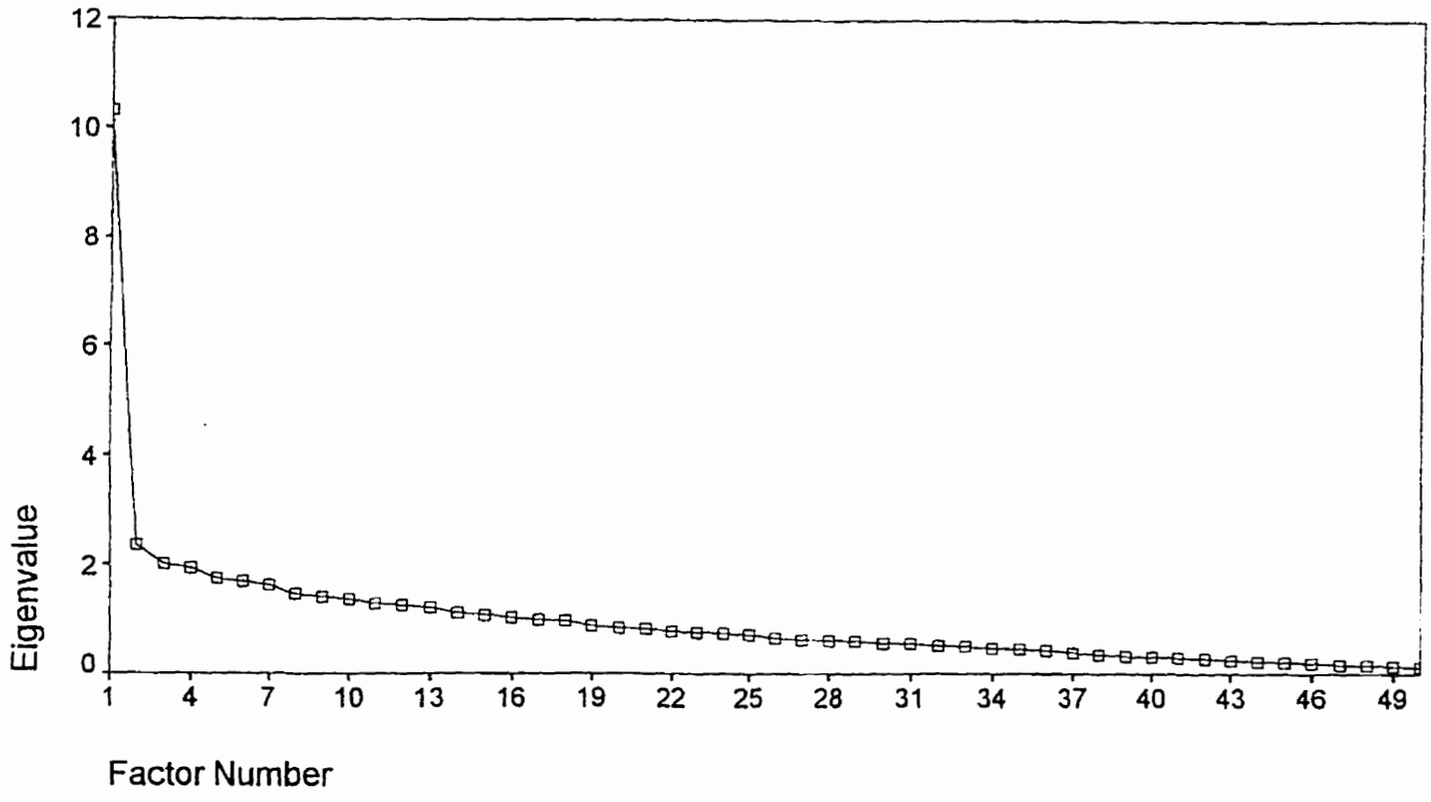
Results

The matrix of item correlations was analyzed using the principal components procedure. The decision on the number of factors to include in the model was taken after considering several lines of evidence.

(1) The Scree plot (Figure 1) indicated that there was one very dominant factor. (2) In the unrotated factors of multifactor models, with two, three, four, or five factors, very few items (one or two) were loading at or above .40 on any but the first factor. (3) None except the first factor was an interpretable factor (See appendix C for factor loadings). (4) The number of residuals greater than .05 remained relatively constant in one, two, three, four, or five factor models. In a one factor model 51% of residuals above the diagonal had absolute values greater than .05. Residuals greater than .05 were 49% for a two factor model, 44% for a three factor model, 41% for a four factor model, and 41% for a five factor model. (5) A varimax orthogonal rotation of two factors (Appendix D) supported a one-factor solution. The direct proportionate contribution of the first factor to the common variance of the two factor solution was .93. On the basis of all these lines of evidence, it was decided to proceed with a single factor model. That factor was identified as a general learning disabilities factor. Eighteen items loaded at .50 or higher on that one (unrotated) factor (i.e. general learning disabilities)

FIGURE 1

Factor Scree Plot for Original Learning Disabilities Questionnaire



and were retained for further examination. The retained items and their factor loadings are shown in Table 5. All other items related to learning disabilities were discarded. Because the factor analysis was not strong, a secondary construct was used to determine the items to be retained for the learning disabilities screen. In order to ensure that the items retained for the revised screen were the ones most frequently selected by adults with learning disabilities, only those items endorsed by a minimum of 60% of individuals who indicated that they believed they had learning disabilities were retained for inclusion in a learning disabilities screen (Table 6). The 11 retained items were endorsed by fewer than 46% of those who indicated that they did not believe they had learning disabilities. The revised questionnaire (Figure 2) contained the 11 retained items related to learning disabilities, and nine filler items.

The 11 learning disabilities-related questions reflect eight of the ten indicators of learning disabilities referred to earlier in this text in the section on the development of the questionnaire (Chapter II). The two indicators from the ten indicators previously identified which were not represented in the revised questionnaire were: low frustration tolerance; and attention deficit. These are both related to attention deficit/hyperactivity disorder (ADHD) (Barkley, 1990). Two indicators related to ADHD were, however, represented in the eleven retained items (poor impulse control and poor organizational skills) so that elements of ADHD are retained in the revised screen.

Thus, the eight LD indicators represented in the revised LD screen are:

1. Organizational skills deficits
2. Low self-esteem
3. Social skills deficits
4. Language processing deficits
5. Poor impulse control
6. Reading disabilities
7. Arithmetic disabilities
8. Memory deficits

Discussion of this study is combined with the Discussion section of Study 2.

Table 5

Items from Original Learning Disabilities Questionnaire with Factor Loadings At or Above .50

ITEM	FACTOR LOADING
Do you sometimes feel as if, even though you know you are as intelligent as the people around you, they seem to be able to organize what they are doing and get it done in a more efficient way, or in less time, than you do?	.50
Do you often feel very frustrated because you can't (or not without great difficulty) do things that other people find so easy?	.60
Do you often feel very frustrated because people treat you as if you were not very bright, or are making excuses when you are having difficulty?	.51
Do people often get angry with you for leaving jobs half done?	.51
Do you often expect to fail when you think about doing or learning something new?	.55
Have you often felt as though you just don't fit in?	.61
Do people have trouble understanding you, and ask a lot of questions, even when you think you are explaining yourself very clearly?	.54
Do you often have difficulty understanding instructions?	.61
Do you often have difficulty thinking of the word you want to use, even though you know that you know it?	.64
Do people sometimes become angry or frustrated with you when you don't understand, because they know that at other times you can understand, and they seem to think you are doing it on purpose?	.51
Do you often do things you wish you hadn't done?	.61
Do you get yourself into difficulties because you act before you think, so you would, for example, spend too much money on payday and not have enough left to pay the rent?	.50
Do you often say something that you realize almost immediately you wish you had not said?	.52
Did you have great difficulty memorizing number facts or times tables?	.53
Do you find that you have to read things over several times in order to understand?	.56
Do you often feel frustrated because you forget things that are important to you?	.54
Do you think you have more problems in remembering certain types of information than most people do?	.65
Do you find that you have trouble remembering things that you have learned?	.59
Do you often feel frustrated because you forget to do things that really are important to you?	.62
Do you become very frustrated when you are in a traffic jam or a long lineup?	.54
Do you often have difficulty understanding instructions?	.61

Table 6

Items from Original LD Questionnaire Endorsed by >60% of Persons Who Believed They Had Learning Disabilities

ITEM	% LD	% NON LD
Do you sometimes feel as if, even though you know you are as intelligent as the people around you, they seem to be able to organize what they are doing and get it done in a more efficient way, or in less time, than you do?	80	35
Do you often feel as if you are not worth very much, not living up to people's expectations of you?	67	24
Have you often felt as though you just don't fit in?	78	41
Do you often have difficulty thinking of the word you want to use, even though you know that you know it?	76	35
Do you often do things you wish you hadn't done?	69	46
Do you get yourself into difficulties because you act before you think, so you would, for example, spend too much money on payday and not have enough left to pay the rent?	69	44
Did you have great difficulty memorizing number facts or times tables?	73	28
Do you find that you have to read things over several times in order to understand?	71	36
Do you often feel frustrated because you forget things that are important to you?	66	22
Do you think you have more problems in remembering certain types of information than most people do?	71	25
Do you find that you have trouble remembering things that you have learned?	61	26

FIGURE 2
Smith Learning Disabilities Screen

I am going to ask you some questions about yourself. The questions relate to things that most people do at least some of the time. I want to know if they relate to you a great deal of the time. For each question I want you to respond, "yes", "no", or, if the question relates to something that used to be a problem for you, but no longer is, your answer would be, "used to".

Please circle the answer which applies to you for each question: Y = yes N = no U = used to.

[* Questions related to learning disabilities.]

1.[*]	Do you sometimes feel as if, even though you know you are as intelligent as the people around you, they seem to be able to organize what they are doing and get it done in a more efficient way, or in less time, than you do?	Y	N	U
2.[*]	Do you find that you have trouble remembering things that you have learned?	Y	N	U
3.	Do you usually feel "on top of things"?	Y	N	U
4.	Have you often been told that you have a good sense of humour?	Y	N	U
5.[*]	Do you often feel as if you are not worth very much, not living up to people's expectations of you?	Y	N	U
6.	Would people describe you as a very organized person?	Y	N	U
7.[*]	Have you often felt as though you just don't fit in?	Y	N	U
8.	Are you often the person in a group who makes others laugh?	Y	N	U
9.	Is there some area of your life where you are considered to be creative?	Y	N	U
10.[*]	Do you often feel frustrated because you forget things that are important to you?	Y	N	U
11.[*]	Do you think you have more problems in remembering certain types of information than most people do?	Y	N	U
12.[*]	Did you have great difficulty memorizing number facts or times tables?	Y	N	U
13.[*]	Do you often do things you wish you hadn't done?	Y	N	U
14.	Are you good at juggling your schedule to get several tasks done for a specific deadline?	Y	N	U
15.[*]	Do you get yourself into difficulties because you act before you think, so you would, for example, spend too much money on payday and not have enough left to pay the rent?	Y	N	U
16.	Would people describe you as "creative"?	Y	N	U
17.[*]	Do you often have difficulty thinking of the word you want to use, even though you know that you know it?	Y	N	U
18.[*]	Do you find that you have to read things over several times in order to understand?	Y	N	U
19.	Are you the kind of person who can find just the right way to express an idea when others are having trouble finding the right words?	Y	N	U
20.	Were you a good or excellent student all through your school years?	Y	N	U

CHAPTER IV

Study 2: Validation of the Smith Learning Disabilities Screen

The purpose of Study 2 was to estimate the reliability and criterion validity of the Smith Learning Disabilities Screen (SLDS). Analyses were conducted to estimate the internal consistency of the items and test-retest reliability. As the stated purpose of the SLDS is initial identification of adults who may have learning disabilities, the SLDS scores of adults who have learning disabilities diagnosed on the basis of conventional psychometric tests were compared with the SLDS scores of adults who do not have learning disabilities as indicated by psychometric data.

The hypothesis guiding this study was that individuals with learning disabilities would score higher on the learning disabilities screen than individuals who do not have learning disabilities. Post-hoc analyses were conducted to determine whether SLDS score differences were associated with learning disabilities subgroups according to the achievement tests on which learning disabilities classification was based.

Method

Participants

Eighty-two individuals participated in Study 2. The sample was divided into the following groups: 26 participants representing a Clinic group with learning disabilities of whom 12 were clients referred for psychoeducational assessment or treatment related to learning disabilities (9 male, 3 female), 7 were unemployed individuals found to have learning disabilities during this study (3 male, 4 female), and 7 were a comparison group of unemployed individuals without learning disabilities (5 male, 2 female); 26 participants from four community colleges of whom 12 were adults with learning disabilities (4 male, 8 female), and 14 were adults without learning disabilities (10 male, 4 female); 30 participants from eight universities of whom 13 were adults with learning disabilities (5 male, 8 female), and 17 were adults without learning disabilities (7 male, 10 female).

All but four participants were Caucasian and had English as a first language. Those with English as a second language had completed all or most of their schooling in English. None of the participants had a history of head injury, medication for psychiatric illness, or a history of alcohol or drug abuse. All participants had estimated IQ scores at or above 80.

Recruitment of Participants

The sample included one clinic participant and 30 student participants from Study 1 who had indicated willingness to participate in a follow-up study. Thirteen additional college and university students were recruited through letters distributed by their professors and the Special Needs Offices at one community college and two universities. Thirteen additional student volunteers were recruited through the youth group leaders of a church in a suburban community near Metropolitan Toronto. They were contacted by telephone by the researcher.

Thirteen participants were individuals referred to a university psychoeducational clinic, members of a learning disabilities adult peer support group, or individuals referred to the researcher for psychoeducational assessments or counselling/coaching related to diagnosed or suspected learning disabilities.

Sixteen participants were recruited as a comparison group for the clinic sample. Twelve were drawn from three classes of participants attending Human Resources Development (HRD)-sponsored training programs for unemployed individuals who were receiving unemployment insurance payments. Three additional individuals were known to the researcher, were unemployed, and volunteered to participate in the study. One additional individual was the fiance of a participant in the Clinic sample. None had previously diagnosed learning disabilities.

Seven of the 12 participants from the HRD programs were found to meet the psychometric criteria for learning disabilities. One of the 7 was not included in the study because, in discussion of her test results indicating that she had learning disabilities, she reported several years of addiction to glue sniffing. Three more of the seven were not included in the study because their test results, indicating that they had learning disabilities, were not consistent with their academic or work histories (Katz, Goldstein, Rudisin, and Bailey, 1993). All three reported significant stress in addition to job loss, including their own illness or the serious

illness of a close family member, and loss of a home. The remaining three of the seven HRD-sponsored program participants were placed in the Clinic-LD group.

Three of the four additional unemployed volunteers were found to have learning disabilities, and were included in the Clinic-LD sample. Thus, the final Clinic sample included 19 individuals with learning disabilities and seven unemployed individuals without learning disabilities.

Measures

Demographics

Highest educational level successfully completed was used as a measure of educational success. The categories were: High School; College (or other accredited post-secondary training); University.

Socioeconomic status (SES) was calculated according to the Blishen Scale (Blishen, Carroll, and Moore, 1987). The Scale is a composite of the prevailing income and education levels in each occupation, and provides codes based on full-time employment only. For students 25 years old or younger the SES of the supporting or higher scoring parent was used. For students 26 years old or older their own occupation prior to returning to formal studies was used. For the clinic and clinic comparison groups SES according to the Blishen Scale was used if the individuals held jobs. In all other cases, including individuals on Social Assistance, Family Benefits Allowance and Unemployment Insurance, SES was coded as 20.00, consistent with the lowest codes on the scale (e.g., service station attendants, 21.47; food and beverage serving occupations, 23.31; lodging cleaners, 21.37; childcare occupations, 23.70).

Psychometric Measures

Three broad categories of measures were used in the study; cognitive, academic achievement, and the LD screen. The cognitive and academic achievement tests used were well-known standardized tests frequently used in the assessment and identification of adults with learning disabilities (e.g., Beers, Goldstein, and Katz, 1994; Bruck, 1993; Shafrir and Siegel, 1994a; Vogel and Adelman, 1992)

Cognitive measures: A short version of the Wechsler Adult Intelligence Scales-Revised (WAIS-R) (Wechsler, 1981) consisting of the Block Design and Vocabulary subtests was used to obtain an estimated IQ

score. This IQ estimate has been found to correlate .90 with full scale IQ (Sattler. 1988; Silverstein, 1982).

Academic achievement measures: The complete Wide Range Achievement Test-1993 Edition (WRAT3) (Wilkinson, 1993) was used to measure single word reading, spelling to dictation, and computational arithmetic skills. The WRAT3 has two equivalent forms (Tan and Blue). The Blue form was used in this study. The Reading subtest requires testees to pronounce aloud individual words from a list of words of gradually increasing difficulty. It tests sight reading and decoding skills, and is not a timed test. The testee is stopped after ten consecutive errors. On the Spelling subtest the testee writes up to 40 words from dictation with a maximum time of 15 seconds per word, although if a testee is in the process of writing a word at the 15-second mark, sufficient time to complete the word may be provided (Wilkinson, 1993). The testee is stopped after ten consecutive words misspelled. The arithmetic subtest is a timed 15-minute test consisting of written arithmetic computation problems of gradually increasing difficulty and complexity. Absolute Scores, Standard Scores, Grade Scores, and Percentiles are provided for each of the three WRAT3 subtest areas. The median test coefficient alphas range from .85 to .95. The alternate form correlations for the WRAT3 substantiate the reliability of the instrument. They are .98 for Reading, Spelling, and Arithmetic. Concurrent validity as indicated by the correlations of the WRAT3 with other achievement tests is acceptable (Wilkinson, 1993).

The Reading Rate and Reading Comprehension subtests of the Nelson-Denny Reading Test (Brown, Fishco, and Hanna, 1993) were used in this study. The Reading Comprehension subtest comprises seven reading passages and a total of 38 questions, each with five answer choices. The time limit is 20 minutes, the first minute being used to determine reading rate. The test has two equated forms, Form G and Form H. Form H was used in this study. The test was normed on three populations of students (high school, two-year college, and four-year college) and provides norms for each of the three groups for the beginning and end of the school year. Scaled Scores, Grade Equivalent Scores, and Percentiles are provided for each educational level. Percentile scores were used in this study, as the scaled score equivalent of the 50th percentile varies across groups for which norms are provided.

The Word Attack subtest of the Woodcock-Johnson Tests of Achievement-Revised (WJ-R) (Woodcock and Johnson, 1989) was used as a test of phonological processing which has been found to be an often underdeveloped ability in individuals with learning disabilities (Bruck, 1993; Shafrir and Siegel, 1994; Siegel and Ryan, 1988; Vogel and Adelman, 1992) and associated with deficits in reading and spelling.

The Smith Learning Disabilities Screen: The SLDS was developed in Study 1 reported herein (Appendix E). It is a paper-and-pencil questionnaire. Questions are read to individuals who mark their responses on their own questionnaires. There are 20 items. Eleven items are questions related to manifestations of learning disabilities. The remaining nine items are filler items. Individuals are asked to respond Yes if the question asks about a behaviour that is a problem for them, No if the question asks about a behaviour that is not a problem for them, and Used To if the question is about something that used to be a problem for them, but no longer is a problem at the time of testing. Yes and Used to are scored as positive responses, and No is scored as a negative response. The total number of learning-disabilities-related items responded to positively represents the score for each person.

Criteria for Identification As Having Learning Disabilities

Learning disabilities classification was based on the definitional criteria that participants had to be functioning within the average range of intellectual ability (estimated IQ score of 80 or higher on a short form of the WAIS-R as previously discussed), and exhibit a deficit (at or below the 25th percentile) in one of the academic tests used in the study. Participants were placed in the learning disabilities group if they scored at or below the 25th percentile on one of the two WRAT3 subtests of Reading or Arithmetic (see Shafrir and Siegel, 1994), or on the Nelson-Denny Test of Reading Comprehension. The Nelson-Denny was selected because it has norms suitable for the populations included in this study (college and university students), and because Shessel (1995) and Weaver (1995) found it a useful discriminator of learning disabilities in adults. All definitions of learning disabilities include exclusionary clauses indicating that learning disabilities are not caused by, but may coexist with, visual, hearing, or motor handicaps, mental retardation, emotional disturbance, or environmental disadvantage. Participants were questioned to determine that none of the aforementioned problems were, or had been, present to confound test results. In addition, they were asked if they had ever sustained head injuries that

resulted in loss of consciousness, and if they had, or had ever had, problems with drug or alcohol abuse. A summary score sheet (Appendix F) was used to record responses, and individuals were excluded from the study if they reported problems in any of these areas.

Procedure

Letters distributed by college or university professors (Appendix G) were signed by students who wished to participate and were returned to their professors. Forms were returned to the researcher who contacted the students by telephone to arrange a meeting time and place. Members and former members of the church youth group were contacted by the researcher by telephone and arrangements were made with willing participants for a time and place to meet. All participants in the Clinic population were asked by the researcher during the course of service delivery if they would be willing to participate in the study. For the clinic comparison group the researcher visited HRD-sponsored classes to make brief presentations about the purpose of the study and to circulate recruitment letters (Appendix H). Participants who were willing to take part in the study provided their names and telephone numbers and returned the forms to the researcher. They were later contacted by telephone to make arrangements to meet with the researcher.

All testing was conducted in the psychoeducational clinic of a university, in space provided by the college, university or agency, or in the private office of the researcher. Care was taken in the administration of the SLDS to meet criteria known to positively affect the validity of self-evaluation (Maybe and West, 1982). Specifically, participants were told that the results would be compared with criterion measures, they were guaranteed the anonymity of the results, and the instructions and questions emphasized comparison with others.

All testing was conducted individually and privately. Each participant signed a consent form (Appendix I). Demographic information was collected and recorded on the Summary Form. Participants were asked if they had ever taken medication for psychiatric illness or were doing so at the time of testing, if they had ever had a head injury which resulted in loss of consciousness, and whether they had any history of drug or alcohol abuse. Individuals were excluded if they met any of the above conditions. While it is possible for such individuals to have learning disabilities, for the purpose of this study it was deemed preferable to avoid the possible

confounding of results by including them. Individuals were not excluded if they were taking, or had ever taken, medication related to attention and anxiety, as these are not uncommon for persons with learning disabilities.

The learning disabilities screen was read to participants while they followed along on their own copies and marked their answers. For each item, participants circled Yes if the question applied to them, No if it did not, and Used To if the question referred to something that used to be a problem for them, but was no longer so at the time of testing. Participants also gave their responses orally so the examiner could verify a match between intended and written answers. Yes and Used To were scored as positive responses, and No as negative. Scores were calculated as the number of learning-disabilities-related items to which the participant responded positively.

Cognitive ability was measured using a prorated formula of the Information and Block Design subtests of the Wechsler Adult Intelligence Scales-Revised (WAIS-R) (Sattler, 1988). All participants scored at or above 80.

Participants were asked if they wished to receive a written summary of their test results at the conclusion of the project. Those who were found to have learning disabilities and who had not previously been so identified were provided with referrals to the OISE Psychoeducational Clinic and to their local Learning Disabilities Associations. Offers were also made by the researcher to complete a full psychoeducational assessment at a significantly reduced cost. In some instances letters containing the test results were provided to students to take to the Special Needs Offices of their colleges immediately following the testing.

Test-retest reliability was measured by obtaining a derived SLDS score for the 31 participants from Study 1 who agreed to participate in Study 2. The derived scores were obtained by comparing responses from the original questionnaires for only those learning-disabilities related questions retained in the revised learning disabilities screen. Thus there were two scores based on identical questions for each subject taking part in both studies. The interval between administration of the original questionnaire and the SLDS ranged from two to four months.

Data Analysis

Three main groups were compared: (a) Clinic population (n=19) referred for psychoeducational services related to learning disabilities and a comparison group (n=7) of unemployed individuals with no prior diagnosis of learning disabilities; (b) College students with learning disabilities (n=12) and a comparison group of college students without learning disabilities (n=14); (c) University students with learning disabilities (n=13) and a comparison group of university students without learning disabilities (n=17). These groups are designated by Location (Clinic, College, University) in the results section. Inclusion in the LD groups was based on scores on psychometric tests as described below.

First, descriptive statistics on the variables were calculated. Second, test reliability and validity were assessed. Third, a comparison of the relative contributions of the cognitive variables, achievement variables, and demographic variables to SLDS scores was made. Finally, categorical analyses were conducted to determine appropriate cut-off scores by Location and by Age. Post-hoc analyses were conducted to determine whether there was evidence of significant differences in SLDS scores for subgroups of participants classified according to results on the different tests used in the study. The post-hoc analyses were not part of the original research design. All data analyses were conducted using the SPSS for Windows Version 6.1, or SPSS for Windows Version 7.0, statistical packages.

Results

Description of Sample

Eighty-two individuals participated in Study 2, 44 with learning disabilities (LD), and 38 without learning disabilities (NotLD). Twenty six represented a Clinic group referred for psychoeducational assessment or treatment related to learning disabilities (n=19) and a comparison group of unemployed individuals (n=7). Twenty-six represented a sample of College students with learning disabilities (n=12) and without learning disabilities (n=14). Thirty represented a sample of University students with learning disabilities (n=13) and without learning disabilities (n=17). Gender was distributed evenly across the sample between groups. Table 7 provides a summary of demographic information.

Table 7

Demographics for Total Sample

		Clinic		College		University		Total
		LD N=19	NotLD N=7	LD N=12	NotLD N=14	LD N=13	NotLD N=17	82
Gender	M	12	5	4	10	5	7	43
	F	7	2	8	4	8	10	39
Age	x	27.74	35	22.75	25.43	28	23.35	26.37
	SD	5.59	7.51	4.710	8.97	9.29	5.36	7.54
SES*	x	29.34	25.26	42.52	52.51	58.83	66.65	47.29
	SD	14.25	13.92	8.757	10.23	14.65	13.44	19.49
ED**	x	2.56	3.33	2.09	2.33	2.66	2.82	2.59
	SD	.89	.82	.54	.78	.98	1.01	.90

* SES coded according to the Blishen Scale

** ED = Highest Level of Education Completed

1 = < High School
2 = High School
3 = Community College Certificate or Diploma or Equivalent
4 = University Degree

All participants had estimated IQ scores within or above the average range (at or above 80) (Wechsler, 1981), and had no sensory, emotional, or substance abuse disabilities, or traumatic head injury. They were classified as LD or NotLD according to standardized test scores on the WRAT3, Reading and Arithmetic subtests, and the Nelson-Denny Test of Reading Comprehension. Those who scored at or below the 25th percentile on one or more of the tests were classified as LD (n=44) and those who scored at or above the 26th percentile on all of those tests were classified as NotLD (n=38). Reading Rate scores were obtained as part of the Reading Comprehension test, but were not used as classification criteria. Two additional tests were administered because they measure areas of functioning often associated with deficit functioning in adults with learning disabilities, but scores were not used for classification purposes because there is no literature to support such a practice. The tests are WRAT3, Spelling subtest, and the Woodcock-Johnson Word Attack subtest (see Psychometric Measures section for description of the properties of these tests). Test results are shown in Table 8.

Of the 44 individuals classified as having learning disabilities, 24 had been previously diagnosed, and 20 had not been previously diagnosed, but had always had trouble in school, had received extra help in school, or thought they had learning disabilities. The remaining four had no previous diagnoses, and reported only mild problems in school, but had experienced serious difficulties in adulthood in jobs and relationships. (Three of these four had WRAT3 Arithmetic scores below the 20th percentile, and the fourth scored at the 12th percentile on the Nelson-Denny Test of Reading Comprehension within the 20-minute time limit, but at the 79th percentile with additional time.)

Reliability of SLDS

Test reliability was measured using Cronbach's alpha. The standardized item alpha was .79. (See Appendix J for the complete Reliability Scale.)

A subsample of 31 individuals participated in both Study 1 and Study 2 (Clinic, n=1; College and University Students, n=30). Derived scores from the original learning disabilities questionnaire were obtained for each individual by calculating scores based on their responses to those questions retained in the SLDS. The

time elapsed between administrations ranged from two to four months. These derived scores were compared with SLDS scores. Test-retest reliability as measured by a Pearson Correlation was .89.

Criterion Validity of SLDS

Criterion validity was examined by determining whether participants with and without LD obtained significantly different scores on the SLDS. Additional variables (Age, SES, IQ, Location, Gender, Education) were considered to assess their possible effects on SLDS scores.

Effectiveness of the SLDS

A t-test was carried out in order to specifically examine the differences in SLDS scores between participants with and without learning disabilities. Results are shown in Table 9. A significant difference was found between the mean SLDS scores of participants with and without learning disabilities ($t(80) = 6.86$, $p < .0005$). Participants with learning disabilities, as a group, obtained higher scores than those without learning disabilities. Some overlap is evident, suggesting that there may not be a clean break point in SLDS scores between those who do and do not have learning disabilities (See Table 10 for frequency distribution).

Contributions of Demographic and Classification Variables to SLDS Scores

In order to examine the effectiveness of the SLDS within the three main groups in the study a two-way ANOVA was calculated with SLDS scores as the dependent variable and Learning Disabilities and Location as independent variables. The results indicated that there was a significant effect for Learning Disabilities ($F (1,3) = 51.28$, $p = <.0005$) and Location ($F (2,3) = 3.14$, $p = .05$). There was also a significant interaction effect for Learning Disabilities and Location ($F (2,3) = 5.71$, $p = .005$) (See Table 11).

Table 8

Cognitive and Academic Test Results for Participants

		Clinic		College		University	
		LD N=19	NotLD N=7	LD N=12	NotLD N=14	LD N=13	NotLD N=17
IQ*							
	x	101	106	102	114	110	118
	SD	16.69	6.40	11.10	14.82	10.97	11.40
	Range	82-136	97-114	89-125	91-144	94-130	97-136
WRAT3-R*							
	x	96.13	103.5	98.91	98.92	101.3	108.6
	SD	12.84	7.12	8.76	26.12	9.17	6.11
	Range	64-118	94-109	90-118	95-118	84-114	97-116
WRAT3-S*							
	x	98.63	107.83	102.90	110.33	103.92	111.59
	SD	15.07	6.49	11.67	7.19	11.07	6.98
	Range	58-125	95-120	80-120	99-126	84-117	97-125
WRAT3-A*							
	x	86.50	101.12	88.45	99.83	94.17	108.18
	SD	10.14	5.64	8.31	7.28	16.26	9.95
	Range	70-103	96-117	75-108	91-115	72-120	93-129
N-D. R**							
	x %ile	32.6	59.5	52.0	60.8	26.5	64.3
	Median	27	57.5	45.0	54.5	27.0	58.0
	Range	1-87	27-91	10-92	12-93	1-67	2-99
N-D. COMP**							
	x %ile	13.9	51.0	56.2	66.8	24.6	55.9
	Median	4.4	54.5	51.0	68.0	22.0	54.0
	Range	1-63	26-75	15-87	38-98	1-88	26-88
W-J. RWA							
	x	98	111	102	114	102	119
	SD	16	11	21	16	15	23
	Range	64-126	98-120	73-138	87-144	78-132	90-180

IQ — Wechsler Adult Intelligence Scales-Revised. IQ estimate (x = 100, S.D. = 15)
WRAT3 — Wide Range Achievement Test, 1993 Edition, (x = 100, S.D. = 15)
WRAT3-R Reading subtest
WRAT3-S Spelling subtest
WRAT3-A Arithmetic subtest
N-D,R — Nelson-Denny Reading Rate
N-D,COMP — Nelson-Denny Test of Reading Comprehension, (x = 200, S.D. = 25)
W-J,RWA — Woodcock-Johnson, Revised, Tests of Achievement; Word Attack subtest (x = 100, S.D. = 15)

* Scores reported are standard scores.
** Scores reported are percentiles.

Table 9

t-test for Independent Samples of LD

Variable	Number of Cases	SLDS Mean	SD	SE of Mean
LD	44	6.91	2.46	.37
Not LD	38	3.19	2.49	.41

Mean Difference = 3.72

Levene's Test for Equality of Variances: F = <.0005, p = .982

t-test for Equality of Means

Variances	t-value	df	2-Tail Sig	95% SE of Diff	CI for Diff
Equal	6.86	80	<.0005	.55	(2.67, 4.86)
Unequal	6.85	76.55	<.0005	.55	(2.67, 4.86)

Table 10

Frequency Distribution of SLDS Scores for LD and NotLD

SLDS Score	LD	NotLD
0	0	7
1	0	7
2	2	1
3	2	4
4	3	6
5	6	6
6	8	2
7	2	4
8	4	1
9	10	0
10	5	0
11	2	0

Table 11

ANOVA for Effect of Learning Disabilities and Location on SLDS Scores

	LD SLDS Mean Scores	NotLD SLDS Mean Scores
Clinic	8.26 (n 19)	1.83 (n 7)
College	6.50 (n 12)	4.60 (n 14)
University	5.62 (n 13)	2.53 (n 17)

Source of Variation	Sum of Squares	DF	Mean Squares	F	Sig of F
Main Effects	337.72	3	112.58	22.37	<.0005
LD	288.75	1	288.75	57.38	<.0005
Location	48.97	2	24.49	4.866	.010
2-Way Interaction	57.47	2	28.73	5.71	.005
LD x Location	57.47	2	28.73	5.71	.005

Further analyses were conducted to explore the relationship of Location and Learning Disabilities to SLDS scores. The results of t-tests indicated that there is a significant difference between SLDS scores of participants with and without learning disabilities in the Clinic, College, and University samples (Table 12).

Mean SLDS scores are higher for the Clinic LD sample than for the College LD sample, and the mean SLDS scores are higher for the College LD sample than for the University LD sample. Differences between LD and NotLD are most extreme in the Clinic sample, less so in the University sample, and least different in the College sample. Nevertheless, mean SLDS scores are significantly higher for all LD groups than for all NotLD groups.

In order to understand what might be contributing to the Location score differences an ANCOVA was calculated with Age, IQ, and SES as covariates (Table 13). The regression shows that the covariates do have explanatory power for the differences between Locations. IQ has most explanatory power, followed by SES, and then Age. All relationships are negatively correlated, indicating that as IQ, Age, and SES increase, SLDS scores decrease. This is what would be expected, given that IQ and academic achievement are related, and academic achievement and SES are related (Maybe and West, 1982).

A graphical illustration of the interaction of LD and Location is shown in Figure 3. It shows that the means of SLDS scores for the sample of adults with learning disabilities decrease from Clinic to College to University, indicating that the number of learning disabilities-related problems experienced by individuals decreases across those settings, consistent with increasing IQ and SES. However, the mean SLDS scores are lower for the NotLD portion of the Clinic sample than for the other two samples. Inspection of the raw data shows that the NotLD Clinic sample is older than all other groups, and has lower SLDS scores than all other groups. This is consistent with the finding that age is negatively correlated with SLDS scores.

Cross-tabulation analyses were conducted to identify the optimal cut-off scores for the SLDS, and to determine whether different cut-off scores were indicated for the locations in this study, or for different age groups.

In the Locations analyses, based on a cut-off score of 4, results indicate that there was a relationship between how participants were classified based on SLDS scores and how they were classified according to

Table 12

t-tests for Significance of SLDS by Location

	LD			NotLD			
Location	n	x	SD	n	x	SD	Sig
Clinic	19	8.26	2.16	7	2.29	2.89	<.0005
College	12	6.5	2.07	14	4.6	2.71	.05
University	13	5.62	2.47	17	2.53	1.94	.001

Table 13

ANCOVA for SLDS Scores by Locations with Age, Education, and IQ as Covariates

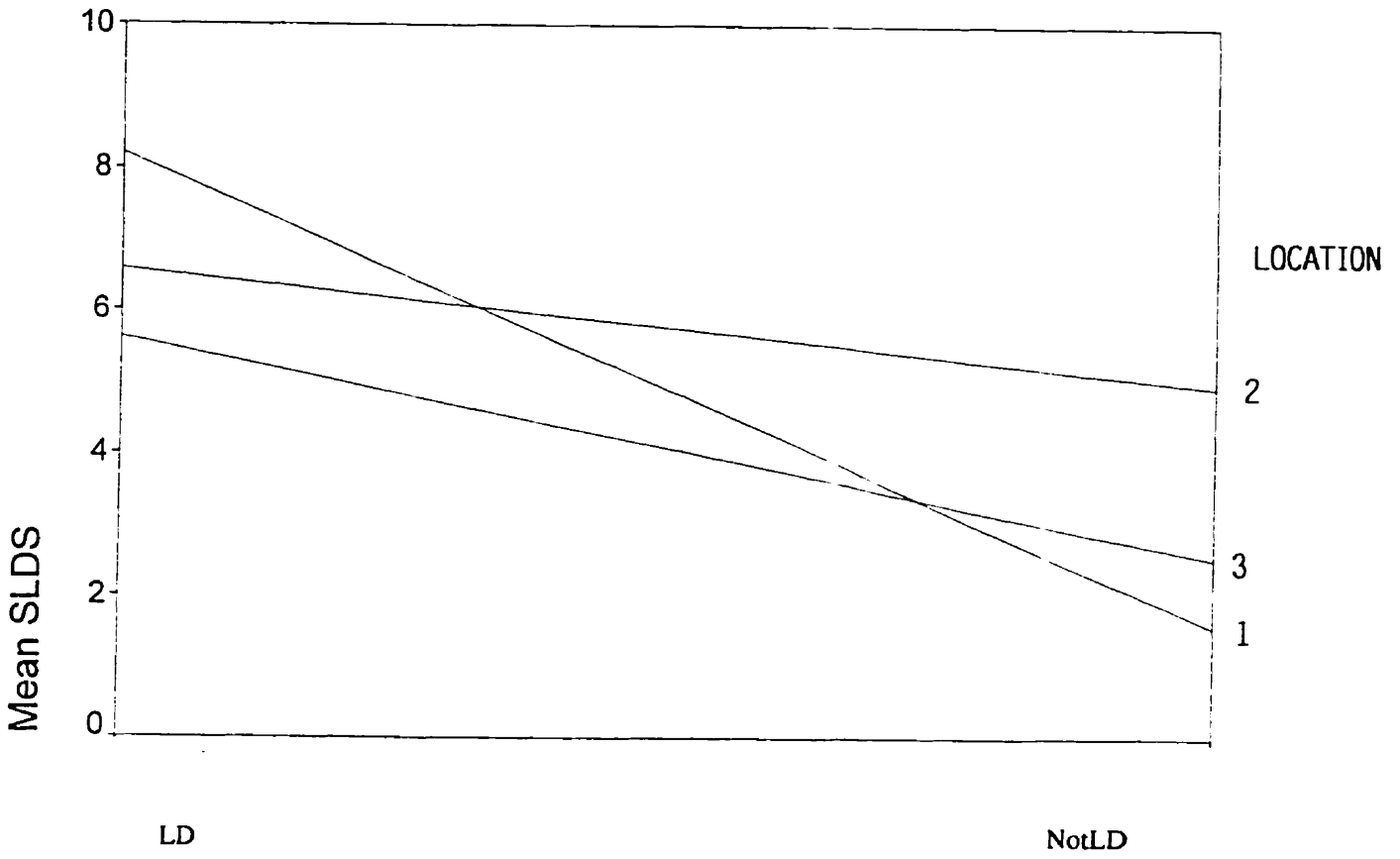
Source of Variation	SS	DF	MS	F	Sig of F
Within + Residual	337.01	73	4.62		
Regression	45.42	3	15.14	3.28	.03
LD	177.83	1	177.83	38.52	< .0005
Location	15.89	2	7.94	1.72	.186
LD By Location	45.59	2	22.79	4.94	.010

Correlation between Covariates and Predicted Dependent Variable

	Covariates		
	Age	SES	IQ
Variable			
SLDS	-.220	-.371	-.586

Figure 3

Interaction of Mean SLDS Scores for LD and NotLD by Location



Location
1 Clinic
2 College
3 University

psychometric tests for the Clinic sample (Fisher's Exact, two-tailed, = <.005) (see Table 14) and the University sample (Fisher's Exact, two-tailed, = .008) (see Table 15), but not for the College sample (Fisher's Exact, two-tailed, = .16) (see Table 16). The model explained 72% of the variance for the Clinic sample (Phi = .72259, p = < .005), 52% of the variance for the University sample (Phi = .52177, p = .004), and 32% of the variance for the College sample (Phi = .32398, p = .10). Changing the SLDS cut-off score for the College sample did not result in a more acceptable level of misclassification.

Because mean SLDS scores were lower for the University sample a separate analysis was conducted to determine whether a lower cut-off score of 3 would be more appropriate for the University sample, but results indicated that lowering the cut-off score to 3 would reduce the effectiveness of the SLDS scores to identify LD (Fisher's Exact, two-tailed, = .03) (see Table 17). The model with a cut-off score of 3 would explain only 41% of the variance for the University sample (Phi = .41349, p = 02).

The results of these cross-tabulation analyses indicated that using a cut-off score of 4 is the best way to predict learning disabilities in the Clinic and University samples. Results also indicated that the SLDS had excellent power for correctly identifying College students who do have learning disabilities according to the psychometric classification criteria used in this study (11/12, or 92%). It is not as successful in correctly predicting those who do not have learning disabilities according to the classification criteria used in this study (6/15, 40%).

For the Age analyses, subjects were separated into three age ranges: 18-25 years, 26-35 years, and 36 years and above. Based on a cut-off score of 4, results indicate that there was a relationship between how participants were classified based on SLDS scores and how they were classified according to psychometric tests for the Age 18-25 sample (n= 66) (Fisher's Exact, two-tailed, = .01) (see Table 18), and the Age 26-35 sample (n=24) (Fisher's Exact, two-tailed, = .001) (see Table 19). The model with an SLDS cut-off score of 4 would explain 41% of the variance for the Age 18-25 group (Phi = .40534, p = .006) and 71% of the variance for the Age 26-35 group (Phi = .71302, p = .0005). For the Age 36+ sample (n=11) 5 was found to be the best SLDS cut-off score (Fisher's Exact, two-tailed, = .06) (see Table 20). The model with a cut-off score of 5 would explain 67% of the variance for Age 36+ (Phi = .67082, p = .03). While a large amount of

the variance is explained with this model (67%), the Chi Square does not produce an acceptable level of misclassification.

For practical purposes, using an SLDS cut-off score of 4 for the Age 36+ group would appear to be even more appropriate. When using a cut-off score of 4, the number of individuals with actual learning disabilities correctly identified by SLDS scores did not change, but the model resulted in one false positive (Fisher's Exact, two-tailed, = .24) (see Table 21), while using a cut-off score of 5 resulted in no false positives. Using an SLDS cutoff score of 4 would explain 45% of the variance (Phi = .44854, p = .14).

Table 14

Cassification Table for Clinic Sample with Cut-off Score of 4

LD by NotLD

	SLDS 5 or above	SLDS 4 or below	Row Total
LD	17	2	19 73.1%
Not LD	1	6	7 26.9%
Column	18	8	26
Total	69.2%	30.8%	100%

	Chi Square	Significance
Fisher's Exact Test:		
One-Tailed		.00078
Two-Tailed		.00078

Statistic	Value	Approximate Significance
Phi	.72259	.0002

Table 15

Classification Table for University Sample with Cut-off Score of 4

LD by NotLD

	SLDS 5 or above	4 or below	Row Total
LD	9	4	13 43.3%
NotLD	3	14	17 56.7%
Column	12	18	30
Total	40%	60%	100%

Chi Square	Significance
Fisher's Exact Test:	
One-Tailed	.006
Two-Tailed	.008

Statistic	Value	Approximate Significance
Phi	.523	.004

Table 16

Classification Table for College Sample with Cut-off Score of 4

LD by NotLD

	SLDS 5 or above	4 or below	Row Total
LD	11	1	12 46.2%
NotLD	9	5	14 53.8%
Column	20	6	26
Total	76.9%	23.1%	100%

Chi Square	Significance
Fisher's Exact Test:	
One-Tailed	.117
Two-Tailed	.169

Statistic	Value	Approximate Significance
Phi	.323	.098

Table 17

Classification Table for University Sample with Cut-off Score of 3

LD by NotLD

	SLDS		Row
	5 or above	4 or below	Total
LD	10	3	13 43.3%
NotLD	6	11	17 56.7%
Column	16	14	30
Total	53.3%	46.7%	100%

Chi Square	Significance
Fisher's Exact Test:	
One-Tailed	.027
Two-Tailed	.032

Statistic	Value	Approximate Significance
Phi	.413	.024

Table 18

Classification Table for Age 18-25 with SLDS Cut-off Score of 4

LD by NotLD

	SLDS 5 or above	4 or below	Row Total
LD	19	4	23 50%
NotLD	10	13	23 50%
Column	29	17	46
Total	63%	37%	100

Chi Square	Significance
Fisher's Exact Test:	
One-Tailed	.007
Two-Tailed	.013

Statistic	Value	Approximate Significance
Phi	.405	.006

Table 19

Classification Table for Age 26-35 Sample with SLDS Cut-off Score of 4

LD by NotLD

	SLDS 5 or above	4 or below	Row Total
LD	15	1	16 66.7%
NotLD	2	6	8 56.7%
Column	17	7	24
Total	70.8%	29.2%	100%

Chi Square	Significance
Fisher's Exact Test:	
One-Tailed	.001
Two-Tailed	.001

Statistic	Value	Approximate Significance
Phi	.713	< .005

Table 20

Classification Table for Age 36 + Sample with SLDS Cut-off Score of 5

LD by NotLD

	SLDS 6 or above	SLDS 5 or below	Row Total
LD	3	2	5 45.5%
NotLD		6	6 54.5%
Column	3	8	11
Total	27.3%	72.7%	100%

Chi Square	Significance
Fisher's Exact Test:	
One-Tailed	.06
Two-Tailed	.06

Statistic	Value	Approximate Significance
Phi	.67	.03

Table 21

Classification Table for Age 36+ Sample with SLDS Cut-off Score of 4

LD by NotLD

	SLDS		Row
	5 or above	4 or below	Total
LD	3	2	5 45%
NotLD	1	5	6 55%
Column	4	7	11
Total	36.4%	63.6%	100

Chi Square	Significance
Fisher's Exact Test:	
One-Tailed	.08
Two-Tailed	.17

Statistic	Value	Approximate Significance
Phi	.65	.04

Post-Hoc Analyses: Differences in SLDS Scores According to LD Subgroups

Analyses were conducted to determine whether individuals with different classification criteria for learning disabilities would obtain different SLDS scores. It was predicted that those with Reading LD or Arithmetic LD would obtain lower SLDS scores than those with both Reading and Arithmetic learning disabilities.

Participants were placed in an LD-Reading group (n=14) if they scored at or below the 25th percentile on the WRAT3 Reading subtest, or on the Nelson-Denny test of Reading Comprehension, and in an LD-Arithmetic n=13) group if they scored at or below the 25th percentile on the WRAT3 Arithmetic subtest. Participants scoring at or below the 25th percentile on tests of reading and arithmetic were placed in a Reading and Arithmetic(n=17) group. Academic achievement test scores for each subgroup are shown in Table 22.

SLDS scores for the LD subgroups are shown in Table 23. The three subgroups of adults with learning disabilities were compared on total SLDS scores. No significant differences were found between the subgroups; however, there was a significant difference between each of the LD subgroups and the NotLD group.

Table 22

Academic Achievement Test Scores for LD Subgroups

		LD Subgroups			
		NotLD N 38	LD-Reading N 14	LD-Arithmetic N 13	LD Reading & Arithmetic N 17
Tests					
WRAT3-R*	x	104.8	103.1	103.5	89.3
	SD	15.8	9.5	6.6	11.7
	Range	94-109	91-116	100-109	64-94
WRAT3-S*	x	110.6	107.8	108.5	88.1
	SD	6.8	11.6	7.9	12.6
	Range	103-120	99-123	94-119	58-95
WRAT3-A*	x	104.2	101.6	84.1	82.1
	SD	8.8	9.55	5.1	7.8
	Range	94-105	91-110	81-86	70-86
N-D.R**	x %ile	62.3	32.1	52.8	26.5
	Range	2-99	1-87	4-99	1-92
	Median	74	28.5	66.5	15
N-D. Comp**	x %ile	58.8	16.1	59.7	19.2
	Range	26-98	1-50	26-88	1-82
	Median	55	15.5	63	12
W-J. RWA*	x	117.2	101.9	108.4	90.5
	SD	18.9	21.2	18.0	15.1
	Range	87-180	73-126	93-138	64-126

WRAT3 — Wide Range Achievement Test. 1993 Edition. (x = 100, S.D > = 15)
- WRAT3-R Reading subtest
- WRAT3-S Spelling subtest
- WRAT3-A Arithmetic subtest

N-D.R — Nelson-Denny Reading Rate

N-D.Comp — Nelson-Denny Test of Reading Comprehension

W-J. RWA — Woodcock-Johnson, Revised, Tests of Achievement: Word Attack subtest (x = 100, S.D. = 15)

* Scores reported are standard scores.

** Scores reported are percentiles

Table 23

SLDS Mean Scores for LD Subgroups

Subgroup	N	Mean	Std. Dev.
NotLD	38	3.19	2.49
LD-Reading	14	6.86	2.93
LD-Arithmetic	13	6.46	2.40
LD-Reading & Arithmetic	17	7.53	2.13

Discussion

Study 1 was designed to identify the number of factors needed in a screen for learning disabilities in adults and to identify specific items to include in such a screen. The study began with the identification of ten indicators of learning disabilities; however, principal components analysis established only one main learning disabilities factor. The one factor included items related to eight of the pre-identified indicators of learning disabilities. This finding provides some support for the concept that adults with learning disabilities are affected in a number of areas. This would support learning disabilities as a multifaceted construct, rather than as separate, discrete areas of dysfunction. This view of learning disabilities is consistent with the polythetic view of classification that has become dominant in the last 15 years in psychiatric classification (Blashfield, 1993) which holds that all of the characteristics used to define a category need not be present in order to make a positive diagnosis. Rather, some subset of the characteristics is sufficient. It is possible, therefore, that learning disabilities reflects deficits in many areas of neurological functioning which results in many behavioural manifestations, the particular combination of which is unique to each individual with learning disabilities.

The screen developed reflects all of the indicators articulated by adults with learning disabilities (Smith, 1991) and published definitions of learning disabilities (Hammill, 1990) except coordination and spatial orientation deficits. It may be that the latter indicators affect only a small percentage of adults with learning disabilities. There is one group of adults with a subtype of learning disabilities, referred to as nonverbal learning disabilities (Rourke, 1989), for whom spatial and motor deficits are defining characteristics. This group may represent only a small percentage (approximately 5%) of adults with learning disabilities (Casey and Rourke, 1989; Casey, Rourke, and Picard, 1991; Harnadek and Rourke, 1994; Rourke, 1989), but may be the group for whom coordination and spatial orientation deficits are primary learning disabilities indicators. This population is characterized more by the pattern of specific academic and cognitive strengths and weaknesses than by absolute scores. The omission of coordination and spatial deficits from this learning disabilities screen is statistically justifiable according to this factor analysis, but it may be that questions relating to these LD

indicators should nevertheless be included in order to ensure that individuals with nonverbal learning disabilities, although limited in numbers, would not be at risk of being missed by screening results as candidates for learning disabilities assessments.

The purpose of Study 2 was to examine the validity and reliability of the LD screen developed in Study 1. The results indicate that the SLDS appears to have adequate reliability and validity, that there is a set of indicators which together form a construct of learning disabilities in adults, and that not all adults with learning disabilities endorse all of the indicators. Several specific questions were addressed in this study and will be considered separately below.

Questions Addressed in Study 2

Is there a set of indicators common to all adults with learning disabilities?

The concept underlying the development of the SLDS was that individuals who have learning disabilities experience deficits in many areas. The present study would seem to support this view. Eight indicators associated with learning disabilities in the literature are represented in the eleven items included in the SLDS, all loading on one factor. Because higher SLDS scores are associated with learning disabilities, the assumption can be made that adults who have learning disabilities do experience difficulties in several areas. The eight indicators useful in the identification of adults with learning disabilities are: (a) poor impulse control; (b) organizational skills deficits; (c) memory deficits; (d) social skills deficits; (e) language processing deficits; (f) low self-esteem; (g) reading disabilities; (h) arithmetic disabilities.

There was, however, no single item which was endorsed by every individual with learning disabilities. This implies that, while adults with learning disabilities do appear to have deficits in several areas of functioning, there are no specific indicators common to all adults with learning disabilities. All of the questions on the SLDS refer to behaviours which may not be indicative of dysfunction in themselves. Rather, it may be the case that the frequency and severity with which these behaviours occur in adults with learning disabilities, such that the behaviours interfere with daily functioning, is what separates adults with learning disabilities from adults who do not have learning disabilities.

The number of LD indicators endorsed also appears to be important. Using 4 as the cut-off produced optimal results. Thus, an SLDS score of 4 or lower is a good indicator that an individual does not have learning disabilities, and an SLDS score of 5 or more suggests the need for referral for a full psychoeducational assessment, as the individual likely has learning disabilities.

Humour and creativity were two characteristics put forward by members of the LDAC Consumer Advisory Committee as ones which they considered to be particular characteristics of persons with learning disabilities. This study does not support that position. It is true that a high percentage of persons with learning disabilities endorsed items related to humour and creativity (89% and 97% respectively), but it is also true that the same or higher percentage of persons without learning disabilities endorsed those items (94% and 97% respectively). The perception of oneself possessing a good sense of humour and/or creativity does not seem to mitigate a sense of low self-esteem , as 72% of persons with learning disabilities endorsed items related to low self-esteem, while only 29% of those without learning disabilities endorsed low self-esteem items. Items related to humour and creativity provide good filler items, as they would seem to be items which allow individuals with learning disabilities to identify positive attributes rather than having their attention directed only to items related to their deficit areas.

The direct answer to the question of whether there is a set of indicators common to all adults with learning disabilities is that there does not seem to be such a set of indicators. It is, however, a qualified negative, as there does appear to be a set of indicators useful in the identification of adults with learning disabilities. These indicators are organizational skills deficits, poor impulse control, language processing deficits, reading disabilities, arithmetic disabilities, memory deficits, low self-esteem, and social skills deficits.

Whether low self-esteem is a primary manifestation of learning disabilities or a result of living with the failures which accompany the presence of learning disabilities is a question beyond the scope of this study, but one which merits further investigation and discussion.

To what extent is the SLDS reliable and valid?

This study indicated that the SLDS does have internal consistency as well as good test-retest reliability. It has construct validity, as it is based on the indicators of learning disabilities found in all published definitions

of learning disabilities. It also appears to have criterion validity according to the criteria outlined in Sommer and Sommer (1991), as SLDS scores were correlated with learning disabilities classification according to well-known standardized academic test instruments commonly used in the identification of learning disabilities.

Is the SLDS an effective learning disabilities screening test for adults?

This study indicates that the SLDS could be a useful tool to identify adults who are at risk for learning disabilities. It would thus be an easily and quickly administered screen which would answer many questions. For adults who have often wondered whether they might have learning disabilities, the SLDS could answer the question with a reasonable degree of accuracy. For well-functioning adults, that answer may be sufficient. For example, several university students who did not have learning disabilities told the researcher that they had often wondered if they did have learning disabilities. They were relieved to hear, in discussions following testing, that some of their concerns, which had led them to question whether they had learning disabilities, are ones which many people share (e.g. difficulty remembering certain kinds of information), but that does not necessarily mean a person has learning disabilities. For adults who are experiencing difficulty with one or more of life's major tasks of adulthood, such as education, employment, or relationships, positive results on the SLDS may indicate that a useful way to begin looking for explanations would be to have a full learning disabilities assessment.

Of the 38 individuals classified as NotLD according to the psychometric classification measures used in this study, 13 had SLDS scores of 5 or higher. Using 4 as a cut-off score, these 13 individuals would be misclassified as having learning disabilities. Examination of their academic scores suggests that the SLDS score may be appropriate as a guide for referring many of these individuals for further psychoeducational assessment. Five of the 13, while not scoring at or below the 25th percentile on the WRAT3 or Nelson-Denny test of Reading Comprehension, could have learning disabilities on the basis of phonological processing scores at or below the 25th percentile as measured by the Woodcock-Johnson Word Attack subtest or on the WRAT3 Spelling subtest, which were administered but not used as selection criteria for inclusion in the LD group, or on the basis of academic scores marginally above the cut-off point used in this study. Spelling and word attack were not used as classification criteria in this study because there is no specific precedent in adult learning disabilities research literature to support such a decision; however, there is evidence that Spelling and

phonological processing deficits are core deficits associated with learning disabilities (Bruck, 1985, 1993; Siegel and Ryan, 1988). (One person (SLDS = 7) reported that he cannot get his thoughts down on paper, and thinks he has learning disabilities. No writing tests were administered in this study, and it is possible that a full psychoeducational assessment would reveal that this person has dysgraphia (writing disability); one (SLDS = 5) scored at the 26th percentile on the Nelson-Denny Test of Reading Comprehension, and at the 25th percentile on the WJ-R Word Attack subtest; one (SLDS = 6) scored at the 26th percentile on Reading Comprehension and the 14th percentile on Reading Rate; one (SLDS = 5) obtained an estimated IQ score in the Superior range, and a score at the 19th percentile on the WJ-R Word Attack subtest; one (SLDS = 5) attained an estimated IQ score in the Superior range and scored at the 27th percentile on the WRAT3 Arithmetic subtest.) In addition to these five, one person (SLDS = 5) had been diagnosed as ADHD, and one (SLDS = 8) thinks she has learning disabilities because she has always had problems in school, despite High Average IQ. This means that seven of the 13 "false positives" who do not appear to have learning disabilities according to the classification criteria used in this study do have sufficient signs of academic weakness or attention deficit to warrant full psychoeducational assessments. If full psychoeducational assessments and use of additional classification criteria resulted in identification of learning disabilities in these seven individuals, the success rate of positive identification for those with SLDS scores of five or higher would be 84%. Five of these seven subjects were College students. This helps to explain why the SLDS did not have good predictive ability for that group, and suggests that it would be useful to test the SLDS with that population against full psychoeducational assessment results. It is possible that, under those conditions, the SLDS would have predictive power for the College group equal to that of the other groups in this study.

Of the 25 participants correctly predicted by SLDS scores as not having learning disabilities according to the psychometric classification criteria used in this study, one individual (SLDS = 4) had one score (reading rate) at or below the 25th percentile (at the 2nd percentile) on any of the tests administered, but not used as classification criteria in this study. Her reading comprehension score fell at the 33rd percentile. She had been diagnosed as having learning disabilities as a child, but all of her other achievement scores were above the 33rd percentile. For all other NotLD participants correctly predicted by SLDS scores as not having learning

disabilities according to the psychometric classification criteria used in this study, the lowest academic achievement score fell at the 32nd percentile, with most scores falling at or above the 40th percentile. Thus, a cut-off score of four is supported, with referral for assessment for individuals scoring at or higher than 5 seeming to be appropriate.

Of the 44 individuals classified as having learning disabilities according to the psychometric criteria used in this study, seven had SLDS scores of 4 or lower. There does not appear to be any pattern to, or explanation for, these false negative misclassifications. All IQ ranges included in the study except Very Superior were represented in the group. One scored below the 9th percentile on all academic tests administered. Three scored below the 25th percentile on the Nelson-Denny test of Reading Comprehension only. One scored below the 25th percentile on the WRAT3 Reading and Arithmetic subtests and on the Nelson-Denny test of Reading Comprehension. Two scored below the 25th percentile on the WRAT3 Arithmetic subtest only. Thus, in this study 15% of persons taking the SLDS received false negative scores which cannot be explained. Five of the 7 had previous diagnoses of learning disabilities. Four of these five were not finding that their learning disabilities were causing problems in their lives at the time of testing. The fifth has very severe learning disabilities in all academic areas, and processed information extremely slowly. Of the remaining two, one was not aware that she had learning disabilities, but reported that she is very "hyper", and must run every day in order to function "normally" (her words). The other one was referred for a psychoeducational assessment after failing his first year of university, and despite attaining scores indicating academic deficits in reading (decoding and comprehension) and arithmetic, still did not believe he had learning disabilities, and was not open to suggestions for intervention. Possible explanations for these false negative scores could be: (a) some individuals with learning disabilities may be unwilling (or unable) to acknowledge areas of weakness; (b) some individuals may have highly specific deficits associated with learning disabilities as measured in this study, and not be affected in a number of areas as most individuals with learning disabilities seem to be; (c) some individuals with learning disabilities may lack the insight required to be aware of their deficit areas in comparison with most people.

The number of false negative scores is of concern because it means that some persons with learning

disabilities could fail to be referred for psychoeducational assessments on the strength of their SLDS scores and thus denied services or accommodations. This places emphasis on the importance of administering the SLDS in conjunction with an interview (see Benezra, Crealock, and Fiedorowicz, 1993 for an excellent example) which would probe the individual's academic, work, health, and social history . Reports indicating significant difficulties with academic history would need to be considered as well as SLDS scores, and a judgment regarding whether to refer the client for psychoeducational assessment made on that basis.

The reason for administering full psycheducational assessments is that learning disabilities-related deficits in areas not measured in this study could be identified. These would include writing skills, attention, memory, social skills, coordination, and spatial orientation. The battery of tests used in such an assessment could include: Wechsler Memory Scale-Revised (Wechsler, 1987) (memory and attention/concentration); Wechsler Adult Intelligence Scales-Revised (Wechsler, 1981) (attention, visual-spatial skills, verbal reasoning skills, processing speed); the Wisconsin Card Sorting Test (Heaton et al., 1993) (attention, executive functions such as ability to conceptualize the nature of a problem, planning, response to feedback, ability to maintain set); Grooved Pegboard Test (Technical Industries Ltd.) (coordination, processing speed); Woodcock-Johnson Psycho-Educational Battery (Woodcock and Johnson, 1989) (auditory and visual processing, memory, attention, writing skills, processing speed). Social competence is the one area for which there are no standardized tests available. Social skills functioning can be evaluated through careful history-taking, probing questions, and clinical observation. The Means-Ends Problem Solving Test (Spivack, Platt, and Shure, 1976) is a good instrument to use for clinical purposes to measure gains in social functioning as a result of treatment, and it has been found to be effective for adults with learning disabilities, but there are no diagnostic criteria associated with it.

Although age did have some correlation to SLDS scores, a differential SLDS cut-off score was not indicated according to age. Statistically there was support for an SLDS cutoff score of 5 for the Age 36+ group; however, inspection of the raw data indicated that 4 would likely be at least as effective, if not more so. The one individual with the false positive LD identification produced by the model with a cut-off score of 4 obtained significantly different scores for the two subtests of the WAIS-R administered (Wechsler, 1981), and

therefore a referral for a full psychoeducational assessment would be appropriate. The individual scored 16 on the Vocabulary subtest of the WAIS-R, two standard deviations above the mean, at the 98th percentile, and 9 on the Block Design subtest, 1/3 standard deviation below the mean, at the 37th percentile.

Overall, then, the SLDS may identify adults with learning disabilities with 84% to 86% accuracy. Individuals with scores of 5 or more would benefit from referral for full psychoeducational assessments to identify specific areas of dysfunction. Because psychometric training is not required for administration of the SLDS it could be used by professionals in a number of fields such as human resources, employee assistance programs, post-secondary educational institutions, and medical facilities.

The unemployed individuals recruited as a comparison group for the clinic population represent a particularly interesting phenomenon. Eleven of the 16 (68%) recruited were found to have learning disabilities according to the psychometric criteria used in this study, including 7 of the 12 (70%) individuals who were attending HRD-sponsored programs. Of the four who were not in HRD-sponsored programs, one was on Social Assistance and one has received unemployment insurance payments off and on for several years. One was a college drop-out, and one has never held a full-time job.

Community colleges and Human Resources Development Canada may have a particular interest in this group. College staff involved in providing services for students with disabilities are often unable to meet the needs of students in HRD sponsored programs because of the short duration and inflexibility of most such programs. By the time a student in a HRD sponsored program comes to the attention of the Special Needs staff, it is frequently too late to put accommodations in place to help the student, and the staff are unable to extend the timeline of the student's program. College staff are aware that many individuals complete one HRD-sponsored program only to turn up at a later time in another such program. Perhaps better up-front screening of applicants to HRD-sponsored programs, with appropriate services for those identified as having learning disabilities, would make better use of scarce resources while providing more useful training opportunities to clients geared to their particular strengths and weaknesses.

Are there differences in SLDS scores between learning disabilities subgroups?

There were no significant differences in SLDS scores between participants with low reading scores only, low arithmetic scores only, and low scores in reading and arithmetic. All three subgroups of adults with learning disabilities obtained higher SLDS scores than the adults without learning disabilities. Due to low statistical power in these analyses, it would be inappropriate to conclude, however, that significant differences between subgroups would not be evident in a larger sample. The breakdown of group membership in this study is similar to the proportions reported for children by Geary (1993). Although arithmetic disabilities have been relatively neglected in learning disabilities research, its incidence in children has been reported as slightly higher (6.4%) than is the incidence of reading disabilities (4.9%) among elementary and junior high school students (Badian, 1983). Badian also reported that 56% of children with reading disabilities also had arithmetic disabilities, and 43% of children with arithmetic disabilities also had some form of reading disabilities.

It was interesting to note that only one participant in the LD-R group was classified on the basis of below Average WRAT3 Reading score only, while 12 were classified on the basis of below Average Nelson-Denny Reading Comprehension scores. This is consistent with the findings of Shessel (1995) who found that the only test score (among the tests used in her study) by which many high-functioning adults with learning disabilities could be classified was reading comprehension. It may be that some adults with reading learning disabilities compensate for their phonological deficits which underlie reading disabilities (Shafrir and Siegel, 1994b); Bruck, 1985, 1993) by using visual strategies to recognize individual words (Shafrir and Siegel, 1994b), but do not reach the level of automaticity required for good reading comprehension.

In the LD-A & R group the pattern of reading scores was different. In that group of 17, 6 had WRAT3 Reading scores below the 26th percentile, 6 had Nelson-Denny scores below the 26th percentile, and 5 had scores below the 26th percentile on both the WRAT3 and the Nelson-Denny.

For practical purposes, the differences in SLDS scores have no importance other than to identify those who likely do have learning disabilities, and for whom further assessment is required to determine the nature and severity of the learning disabilities. The higher the SLDS score, the more areas of deficit are likely to be found.

CHAPTER V

Conclusion

The purpose of these studies was to develop and test a screening instrument to be used in the identification of adults with learning disabilities. It was determined that there is no list of learning disabilities indicators common to all adults with learning disabilities; however, it was determined that there is a set of learning disabilities indicators which form a construct of learning disabilities in adults. These indicators are useful in the identification of learning disabilities in adults:

1. Organizational skills deficits
2. Low self-esteem
3. Social skills deficits
4. Language processing deficits
5. Poor impulse control
6. Reading disabilities
7. Arithmetic disabilities
8. Memory deficits

The Smith Learning Disabilities Screen based on these indicators, developed and tested in these studies, has some ability to identify learning disabilities in adults.

The data suggest that the SLDS is a screen and should not be used as a substitute for a diagnostic psychoeducational assessment. There may be some situations, as discussed in Chapter 4, where the results of the SLDS would be sufficient to answer the presenting question. In most instances, however, SLDS scores would be used to determine if a full psychoeducational assessment were warranted. It should never be administered to large groups of individuals who have no reason to believe they might have learning disabilities, as false positive scores could then lead to unnecessary concerns by individuals who do not have learning disabilities. It is intended to be administered individually by a responsible professional in the case of an individual who is experiencing some difficulties in adjustment or achievement, and is seeking an explanation for the problems. It should be administered in conjunction with an interview as discussed previously, and individuals completing the SLDS should be made aware of its purpose and provide informed consent prior to completing the test. Referrals for psychoeducational assessment should be made only when an individual scores at or above 5 on the SLDS, and has a history of academic and/or vocational struggles.

The Smith Learning Disabilities Screen represents a unique contribution to the field, as no such instrument exists at the present time. It would allow employers, educators, and health and social service workers to evaluate the necessity of a full psychoeducational assessment for an employee, student, or client in a direct and cost-effective manner. Further assessment, when indicated, could then provide the basis for intervention. The SLDS would seem to have particular relevance for unemployed individuals.

Implications for Future Research

The SLDS should be tested with larger samples in several target populations, and results compared with results of full psychoeducational assessments. It is possible that doing so would result in identification of some adults with learning disabilities that may have been misclassified in this study, such as those with dysgraphia, spelling deficits, and nonverbal learning disabilities.

Consideration of a parallel test completed by a 'significant other' would be interesting. It is possible that considering input from two sources would increase the effectiveness of the SLDS in correctly identifying adults with learning disabilities. Exploration of discrepancies between test results from 'self' and 'others' could identify instances of denial on the part of individuals with learning disabilities, false responding on the part of individuals who may wish to have some form of disability identified for reasons having to do with attention-seeking, or inaccurate self-reports due to limited insight or difficulties in processing the language of the test. A system of tracking the number of times individuals request explanation or repetition of test questions would also indicate whether the wording of any of the questions is problematic.

The SLDS would also need to be tested with groups representing other clinical populations to determine the extent to which it can distinguish between NotLD clinical groups, such as individuals with emotional disabilities, traumatic head injury, and substance abuse problems.

These studies did not identify a specific set of characteristics common to all adults with learning disabilities. Identification was correlated with overall scores on the SLDS rather than on responses to any specific number of learning disabilities indicators. It appears that the overall level of dysfunction is important in learning disabilities identification rather than responses to specific questions. If it is the case that it is the degree

to which adults with learning disabilities are affected by their areas of dysfunction that identifies them, rather than the experience of difficulty in any given set of learning disabilities indicators, it may be that the use of a Likert-type format would be more effective in classifying accurately those who do have learning disabilities. Therefore it would be useful to compare two versions of the SLDS, one using the Yes-No format presented in this study, and the other using a Likert-type scale.

Coordination deficits and spatial orientation deficits are two learning disabilities indicators that were not included in the SLDS, but which merit further investigation. It would be interesting to test an alternate form of the SLDS that includes questions related to these indicators.

These studies offer support for the assumptions underlying the development of the SLDS. Psychological processes such as memory, attention, and language processing remain problem areas for adults with learning disabilities in addition to the commonly identified difficulties in specific academic subjects. Adults who have learning disabilities are aware of their problems in these areas, and able to identify their deficits in a self-report format by responding to focused questions. This was poignantly demonstrated by participants who responded vehemently to particular questions by adding statements such as "Yes! Yes! Yes!" and "I just hate that!" to their oral answers, or by putting several exclamation marks beside their written responses.

I hope that the SLDS will assist in the identification of adults with learning disabilities who have not been diagnosed previously. The identification and naming of learning disabilities could form a basis for self-understanding and acceptance. Gerber, Ginsberg, and Reiff (1992) identified a high level of acceptance as one of the attributes of highly successful adults with learning disabilities. Identification could also lead to the provision of appropriate services and accommodations. Development of the SLDS is seen as an important first step in the development of a consistently reliable screening test to identify adults with learning disabilities.

APPENDIX A: DEFINITIONS OF LEARNING DISABILITIES

Appendix A

DEFINITIONS OF LEARNING DISABILITIES

1. Kirk's Definition

A learning disability refers to a retardation, disorder, or delayed development in one or more of the processes of speech, language, reading, writing, arithmetic, or other school subjects resulting from a psychological handicap caused by a possible cerebral dysfunction and/or emotional or behavioral disturbances. It is not the result of mental retardation, sensory deprivation, or cultural and instructional factors. (Kirk, 1962, p. 263)

2. Bateman's Definition

Children who have learning disorders are those who manifest an educationally significant discrepancy between their estimated intellectual potential and actual level of performance related to basic disorders in the learning process, which may or may not be accompanied by demonstrable central nervous dysfunction, and which are not secondary to generalized mental retardation, educational or cultural deprivation, severe emotional disturbance, or sensory loss. (Bateman, 1965, p. 220)

3. The National Advisory Committee on Handicapped Children Definition

Children with special (specific) learning disabilities exhibit a disorder in one or more of the basic psychological processes involved in understanding or in using spoken and 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 that are due primarily to visual, hearing, or motor handicaps, to mental retardation, emotional disturbance, or to environmental disadvantage. (NACHC, 1968, p.34)

4. The Northwestern University Definition

Learning disability refers to one or more significant deficits in essential learning processes requiring special education techniques for remediation.

Children with learning disability generally demonstrate a discrepancy between expected and actual achievement in one or more areas such as spoken, read, or written language, mathematics, and spatial orientation.

The learning disability referred to is not primarily the result of sensory, motor, intellectual, or emotional handicap, or lack of opportunity to learn.

Significant deficits are defined in terms of accepted diagnostic procedures in education and psychology.

Essential learning processes are those currently referred to in behavioral science as involving perception, integration, and expression, either verbal or nonverbal.

Special education techniques for remediation refers to educational planning based on the diagnostic procedures and results. (Kass & Myklebust, 1969, pp. 378-379)

5. The CEC/DCLD Definition

A child with learning disabilities is one with adequate mental ability, sensory processes, and emotional stability who has specific deficits in perceptual, integrative, or expressive processes which impair learning efficiency. This includes children who have central nervous system dysfunction expressed primarily in impaired efficiency. (Siegel & Gold, 1982, p. 14)

6. Wepman et al.'s Definition

Specific learning disability, as defined here, refers to those children of any age who demonstrate a substantial deficiency in a particular aspect of academic achievement because of perceptual or perceptual-motor handicaps, regardless of etiology or other contributing factors. The term perceptual as used here relates to those mental (neurological) processes through which the child acquires... basic alphabets of sounds and forms. (Wepman, Cruickshank, Deutsch, Morency, & Strother, 1975, p. 306)

7. The 1976 U. S. Office of Education Definition

A specific learning disability may be found if a child has a severe discrepancy between achievement and intellectual ability in one or more of several areas: oral expression, written expression, listening comprehension or reading comprehension, basic reading skills, mathematics calculation, mathematics reasoning, or spelling. A "severe discrepancy" is defined to exist when achievement in one or more of the areas falls at or below 50% of the child's expected achievement level, when age and previous educational experiences are taken into consideration. (USOE, 1976, p. 52405)

8. The 1977 U. S. Office of Education Definition

The term "specific learning disability" means a disorder in one or more of the basic psychological processes involved in understanding or in using language, spoken or written, which may manifest itself in an imperfect ability to listen, speak, read, write, spell, or to do mathematical calculations. The term includes such conditions as perceptual handicaps, brain injury, minimal brain dysfunction, dyslexia, and developmental aphasia. The terms does not include children who have learning disabilities which are primarily the result of visual, hearing, or motor handicaps, or mental retardation, or emotional disturbance, or of environmental, cultural, or economic disadvantage. (USOE, 1977, p 65083)

9. The National Joint Committee on Learning Disabilities Definition

Learning disabilities is a general term that refers to a heterogeneous group of disorders manifested by significant difficulties in the acquisition and use of listening, speaking, reading, writing, reasoning, or mathematical abilities. These disorders are intrinsic to the individual, presumed to be due to central nervous system dysfunction, and may occur across the life span. Problems in self-regulatory behaviours, social perception, and social interaction may exist with learning disabilities but do not by themselves constitute a learning disability. Although learning disabilities may occur concomitantly with other handicapping conditions (for example, sensory impairment, mental retardation, serious emotional disturbance) or with extrinsic influences (such as cultural differences, insufficient or inappropriate instruction) they are not the result of those conditions or

influences. (NJCLD, 1988)

10. The Learning Disabilities Association of America (ACLD) Definition

Specific Learning Disabilities is a chronic condition of presumed neurological origin which selectively interferes with the development, integration, and/or demonstration of verbal and/or nonverbal abilities. Specific Learning Disabilities exist as a distinct handicapping condition and varies in its manifestations and in degree of severity. Throughout life, the condition can affect self esteem, education, vocation, socialization, and/or daily living activities. (ACLD, 1986, p. 15)

11. The Interagency Committee on Learning Disabilities Definition

Learning disabilities is a generic term that refers to a heterogeneous group of disorders manifested by significant difficulties in the acquisition and use of listening, speaking, reading, writing, reasoning, or mathematical abilities, or of social skills. These disorders are intrinsic to the individual and presumed to be due to central nervous system dysfunction. Even though a learning disability may occur concomitantly with other handicapping conditions (e.g., sensory impairment, mental retardation, social and emotional disturbance), with socioenvironmental influences (e.g., cultural differences, insufficient or inappropriate instruction, psychogenic factors), and especially attention deficit disorder, all of which may cause learning problems, a learning disability is not the direct result of those conditions or influences.

APPENDIX B: LDAC DEFINITION OF LEARNING DISABILITIES

Appendix B

LDAC DEFINITION OF LEARNING DISABILITIES

12. The Learning Disabilities Association of Canada Definition

Learning Disabilities is a generic term that refers to a heterogeneous group of disorders due to identifiable or inferred central nervous system dysfunction. Such disorders may be manifested by delays in early development and/or difficulties in any of the following areas: attention, memory, reasoning, coordination, communicating, reading, writing, spelling, calculation, social competence, and emotional maturation.

Learning disabilities are intrinsic to the individual, and may affect learning and behaviour in any individual, including those with potentially average, average, or above average intelligence.

Learning disabilities are not due primarily to visual, hearing, or motor handicaps; to mental retardation, emotional disturbance, or environmental disadvantage; although they may occur concurrently with any of these. Learning disabilities may arise from genetic variation, bio-chemical factors, events in the pre- to post-natal period, or any other subsequent events resulting in neurological impairment. (LDAC, 1987, p. 5)

APPENDIX C: ORIGINAL LEARNING DISABILITIES QUESTIONNAIRE

Appendix C

ORIGINAL LEARNING DISABILITIES QUESTIONNAIRE

Please check the answer which applies to you for each question. Y = yes N = no U = used to

1. Do you frequently feel confused in your thinking?	Y	N	U
2. Do you sometimes feel as if, even though you know you are as intelligent as the people around you, they seem to be able to organize what they are doing and get it done in a more efficient way, or in less time, than you do?	Y	N	U
3. Do you think you spend more time feeling frustrated than most people do?	Y	N	U
4. Do you dislike structure, schedules, close supervision of your work, and reminders to get things done?	Y	N	U
5. Do you usually feel "on top of things"?	Y	N	U
6. Do you often feel very frustrated because you can't (or not without great difficulty) do things that other people find so easy?	Y	N	U
7. Do you have difficulty planning something such as a party or a project and having all your plans work out?	Y	N	U
8. Would you say that you have a good sense of humour?	Y	N	U
9. Do you have difficulty doing things such as paying bills on time, remembering special birthdays, writing thank-you notes or keeping your room or apartment tidy?	Y	N	U
10. When you are under pressure and facing a tight deadline, or when there is a lot of commotion going on around you, are you unable to think clearly, or do the things that you would normally have no problem doing?	Y	N	U
11. Have you often been told that you have a good sense of humour?	Y	N	U
12. Would people describe you as a very organized person?	Y	N	U
13. Do you find it hard to be as cheerful and good natured as people seem to expect you to be?	Y	N	U
14. Do you think you have a worse than average memory for certain things?	Y	N	U
15. Do you become very frustrated when you are in a traffic jam or a long lineup?	Y	N	U

16. Do people often get angry with you for leaving jobs half done?	Y	N	U
17. Do you often feel as if you are not worth very much, not living up to people's expectations of you?	Y	N	U
18. Are you often the person in a group who makes others laugh?	Y	N	U
19. Do you, from time to time, feel extremely depressed?	Y	N	U
20. Do you ever hear voices which people around you cannot hear?	Y	N	U
21. Did you feel down on yourself when you were in school?	Y	N	U
22. Do you often feel frustrated because you forget things that are important to you?	Y	N	U
23. Do people often tell you to "Take it easy", or not to "be so angry" when you don't understand why?	Y	N	U
24. Do you often feel very frustrated because people treat you as if you were not very bright, or are making excuses when you are having difficulty?	Y	N	U
25. Do you find that people often seem angry with you or irritated by you and you don't know why?	Y	N	U
26. Have you often felt as though you just don't fit in?	Y	N	U
27. Does it seem to you that you were often punished for doing things that everyone else was doing, and yet the others weren't punished?	Y	N	U
28. Do people often correct the word you have used by giving you the correct word that is very similar to the one you had used?	Y	N	U
29. Do you have a skill or hobby at which you are very good?	Y	N	U
30. Do you remember often being told to "Stop interrupting"?	Y	N	U
31. Do you believe you read much more slowly than most people?	Y	N	U
32. Do people have trouble understanding you, and ask a lot of questions, even when you think you are explaining yourself very clearly?	Y	N	U
33. Are you good at juggling your schedule to get several tasks done for a specific deadline?	Y	N	U
34. Do you often have difficulty understanding instructions?	Y	N	U
35. Do you have trouble concentrating when there is noise or confusion going on around you?	Y	N	U

36. Do you often use humour to relieve tension in a group?	Y	N	U
37. Did you have great difficulty memorizing number facts or times tables?	Y	N	U
38. Do you often do things you wish you hadn't done?	Y	N	U
39. Do you get yourself into difficulties because you act before you think, so you would, for example, spend too much money on payday and not have enough left to pay the rent?	Y	N	U
40. Have you often felt as though people don't accept you for the person you are?	Y	N	U
41. Can you remember people, parents and teachers in particular, telling you to PAY ATTENTION?	Y	N	U
42. Would people describe you as "creative"?	Y	N	U
43. Do you think you have developed unique ways of compensating for your areas of difficulty?	Y	N	U
44. Do you often have difficulty thinking of the word you want to use, even though you know that you know it?	Y	N	U
45. Do you often say something that you realize almost immediately you wish you had not said?	Y	N	U
46. Do you often receive compliments about your creativity?	Y	N	U
47. Have you always had difficulty solving arithmetic word problems?	Y	N	U
48. Do people sometimes become angry or frustrated with you when you don't understand, because they know that at other times you can understand, and they seem to think you are doing it on purpose?	Y	N	U
49. Do you find that you have to read things over several times in order to understand?	Y	N	U
50. Do you often expect to fail when you think about doing or learning something new?	Y	N	U
51. Do you find that you can think or pay attention better when you can move around, or have music playing?	Y	N	U
52. Have you had problems with arithmetic because you reverse the order of numbers, or confuse function signs? (+, -, x)	Y	N	U
53. Are you the kind of person who can find just the right way to express an idea when others are having trouble finding the right words?	Y	N	U

54. Is there some area of your life where you are considered to be creative?	Y	N	U
55. Do you often see things differently from other people, and therefore come up with some interesting solutions to problems that other people have not thought of?	Y	N	U
56. Were you a good or excellent student all through your school years?	Y	N	U
57. Do you think you have more problems in remembering certain types of information than most people do?	Y	N	U
58. Do people think of you as "unique"?	Y	N	U
59. Do you have problems remembering numerical information, such as phone numbers, account numbers, your bank balance?	Y	N	U
60. Would you say that you are able to remember anything you need to?	Y	N	U
61. Do you find that you have trouble remembering things that you have learned?	Y	N	U
62. Do you have problems with reading?	Y	N	U
63. Do you have serious problems with spelling?	Y	N	U
64. Do you have problems doing basic arithmetic without the use of a calculator?	Y	N	U
65. Do you often feel frustrated because you drop things, spill things, or bump into things?	Y	N	U
66. Would people describe you as "friendly" or "outgoing"?	Y	N	U
67. Do you find it hard to make and keep friends?	Y	N	U
68. Do you tire quickly when you read?	Y	N	U
69. Do you often feel frustrated because you forget to do things that really are important to you?	Y	N	U

THANK YOU

If you would be willing to take part in the next, and last, phase of this study, please print your name and telephone number and I will contact you within the next four weeks. It would take about one hour of your time. You would be asked to complete the final questionnaire resulting from this phase, and some standardized tests of intelligence and achievement. You would receive a brief written report of the results of your testing.

Name: _____ Telephone: (___) ___ - _____

APPENDIX D: ROTATED FACTOR MATRIX FOR ORIGINAL LD QUESTIONNAIRE

Appendix D

Rotated Factor Matrix for Original LD Questionnaire: Varimax Rotation

	Factor 1	Factor 2
Q1	.10	.26
Q2	.36	.33
Q3	.07	.59
Q4	.25	-.01
Q6	.25	.60
Q7	.36	.39
Q9	.40	.17
Q10	.22	.20
Q14	.42	.24
Q15	.07	.31
Q16	.35	.37
Q17	-.05	.51
Q19	.06	.51
Q21	-.03	.32
Q22	.37	.39
Q23	.04	.57
Q24	.27	.45
Q25	.27	.45
Q26	.07	.28
Q27	.30	.40
Q28	.44	.12
Q30	.12	.15
Q31	.45	.11
Q32	.36	.39
Q34	.68	.17
Q35	.24	.07
Q37	.56	.17
Q39	.31	.39
Q40	.09	.59
Q41	.26	.41
Q44	.58	.32
Q45	.32	.37
Q47	.34	.17
Q48	.35	.37
Q49	.50	.26
Q50	.24	.55
Q51	.24	.21
Q52	.42	.03
Q57	.55	.36
Q59	.59	-.05
Q61	.67	.13
Q62	.41	.22
Q63	.62	.00
Q64	.37	.12
Q65	.12	.28
Q67	.13	.31
Q68	.06	.17
Q69	.35	.31

APPENDIX E: SMITH LEARNING DISABILITIES SCREEN

Appendix E

SMITH LEARNING DISABILITIES SCREEN

NAME: _____

I am going to ask you some questions about yourself. The questions relate to things that most people do at least some of the time. I want to know if they relate to you a great deal of the time. For each question I want you to respond, "yes", "no", or, if the question relates to something that used to be a problem for you, but no longer is, your answer would be, "used to".

Please circle the answer which applies to you for each question. Y = yes N = no U = used to.

1. Do you sometimes feel as if, even though you know you are as intelligent as the people around you, they seem to be able to organize what they are doing and get it done in a more efficient way, or in less time, than you do?	Y	N	U
2. Do you find that you have trouble remembering things that you have learned?	Y	N	U
3. Do you usually feel "on top of things"?	Y	N	U
4. Have you often been told that you have a good sense of humour?	Y	N	U
5. Do you often feel as if you are not worth very much, not living up to people's expectations of you?	Y	N	U
6. Would people describe you as a very organized person?	Y	N	U
7. Have you often felt as though you just don't fit in?	Y	N	U
8. Are you often the person in a group who makes others laugh?	Y	N	U
9. Is there some area of your life where you are considered to be unique?	Y	N	U
10. Do you often feel frustrated because you forget things that are important to you?	Y	N	U
11. Do you think you have more problems in remembering certain types of information than most people do?	Y	N	U
12. Did you have great difficulty memorizing number facts or times tables?	Y	N	U
13. Do you often do things you wish you hadn't done?	Y	N	U
14. Are you good at juggling your schedule to get several tasks done for a specific deadline?	Y	N	U
15. Do you get yourself into difficulties because you act before you think, so you would, for example, spend too much money on payday and not have enough left to pay the rent?	Y	N	U
16. Would people describe you as "creative"?	Y	N	U
17. Do you often have difficulty thinking of the word you want to use, even though you know that you know it?	Y	N	U
18. Do you find that you have to read things over several times in order to understand?	Y	N	U
19. Are you the kind of person who can find just the right way to express an idea when others are having trouble finding the right words?	Y	N	U
20. Were you a good or excellent student all through your school years?	Y	N	U

APPENDIX F: SUMMARY SCORE SHEET

Appendix F

Smith Learning Disabilities Screen: Summary Score Sheet

Name: _____ Date: _____ DOB:_____ Age:_____

Test Administered by: _____

SLDS Score:_____ Learning Disabilities: Yes-R___ Yes-A___ Yes-A&R___ No___

Head Injury: Y N Drugs: Y N Alcohol: Y N Medications: _____

Medication for Psychiatric Illness: Y N Clinic___ College___ University___

Occupation: Self_____ Mother_____ Father_____

SLDS			WRAT3, BLUE	RS	SS	PR		Gender			
1	Y	N	Reading	___	___	___		SES		___	
2	Y	N	Spelling	___	___	___		First Lang		___	
5	Y	N	Arithmetic	___	___	___		Educn		___	
7	Y	N						Race		___	
10	Y	N	Nelson Denny Form H					WAIS-R	RS	SS	IQ
11	Y	N		RS	SS	PR		Vocab	___	___	
12	Y	N	Rate	___	___	___		B D	___	___	
13	Y	N	Comp	___	___	___		Total		___	___
15	Y	N									
17	Y	N	Woodcock Johnson-R		RS	SS	PR				
18	Y	N	Word Attack		___	___	___				

APPENDIX G: RECRUITMENT LETTER TO STUDENTS

Appendix G
Recruitment Letter to Students

Cathy Smith, M.A.
2128 Dunedin Road
Oakville, Ontario L6J 5V3
(905) 844-4144

January, 1996

Dear Student

I am a post-graduate student at the Ontario Institute for Studies in Education, University of Toronto. I would like you to take part in my research study about learning.

My research is the testing of a screening questionnaire I have developed for adults. I would meet with you individually in order to administer the screening, and some standardized tests of intellectual abilities and academic achievement levels. It would require about 1 & 1/2 hours of your time at a place and time that is convenient for you. I will be comparing the responses of individuals to the screening instrument with scores on the standardized tests.

All information will be kept in strict confidence.

If you are willing to help me with this research, please contact me at (905) 844-4144. The only reward I can offer you is the opportunity to help me with my research, and the potential to help many individuals who have learning disabilities in the future.

I hope I will hear from you. Please call (905) 844-4144. It is not long distance from Toronto.

Yours very truly,

Cathy Smith

APPENDIX H: LETTER TO HRD-SPONSORED PROGRAM PARTICIPANTS

Appendix H
Letters to HRD-Sponsored Program Participants

Cathy Smith, M.A.
2128 Dunedin Road
Oakville, Ontario L6J 5V3
(905) 844-4144

August 14, 1996

Dear Participant

I am a post-graduate student at the Ontario Institute for Studies in Education, University of Toronto. I would like you to take part in my research study about learning.

My research is the testing of a screening questionnaire I have developed for adults. I would meet with you individually in order to administer the screening, and some standardized tests of intellectual abilities and academic achievement levels. It would require about 1 & 1/2 hours of your time at a place and time that is convenient for you. I will be comparing the responses of individuals to the screening instrument with scores on the standardized tests.

All information will be kept in strict confidence.

If you are willing to help me with this research, please contact me at (905) 844-4144, or sign this form. The rewards I can offer you are the opportunity **FREE IQ AND ACHIEVEMENT TESTING** and the potential to help many individuals who have learning disabilities in the future, not to mention the opportunity to help me with my research!

Yours very truly,

Cathy Smith

.....

___ Yes I would like to take part in this research study.

Name: _____

Phone: (___) ___ - _____

Thank you. I will contact you to arrange a convenient time and location to meet with you.

APPENDIX I: CONSENT FORM

Appendix I: Consent Form

Cathy Smith, M.A.
Learning Disabilities Consultant
2128 Dunedin Road
Oakville, Ontario L6J 5V3
(905) 844-4144

I am a post-graduate student in Applied Psychology at the Ontario Institute for Studies in Education (O.I.S.E.), University of Toronto. I would iike you to take part in my research study about learning disabilities.

You are asked to answer some questions and complete some academic and intelligence tests. This will not be an assessment. If you wish to have the results of your tests, I will provide you with a brief summary in writing.

All responses will be kept completely confidential.

Please sign below to indicate that you agree to take part in my study.

I, _____, consent to take part in Cathy Smith's study about learning disabilities. I understand that this is not a psychoeducational assessment, and that all results will be held in complete confidence.

_____ _____

Signature Date

____ I do wish to receive a brief summary of my test results.

Address:_____

_____

_____

____ I do not wish to receive a brief summary of my test results.

APPENDIX J: RELIABILITY ANALYSIS SCALE

Appendix J

Reliability Analysis - Scale (Alpha) for SLDS

	Scale Mean If Item Deleted	Scale Variance If Item Deleted	Corrected Item-Total Correlations	Alpha If Item Deleted
1. Q1	15.38	7.97	.50	.77
2. Q2	15.17	7.97	.47	.77
3. Q5	15.04	8.24	.40	.78
4. Q7	15.23	8.18	.39	.78
5. Q10	15.08	7.81	.56	.76
6. Q11	15.35	8.03	.46	.77
7. Q12	15.21	8.29	.35	.79
8. Q13	15.16	7.89	.51	.77
9. Q15	15.18	8.40	.31	.79
10. Q17	15.21	8.22	.38	.78
11. Q18	15.29	7.69	.58	.76

Reliability Coefficients

N of Cases = 82 N of Items = 11
Alpha = .79

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IMAGE EVALUATION
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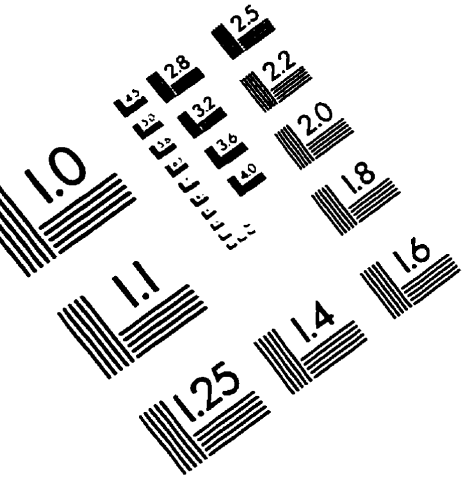

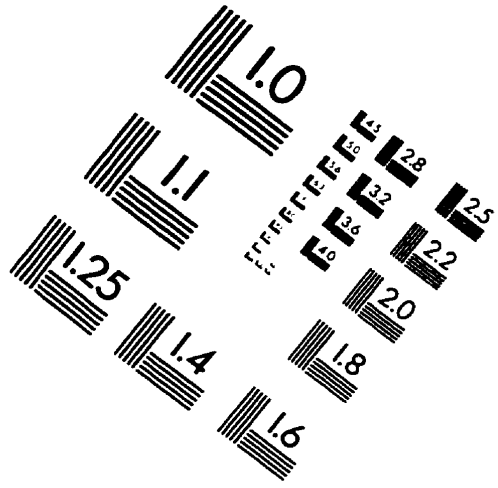

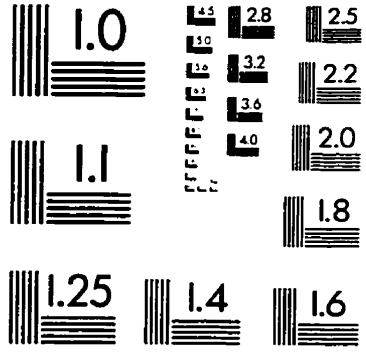

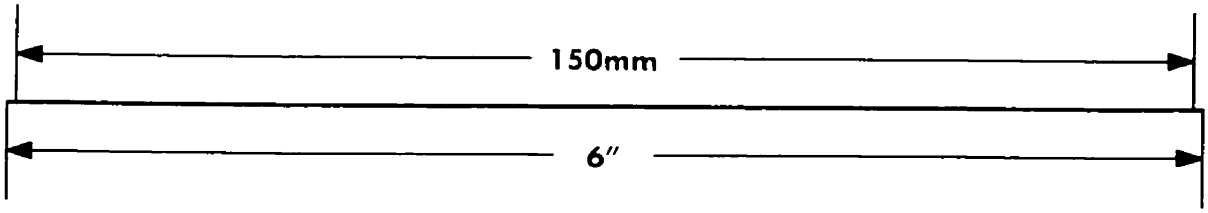

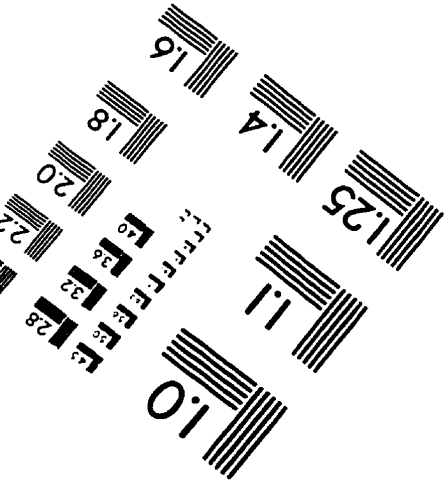

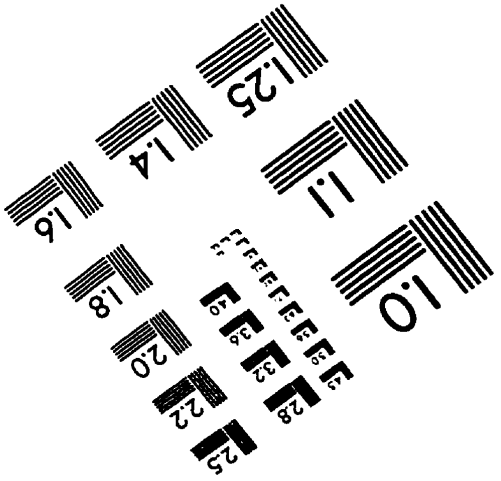

APPLIED IMAGE, Inc
1653 East Main Street
Rochester, NY 14609 USA
Phone: 716/482-0300
Fax: 716/288-5989