THE DIAGNOSIS OF SPECIFIC LEARNING DISABILITIES AMONG A JUVENILE DELINQUENT POPULATION

By:

John W. Podboy, Ph.D.

and

William A. Mallory, Ph.D.

Prepared under the Auspices of the

Sonoma County Probation Department

November 1977

Robert G. Gillen
Chief Probation Officer

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Statement by the Project Director

The purpose of this report is to summarize the results of the research supported by this grant and to make these results available to other agencies and individuals who share our concern for youth who are handicapped by a specific learning disability.

The research conducted by the consultants to this project comprises the largest systematic study ever undertaken to identify youth entering the Juvenile Justice system who have a clearly diagnosed learning disability. A test battery to identify learning disabilities was administered to 250 youths and the results dramatically emphasize the high percentage of those learning disabled youth in this group. This particular test battery developed by Drs. John Podboy and William Mallory will be especially valuable to anyone concerned with screening for learning disabilities. I am confident that this model and the attendant procedures for administering and evaluating the tests provide a giant step forward in our efforts to identify learning disabled youth. They will also materially enhance our ability to provide appropriate remedial services expeditiously and in an economical manner.

All this was not easily accomplished. As has been pointed out by Mr. Mulligan, former Chief Probation Officer, Sonoma County had previously requested funds for this grant to provide for a multi-year program. This program would be designed to not only identify youth with learning disabilities,

but also to divert them out of the Juvenile Justice system and provide them with services to remediate their problems. When funds were finally authorized they were to be available for one year only and were to provide only testing services - no treatment, and no diversion - not even money for support services. However, we were confident that even these limited funds could provide a unique opportunity to research learning disabilities in the Juvenile Justice system population and we proceeded post haste to get the program under way. At this time we overlooked the need to change the project title and "purpose" to more appropriately identify the work which could be accomplished with the limited funds available but this oversight was more than compensated for by good fortune in attracting consultant Psychologists to the project. We recruited from the most qualified and experienced professionals available. The three ultimately selected were recognized in their professions as premier practitioners: Virginia Wiegand, Ph.D., research psychologist, whose most recent experience included several years with Stanford Research Institute, Palo Alto, Calif.; John Podboy, Ph.D., clinical psychologist at Sonoma State Hospital, Eldridge, Calif.; with years of experience in the assessment and treatment of the developmentally disabled while earning a well-deserved reputation for professional competence and dedication on behalf of those patients entrusted to his care; and William Mallory, Ph.D., also staff psychologist at Sonoma State Hospital, whose specialty is the neurologically handicapped youth; his experience and qualifications include an Assistant Professorship at the Brain-Behavior Research Center at Sonoma State Hospital, affiliated with the Langley-Porter Neuropsychiatric Institute and the University of California at San Francisco. In the vernacular of athletics this is a varsity crew of proven championship caliber.

However, once the project was staffed, organized, and testing procedures were operational, it became obvious to all concerned that the resources required

to meet the ambitious goals of all the project staff were not available and could not be made available with the constraints of time and the limited funding available to the project.

Therefore, during a meeting held at the Los Guilicos center in early January 1977, which was attended by the project staff as well as Mary Williams, analyst, OCJP Region E, it was unanimously agreed that the basic research being pursued by Dr. Wiegand would be abandoned since it had been demonstrated to be inappropriate and inconsistent with the goals of the project and that the testing of the youths would be accelerated to the maximum permitted by available resources; that the number one priority of the project would be to develop a revised battery which would provide reliable data but could be administered in a juvenile hall facility by probation officers or others with minimal training in testing techniques and completed routinely within a limited period of time - ideally in no more than one hour. These revised objectives were fully achieved due to the competence, dedication and perseverance of Drs. Podboy and Mallory, together with the assistance provided by others such as Drs. Tom Cooke and Tony Apolloni of Sonoma State College. Also, Joyce Bol and Claire DeLanty provided clerical support and Steve Northam served as special consultant to the project. These individuals all contributed many hours of unpaid overtime. However, special mention should be made of Dr. Podboy who devoted every possible moment to some aspect of the program. In fact, Dr. Podboy has literally lived this project for the past 15 months, and to him goes special credit for his outstanding work in achieving the goals and objectives of this project.

There are many others, too numerous to mention, who contributed directly or indirectly to the project; however, Dr. Francis Crinella, Executive Director of Fairview State Hospital, provided uniquely valuable advice at various stages of the program. We received essential, continuing advice from Mr. Ray Grady and

his staff at OCJP Region E, without which the project would never have succeeded.

My own involvement with this project has been a very rewarding experience. I am especially impressed with the potential for the revised test battery and the enthusiasm with which educators such as Drs. Cooke and Apolloni of Sonoma State College and Dr. Robert Reiland of the Sonoma County Superintendent of Schools office endorse the concept of coordinated efforts to address the needs of learning disabled individuals.

However, two facts concerning "LD" youth are being constantly reaffirmed. First, although only a minor percentage of the total population is "learning disabled" a disproportionately high percentage of youth who are acting out their frustrations are also learning disabled. Secondly, if in the foreseeable future we are to provide remedial services to those LD youth who need help the most, then the leadership and incentives required to initiate and implement such programs must be provided by the juvenile justice system. Only when the justice system is providing the necessary leadership and all other responsible agencies are cooperating fully in coordinated programs to identify and remediate the problems will our communities meet the challenges posed by the learning disabled in our midst.

Finally, attention should be called to the fact that Drs. John Podboy and William Mallory are primarily responsible for the preparation of this report, and credit should be directed to them for specific matters of content.

To each and every one who contributed, a sincere "thank you for your efforts" and congratulations for the outstanding achievements of this project.

John H. Barnes
Project Director

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Abstract

A relatively brief, inexpensive (45-50 minute) test battery was devised and validated to identify learning disabilities in a sample of 250 youths who had been detained in Juvenile Hall. "Learning disabilities" (LD) is a complex of disturbances of behavior, most typically manifested in classroom or structured learning situations.

A rigorously constructed classification system was developed which considered IQ, several reading factors, and various other language measures. According to this system, it was found that 48.9% of the sample were learning disabled (LD), 13.3% were developmentally disabled (DD) and only 37.8% were not learning disabled (NLD). These findings do not firmly establish an "LD/JD Link". They do offer, however, clear support based on the largest sample to date in a study in this area, that the incidence of learning disabilities in the delinquent population is considerably greater than in the general population.

Now that a quick, accurate means of identifying disabled youths among the delinquent population has been established, and having identified competent practitioners in the area of remediation, it becomes a crucial next step to establish a program of testing delinquent youth, identifying those who are learning disabled, and channeling them into appropriate programs of remediation.

Preface A

For approximately the past eleven years, I have had a personal concern regarding the correlation between learning disabilities and delinquency. In 1968, with the help of the Sonoma County School Guidance Department, we developed a screening procedure to determine a child's IQ and his specific learning disability. However, the children tested were primarily those with a long history of delinquency or those who we had reason to believe had a learning disability. Therefore, it was not a truly controlled experimental approach.

In an effort to develop a truly experimental approach, we applied for and received a grant from the Office of Criminal Justice Planning in the amount of $45,333.00. These funds were used to employ three consulting psychologists on a part-time basis, clerical support, testing materials and other supplies.

The psychologists were hired in July, 1976. It was soon evident that standardized testing procedures were too time-consuming and were not diagnostic for the juvenile delinquent population. Consequently, considerable time was spent by the consulting psychologists to research and develop a learning disabilities screening battery specifically designed for the juvenile delinquent population.

It was necessary to test children on a random selection basis and a total of 250 children were tested for learning disabilities. We found that this provided a good cross-section of the total children detained for delinquency and, as you will note, the report amply demonstrates that there is a high correlation between learning disabilities and delinquency.

William Mulligan
William Mulligan
Chief Probation Officer, Retired

Preface B

The present endeavor has offered challenge, stimulation and reward to its participants from its inception. The challenges of the project have been as numerous as the multifaceted elements of juvenile delinquency. The sources of stimulation have been as varied as the clusters of characteristics we refer to as learning disabilities. The rewards of the project, however, have been its most notable accompaniment. These rewards have grown out of the feeling of a job well done along with the hope that the results of the project will contribute in some small way to improving what learning disabled youths in danger of becoming delinquent can expect from our legal and educational institutions.

The cooperative professional interaction and blending of expertise between the staff of the Sonoma County Probation Department and the Area of Special Education at Sonoma State College has clearly contributed to the overall exciting nature of the undertaking. We at the State College eagerly accepted the invitation of John H. Barnes and his colleagues within the Probation Department to become involved in the project. Certainly, the benefits accruing from our cooperation have been reciprocal as they have been plentiful. The vast social significance involved in shedding additional empirical light on the link between juvenile delinquency and learning disabilities demands precisely the variety of interdisciplinary collaboration which has characterized the present project. The time is past when single minded theories or intervention strategies can be expected to solve complex social problems. Certainly a population about whom so little is known as that of the learning disabled potential

juvenile offender merits the combined and mutually supportive attention of special educators, psychologists, and the entire juvenile justice system.

This final report on the project should add to what is known about the learning disabled characteristics of youth in danger of becoming delinquent. The concept of a strategically developed test battery to detect and diagnose learning disabilities in youths who appear to be headed for difficulties with law enforcement agencies is timely and promising. When the learning styles of these youths can be validly assessed, when their academic and social behavioral repertoires can be monitored in relationship to relevant environmental demands, only then can reliably effective and accountable intervention strategies be developed to remediate learning disabilities and thereby mitigate the probability that the learning disabled youth will resort to delinquent behavior.

Thus, the present developmental period of the project, while rewarding in its sense of closure, contains renewed challenges and additional stimulating questions. The concept of a diagnostic battery as thus far developed within the project represents a valuable first step in plans to prevent and reduce juvenile crime. The next significant steps must witness the development of innovative educational methods built upon the preceeding diagnoses to remediate the learning problems which seem so likely to contribute to juvenile delinquency. A valuable test battery has been developed, field tested and modified during the course of this project. Next, the external validity and predictive power of the battery should be assessed through additional pilot studies.

The test data become of even greater applied value if it can be translated into effective intervention strategies. Therefore, the participants of the project reported herein are currently making concerted efforts to secure support for this next step. Certainly there is good reason to believe that the remediation of learning disabilities in potentially delinquent youth may ameliorate many of the environmental conflicts which enhance the probability of a full delinquent repertoire. In youths who have already become delinquent, the remediation of learning disabilities and the development of competent academic and social repertoires should vastly improve their future life chances in virtually all domains.

These then represent our next tasks: To develop sufficient educational methodology to provide learning disabled youths on the apparent path to social conflict with some survival mechanisms with which to adapt their course in a more successful and happier direction.

Thomas P. Cooke, Ph.D.

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Coordinator of Special Education
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Review of Current Literature

Current status of learning disabilities. Interest in "learning disabilities" has developed relatively recently, most dramatically since the early 1960's. The field has antecedents to some extent, however, in children who have been studied and diagnosed by the following labels (Cruickshank, 1966, 1977; Hallahan and Cruickshank, 1973):

brain-injured,
minimal neurological handicap,
hyperkinetic,
hyperactive,
"organic",
perceptual disability,
special learning problems,
language disorders,
dyslexia,
maturational lag,
minimal brain dysfunction,
neurophysiological immaturity, and
central nervous system (CNS) dysfunction.

Although the term "learning disability" was first given widespread recognition by Kirk in 1963, the concept did not evolve in one decade. Werner and Strauss (1938) were among the first to study the learning characteristics of children with brain damage. Their work stimulated others to investigate this field. Stevens and Birch (1957) proposed that children with learning disabilities be designated as suffering from the

Strauss Syndrome, named after one of the above-mentioned investigators (Strauss and Lehtinen, 1947). The term neurophrenia was suggested by Doll (1951), and the minimal cerebral dysfunction syndrome was proposed by Bax and MacKeith (1963). Bender (1946, 1959, 1961) made a major contribution to the diagnosis of understanding children with behavioral problems related to neurological dysfunction. A modified version of the Bender Visual Motor Gestalt test is one of the subtests of the battery developed by this project.

The term "learning disabilities" has met a significant educational and clinical need by distinguishing between those persons who exhibit behavioral difficulties most noticeably in structured learning situations. These individuals do not, in most cases, manifest "hard" neurological signs such as spasticity, motor weakness or gross motor dysfunction, but rather "soft" signs most readily apparent in the use of spoken or written language.

Within a few years, interest in these conditions became nationwide. A society was formed called the Association for Children with Learning Disabilities (ACLD), academic involvement was initiated at all levels, and the majority of states adopted official definitions of learning disability for purposes of dealing with this disorder at the classroom level. Currently, learning disabilities have arrived at a secure yet controversial position in the disciplines of psychology, education and medicine. As would be expected with such a recent entry into established domains, there has been little agreement among professional opinions. In fact, according to Cruickshank (1977) the term has

been poorly understood by many professionals who should be knowledgeable concerning this problem. There is a congruence, nonetheless, about the definition, adopted by the National Advisory Committee on Handicapped Children. This definition has served as a guideline for the Association for Children with Learning Disabilities and for most of the individual state legislatures. The definition reads as follows:

> Children with special learning disabilities exhibit a disorder in one or more of the basic psychological processes involved in understanding or using spoken or written languages. These may be manifested in disorders of listening, thinking, talking, reading, writing, spelling or arithmetic. They include conditions which have been referred to as perceptual handicaps, brain injury, minimal brain dysfunction, dyslexia, developmental aphasia, etc. They do not include learning problems which are due to visual, hearing, or motor handicaps, to mental retardation, emotional disturbance, or to environment disadvantages (Hobbs, 1975, pp. 301-392).

This guideline has led to the creation of public school classes for children with learning problems though the classes are given different names in different states. The classes may be referred to as minimal brain dysfunction (MBD) classes, classes for the educationally handicapped (EH), and classes for the learning disabled (LD). Others are described as classes for emotionally disturbed and/or brain injured (ED/BI) (Koppitz, 1971). There appears to be little actual difference in terms of the behavioral constellations which these various programs

attempt to modify. Nonetheless, some speculate that this label is a non-pejorative way for middle class Americans to remove their mildly retarded children from embarrassing classroom situations. Similarly, the argument has been made that many learning disabled children are, in fact, mildly retarded, and that the label "learning disability" is a convenient way of avoiding an admission of congenital inferiority.

Symptoms and types. Currently, learning disabilities are invariably associated with language difficulties, either written or spoken. This project has repeatedly been referred to as the "dyslexia project" verbally, in print, and on local television.

This popular conception of learning disabilities as dyslexia focuses on reading problems. However, the term dyslexia can denote anything from reading retardation or what was once called "word blindness" (alexia) to specific reading disabilities of a mild nature.

Aphasia is a lesser known but more comprehensive term than dyslexia since it includes difficulty of language use in any of its many forms. This diagnostic term is similar to dyslexia in that the range of severity is great and extends from occasional word clumsiness to a total inability to use language in a comprehensive fashion.

The word "hyperkinesis" is a third term enjoying popular usage in relation to learning disabilities, referring typically to excessive muscular movement. Although it is often used synonymously with hyperactivity, the two are actually quite different. Hyperkinesis is felt to have an organic base, that is, damage to brain tissue, but due to the diagnostic difficulties this damage is generally nor further specified.

The staff of the Sonoma County Probation Department point to an inability to attend or concentrate, hypoactivity, dyspraxia (or impaired coordination), lack of impulse control, and dysphoria (or a blunted ability to experience pleasure) as additional symptoms manifested by those they consider "learning disabled".

Etiological factors. The etiological factors which contribute to learning disabilities are a source of considerable controversy. The range of potential causative factors varies from little more than inadequate reading instruction to neurologically based information-processing difficulties.

A review of the literature on learning disabilities (e.g., Hallahan and Cruickshank, 1973) reveals a substantial emphasis on the neurological origin of difficulties. Regardless of one's theoretical allegiance, those concerned with learning disabilities invariably encounter dysfunctions of perception and perceptual processing. This realization leads to at least a consideration of neurological factors, although one may choose to dismiss them entirely or minimize their importance. We feel, however, that it would be highly unwise to totally dismiss out of hand neurological factors in favor of alternative explanations. For example, while a diagnosis that perceptual difficulties are primarily emotional in origin may have merit, it does not rule out the contribution of neurological or structural defects. The term "learning disabilities" has been preferred by parents especially as it is not stigmatizing for the child. Parents are acutely aware that learning disabilities are not necessarily due to brain damage or retardation as many of the

earlier terms implied. For these reasons, the term "learning disabilities" is quite acceptable to them.

The list of the most frequent labels used to circumscribe this disorder clearly implies a neurological or structural base. However, this remains only conjecture, because of our inability to establish a definite relationship between the behavioral manifestations and actual brain dysfunction (Small, 1973).

It may well be that much of the contradiction and inconsistency concerning the learning disabled population is due to a failure to recognize the need for agreement concerning definition and accurate classification. The term "learning disability" is without question the most widely recognized term associated with this complex of disturbances of learning and behavior, and the process of delineation within this general concept remains active.

Contrary to some opinion, it is impossible to distinguish on the basis of behavioral observation alone, between a functionally "disabled" person and one who is experiencing transient learning problems. This must be determined by standardized psychodiagnostic methods. If a disablement of learning is diagnosed, it can be delineated by subgroup on the basis of expressive, receptive or integrative dysfunction. This strategy accepts the popular usage of the ambiguous term "learning disability" and attaches to it a diagnostic qualification. For example, the child who has been unable to achieve the visual motor integration required by the Block Design and the Bender Visual Motor Gestalt Test may have a dysfunction of the integrative capacities and this should

be noted.

The adjective "minimal" which continues to be used in reference to brain damage or dysfunction aggravates many persons in this field. The term was apparently introduced to distinguish between children with minimal involvement as opposed to diffuse complications. Bax and MacKeith (1963) suggested that children with learning disabilities be categorized as having a minimal cerebral dysfunction syndrome. However, efforts in this direction have proven to be unwieldy and unsuitable for educational and legal purposes. At any rate, the term minimal seems inappropriate because once this problem is finally detected, it can no longer be called minimal.

Recent projects regarding the LD/JD link. In April of 1976, the American Institutes of Research prepared a comprehensive study on this subject for the National Institute for Juvenile Justice and Delinquency Prevention in the Office of Juvenile Justice and Delinquency Prevention, a division of the Law Enforcement Assistance Administration. This report, entitled "The Link Between Learning Disabilities and Juvenile Delinquency - Current Theory and Knowledge," provided an excellent review of existing literature, expert opinion, and current theory, as well as a review of all related demonstration projects. This extensive report provided a solid jumping-off point for the project staff. Many of the authors cited were contacted for detailed summaries of their studies and results which proved to be of invaluable assistance in the design of the project.

The American Institutes of Research assessment of this problem was

reduced to two major conclusions, the first of which is as follows:

> "The cumulation of observational data reported by professionals who work with delinquents warrants further, more systematic exploration of the learning handicaps of delinquents." (Murray, et al., 1976).

The above conclusion was entirely consistent with the approach taken by Chief William Mulligan, Mr. John H. Barnes and other staff members of the Sonoma County Probation Department. Over the years, Mr. Mulligan and his associates had advocated the proposition that an inordinate number of the juvenile clients they served suffered from learning disorders which resulted in serious consequences, both in personal and societal terms (Mulligan, 1969). Mulligan (1972; 1974) concluded that failure, frustration and conflict were caused by this disorder, as was the alienation in school settings, the increasing involvement in antisocial delinquent behavior, and the devastating price paid in personal suffering.

The price paid by the learning disabled and those immediately affected becomes even greater when we recognize that the early identification and successful treatment of these youths is within the grasp of our present knowledge. The authors of the present project have become aware of a great deal of anecdotal and subjective data from numerous practitioners interviewed during the project. While this evidence falls short of the requirements of scientific decision-making, the accumulated wisdom of these persons was carefully considered when the design of the project was formulated.

The American Institutes of Research (1976) report emphasized learning handicaps as opposed to learning disabilities. It was felt that this terminology avoided the assumption of causality; that is, learning difficulties may be caused by learning disabilities which, if undiagnosed and untreated, could result in delinquency.

The second major conclusion of the AIR report was that:

> "The existence of a causal relationship between learning disabilities and delinquency has not been established; the evidence for a causal link is feeble."

The report underscored the fact that there is a paucity of data concerning the LD/JD link, and the research to date has been with small samples and a minimum of scientific rigor.

Some studies have been reported which screened for learning disabilities during the diagnostic phase of the youths' encounters with the juvenile justice system. Varying percentages of youth diagnosed as learning disabled have been reported ranging from 22% to 90%. In all probability, such a wide range is due to such factors as misdiagnosis, overgeneralization, unsystematic procedures and fundamental differences in the definition of learning disability. In some cases, no testing whatever was performed, while in other studies psychometric, neurological and electrophysiological data were all considered. The lack of uniformity regarding the criteria for "learning disabilities" makes it difficult to analyze these relationships.

In one very large program operated by the Colorado Division of Youth Services (Murray, 1976), juveniles committed to the state received

diagnostic screening that begins with audiometric and visual screening examinations. Achievement tests were administered, and the results, along with handwriting analyses, served as the basis for decision-making concerning other testing. A decision-making paradigm was used such that if the youth does poorly on the reading, spelling, or mathematics portion of the achievement test, or if his handwriting did not meet expected standards, further testing was conducted. Testing was administered to evaluate non-verbal intelligence, visual factors, visual memory, visual-motor integration, etc. Learning disability was defined as "anything which prevents the child from achieving successfully in a normal educational setting." Unfortunately, such a definition without an accompanying operational definition, seriously limits the meaningfulness of the study. Furthermore, learning disabled youths were classified by type, such as auditory, information processing, social/psychological, and visual, and then were further classified by degree as mild, moderate, or severe. It is interesting to note that this project did not use standardized tests which had been validated for their diagnostic value for learning disabilities. This poses problems for those who wish to duplicate these efforts, one would suspect, even within the same facility. However, it was felt by personnel of the Colorado Division of Youth Services that standardized tests do not distinguish between retarded and learning disabled youth. This decision was made in spite of the fact that an impressive body of neuropsychological and methodological data exists which readily distinguishes the two clinical entities (e.g., Clausen, 1966; Crinella, 1972, 1973; Tryon

and Bailey, 1970).

Project Approach to Juvenile Delinquency

Juvenile delinquency is a global concept that is used to describe a broad spectrum of qualitatively diverse youth. From a behavioral perspective, the term includes a wide range of behavior which varies sufficiently between jurisdictions to render a general definition exasperatingly vague.

Technically speaking, a delinquent youth is one who has been so determined by a juvenile court. However, this study was limited by time constraints that did not allow the investigators to follow the complete process of adjudication, thereby reducing the heterogeneity of the population in the study. For the purposes of this study, it was necessary to consider as delinquent all of those youths who were brought to and detained at the Sonoma County Probation Department Juvenile Facility at Los Guilicos.

It was recognized that there are types of youths who are both under and over-represented in the juvenile system and that in this study the curfew violator as well as the armed robber are included without qualification as juvenile delinquents. The only distinction that was made was on the basics of the type of offense with which the youth was charged. A "601" offense was a lesser or "status" charge that is peculiar to juveniles. This most typically referred to a charge of "beyond parental control", "runaway", and the like. A "602", on the other hand, was the numerical designation for those youths charged with more serious offenses that are typically seen with adult offenders as

well. For example, grand theft auto, receiving stolen property, and drug offenses were common under the "602" designation.

Methodology

Site of Study

The study was conducted at the Los Guilucos Juvenile Detention Facility, Santa Rosa, California. Los Guilucos consists of several buildings on approximately 300 acres, of which 35 acres is the fenced campus, in a rural area 10 miles southeast of the heart of Santa Rosa, the county seat. It includes the Juvenile Detention facility, the Juvenile Dependent facility, the Juvenile Division of the Probation Department and the Juvenile Court Referee for the County of Sonoma. At the time of the study, three of the buildings were in use as living units for the approximately 50 youths who were detained at a given time.

Participant Selection

The subjects were youths who were detained at the Los Guilicos facility for a period which varied from a few hours to several months, during the period of August, 1976, through April of 1977. The intention was to make the sample as random as possible, i.e., to obtain a true cross section of all youths processed through the facility during the period of the study.

It soon became apparent that any attempt to schedule examination periods with specific youths was doomed to failure. The psychologists were available during certain weekday hours, certain evening hours, and on weekends. However, youths at the facility were subject to release due to parental, judicial or probation factors and it was difficult to gauge their period of detention. Any testing session examination was voluntary, and naturally sports and recreation activities or visits from

parents and relatives took precedence. Additionally, visits from probation officers, attorneys, physicians and nurses were priority situations. In short, it was virtually impossible to schedule the examination procedure due to the voluntary nature of the project and the large number of variables which effected a youth's time involvement.

Typically, the examining psychologist would receive from the correctional counselors a list of 4 to 10 youths who were available. The youth was then asked if he would take the test at that time, or when he would be able to during the next 2-3 hours. Three to four youths were usually examined in succession, and the youths and correctional counselors found that this method of selection was the most acceptable.

There were several other factors which mitigated against attempts to accomplish complete randomization procedure.

(a) An effort was made to evaluate those youths who were definitely scheduled to leave within a short period of time, in order that they be included in the sample. These youths were not necessarily minor violators, as there were at times out of town or out of state violators awaiting transportation to another detention facility within their jurisdiction. Three participants in this study were military personnel who were AWOL (absence without leave) and were 17 years of age.

(b) There was a change in the juvenile detention law on January 1, 1977, stating that only "602's" (those charged with a major offense) were to be detained at the Los Guilicos facility. In

actuality, many "601's" (minors or status offenders) remained at the facility after this date because of logistical problems with interpreting and implementing this new law.

(c) Those youths detained could refuse to participate without adverse consequences, although the project was positively received by youths and there were only two outright refusals.

In retrospect, there would have been no way to scientifically randomize the selection process any better than circumstances had provided. A conversation with a girl friend, an interesting movie on TV, a ping pong contest or an unexpected visit all contributed to making the selection of subjects a very happenstance or random event that actually reinforced the voluntariness and nonthreatening aspects of the project.

In all there were 250 subjects, 183 males and 67 females. One hundred seventeen were considered "601's" and 133 were "602's". The age range was 11 years 7 months to 18 years 1 month, with a median age of 16 years 8 months. There were 5 youths who were over 18 years of age. They had committed offenses as juveniles but were allowed to serve their commitments in a juvenile facility after they turned 18.

Consultant Staff

This project was carried out from June 1, 1976, through June 30, 1977, by staff and consultants of the Sonoma County Probation Department, Santa Rosa, California. It was directed initially by William Mulligan, Chief of the Sonoma County Probation Department. Upon his retirement in January, 1977, John H. Barnes assumed the directorship of the project

until its completion. Drs. John Podboy, William A. Mallory, and Virginia Wiegand were responsible for the development of the diagnostic battery, the testing, and the clinical diagnosis of the 250 participants. Dr. Francis M. Crinella, Executive Director of Fairview State Hospital, and Drs. Tony Apolloni and Thomas Cooke, Professors of Special Education at Sonoma State College, provided technical assistance and consultation.

The examiners were three Ph.D. level Psychologists. Examiner A was a 34 year old male who evaluated 177 of the participants. Examiner B was a 36 year old male who evaluated 38 of the participants. Examiner C was a 47 year old female who evaluated 35 of the participants.

Approach to Participants

Prospective participants were approached with a standard informed consent statement that included the following:

> "I would like to give you a few tests which have to do with your learning abilities. It's a normal part of the procedure here, but will not effect the outcome of your case in any way."

All questions were answered. Approximately 99% of those approached agreed to participate. One reason that there was such a high percentage of participation was that in some cases a youth who refused to participate for one examiner agreed to participate for another examiner on a later occasion.

Testing Conditions

The participant was taken into one of six rooms, depending on (1) which of the three living units to which he or she was assigned, and (2) space availability. Three of the rooms were small, approximately

8' x 10'. The other three were larger interview rooms. All rooms had a desk and two chairs and were well lit. While rock and roll music was being piped into the hallways -- and could be heard in the background in the testing rooms during some of the sessions -- none of the sessions for which the data were retained for analysis contained major distracting factors.

Interview and Demographic Information

The first five to seven minutes were intended to serve a two-fold purpose: (a) to gain rapport and to allow the youth to feel comfortable with the procedure, and (b) to gain as much information as possible which could be later analyzed in terms of predictive relationships. A check-list with coded categories was utilized (see Appendix A). Briefly, the information requested related to the following areas:

(a) type of offense and prior record;

(b) family situation, number of siblings, etc.;

(c) school attendance and performance, especially in English class;

(d) physical condition, medications, illnesses, accidents.

After the above information and any other relevant clinical observations were recorded, the complete battery was administered.

Selection of Initial Battery

Original learning disability battery. One goal of this study was to develop a battery of tests which would involve as many areas as possible relating to learning disability. This battery would be one which could be administered in a "reasonable period of time", ideally 45 minutes, but not longer than one hour, and which would be sufficiently

stimulating to engage the interest of a potentially resistive youth. Furthermore, the battery had to allow for ease of administration in a setting that is potentially difficult for testing. This was, of course, a difficult order. Based on our review of available tests and consideration of previous batteries, it soon became apparent that some degree of compromise was inevitable. For example, one needs to take into account the relationship between general intelligence and whatever deficiency might be observed in reading or other processes. However, the most highly reputed intelligence tests such as the Wechsler Adult Intelligence Scale (WAIS), the Wechsler Intelligence Scale for Children (WISC), and the Stanford Binet Intelligence Scale (S-B), normally take in excess of one hour to administer. The Peabody Picture Vocabulary Test (PPVT) (Dunn, 1959), which takes ten to fifteen minutes to administer, though tapping only limited aspects of intelligence, has been found to have a high degree of correlation with the WAIS and the S-B. Therefore, the PPVT was chosen as the IQ measure. By way of providing a rationale for each of the other measures of the battery, a listing of the processes that the measure is intended to elicit, and summary of the procedure, is given as follows. (Copies of the materials themselves are provided in Appendix B.)

Bender Visual Motor Gestalt. Designed to measure visual perception, fine motor coordination and to detect gross indicators of brain damage. The participant is asked to copy each of nine designs, ranging from simple to complex, on a single piece of white paper.

Dictation. Designed to provide a measure of the ability to transfer the spoken word to the written word. It also acts as a measure of spelling, punctuation, capitalization, and penmanship. Correlates well with reading level. A short three sentence paragraph is read to the participant who is asked to write what has been heard the way he or she usually writes. The paragraph is read slowly enough so that the participant will have no trouble keeping up.

Copying. This is employed if the participant is unable to write from dictation and is designed to identify whether basic visual perception and graphic abilities are present. A participant who is completely--or almost completely--unable to write from dictation is shown the same paragraph and asked to copy it directly beneath.

Babcock Story Recall Test. Designed to provide a measure of both immediate and delayed memory for auditorially-presented prose material and to investigate ways in which the actual material might be distorted in recall. After explanatory instructions, a short (53 word) story is read, after which the participant is asked to repeat it word for word, giving the general idea if the exact words are not remembered. The story is then read again and, ten minutes after the second reading, recall is once again requested according to the same instructions. The ten minute period is utilized by giving another test.

Wechsler Adult Intelligence Scale (WAIS) Block Design. Given to all participants sixteen years of age and older. Designed to provide a measure of visual-motor integration; i.e., the way in which visual perception and motor dexterity systems work together. The materials consist of nine identical blocks which are red on two sides, white on two sides and both red and white on two sides, and a booklet with pictures of designs which can be made from the blocks. The task is to put the blocks together, within a time limit, so that the blocks will match the picture. The designs to be matched successively increase in complexity. There is progressive use of four blocks to nine blocks.

Wechsler Intelligence Scale for Children-Revised (WISC-R) Block Design. Given to all participants fifteen years, eleven months of age and younger. The purpose is the same. The designs are different but the procedure is very nearly the same.

Wechsler Intelligence Scale for Children (WISC) Digit Span. Designed to provide a measure of auditory memory, also has been shown to be a good indicator of concentration ability, and where performance is especially poor, is an indicator of brain damage. Sets of numerals of successively increasing length (e.g., 3,2,6; 5,4,1,7; 6,8,9,2,7) are read aloud to the participant at a rate of one numeral per second. After each set, the participant is asked to say aloud the numbers heard, in the same order, i.e., forward. After the limit of forward recall is reached, backward recall is sought for similar sets of numerals.

Peabody Picture Vocabulary Test. Designed as a quick (10-15 minute) measure of intelligence. The IQ used in this study was derived from this measure, with a cut-off score of 80 which was used to differentiate the Developmental Disability group. This particular test was chosen for ease of administration, the high degree of positive correlation with other measures of general intelligence, and the applicability to the overall purposes of the battery. The Peabody Picture Vocabulary Test was found to be a measure which could be quickly explained to potential testers who may not have had special training in test administration or psychology. Each page of the test booklet consists of four pictures. The examiner says a word which names, or designates a concept, for one of the pictures. The participant is asked to point to the picture which best goes with the word.

Wide Range Achievement Test (WRAT) Reading. Designed to provide a measure of the grade level at which the participant reads. The participant is asked to read aloud as many words as he or she can from a page of words of progressively increasing difficulty.

Gates-MacGinitie Reading Test: Vocabulary Grades 10-12 Version. Designed to provide a measure of reading vocabulary. The participant is asked to read silently groups of five words; one standard and four matching choices. The choice which most closely resembles the standard is to be underlined.

Gates-MacGinitie Reading Test: Comprehension, Grades 10-12 Version. Designed to provide a measure of the degree to which the

participant understands what is read. The participant is asked to read silently a series of short paragraphs. Each paragraph has two blank spaces representing missing words. For each blank space, there are five choices. The participant is asked to underline the word which best fits in the blank space.

Draw a Person. Designed to provide an overall estimate of general intelligence and one's self-image. Certain types of drawings are indicators of emotional disturbance. The participant is simply asked to draw a person. If questions are asked about the kind of a person, sex, "head only" or "whole body", etc., the examiner responds that it can be any kind of person desired.

Need for revision of battery. As the sample size began to reach and exceed 200, three conclusions became apparent: (a) a substantial sample had now been tested and the results could be analyzed; (b) the battery had some shortcomings which could be corrected; and (c) there was time to revise the battery and to test it on a moderate sample equivalent to the bulk of previous studies in this area. Accordingly, after a sample of 214 was completed with the initial battery, testing was temporarily suspended while the battery underwent minor revisions.

Some of the major considerations that led to the specific revisions are as follows. First, the initial intent had been to develop a battery which could be administered in about 45 minutes. In fact, the initial battery took about 65-80 minutes. Sufficient Bender Visual Motor Gestalt tests had been administered so that the basic patterns were emerging with 5 out of the 9 cards: Cards A, 3, 6, 7, and 8. It also became apparent

that much additional information could be obtained in a short period of time by giving five performance tasks with the same cards. A measure of immediate memory could be obtained by showing the participant the card for 5 seconds then requesting that it be copied. As a measure of delayed memory, the participant could be asked to reproduce as many designs as possible after a pause of 90 seconds. Immediately following this, recognition could be tested by showing each of the five designs on a sheet with two "distractors", asking the participant to mark the one remembered. Finally, visual sequencing could be measured by asking the participants to indicate the order in which they recalled having seen the designs.

It also became apparent that the Gates-MacGinitie Vocabulary and Comprehension Tests were not adequately discriminating in the population being tested. The grade 10-12 version of these measures was administered since it was appropriate to the vast majority of the sample, who were old enough to be in at least the 10th grade. On the other hand, a significant proportion of our sample performed at no greater than chance level on those measures. In these cases, it was not clear exactly at which grade level these subjects were reading. Therefore, a test which could more accurately discriminate the actual grade level was needed, and selected comprehension items from all grade levels of the WRAT were chosen. Additionally, the correlation between spelling and reading was considered. The dictation paragraph was basically a measure of spelling, but this paragraph, too, contained material which was uniformly pitched at about the 10th grade level. It was decided to take single words of

known grade level (i.e., from the WRAT Spelling section).

Finally, while the Draw A Person Test was an interesting measure which had proven to be a "therapeutic" final test in many cases (allowing the participants to vent their feelings), preliminary analysis of the data had shown that it was not an indicator of learning disability. Therefore, it was considered an inappropriate investment of time to include this measure.

Refined Battery

In accordance with these considerations, the revised battery was developed and presented as follows (those measures which were the same and administered in the same manner as in the initial battery, are relisted with remarks. The procedures for those measures which differ from the initial battery are described in detail):

Bender Visual Motor Gestalt Test. This measure was found to be the most appropriate initial subtest for the battery because it is non-threatening as well as brief.

(a) Immediate recall: Cards A, 3, 6, 7, and 8 were each presented for five seconds. Immediately upon removal of each card, participants were asked to reproduce what they had seen.

(b) Direct copy: Cards A, 3, 6, 7, and 8 were presented individually and a direct reproduction was requested.

(c) Delayed recall: Upon completion of (b) the participant was engaged in 90 seconds of general conversation, and then requested to reproduce as many of the designs as possible from memory.

(d) Recognition: The subject was shown five sheets of paper each

containing three designs. One of these designs was "correct"--the same as had appeared on one of the cards. The other two were distractors. The participant was asked to mark which of the three designs had been seen before.

(e) Sequencing: The participant was requested to arrange the five cards in the order originally presented.

Peabody Picture Vocabulary Test. This measure was retained because of the reasons previously listed. However, there are acknowledged problems with the PPVT. Some of the items are out of date and represent unusual pieces of information. Furthermore, the PPVT represents white middle class values and experiential systems that some minority persons may find objectionable.

Babcock Story Recall Test. The Babcock Story Recall Test was retained as a subtest in the final battery since it has been reported to be an excellent test of memory (Rapaport, Gill and Schafer, 1968) and it has been demonstrated in clinical experiences that disturbances of memory are of diagnostic significance. The immediate and delayed story sections of this subtest directly test for the recall of meaningful material, and an analysis of the qualitative factors is available. Satisfactory performance requires attention and concentration, the capacity to maintain sets, and intactness of linguistic function as a whole. Furthermore, the short story that is the basis for the test was found to be popular with this age group.

Digit Span. The Digit Span subtest of the Wechsler Adult Intelligence Scale (WAIS) and the Wechsler Intelligence Scale for Children (WISC) is

a measure of auditory memory for digits or supposedly meaningless material. This is quite different from the purpose of the Babcock Story Recall Test. The Digit Span is a good indicator of attention. Where performance is unusual or poor, it has been shown to indicate emotional disorder and/or brain damage. For example, the relation of digits forward to digits backward among normal and neurotic people is typically one of more digits forward than back or perhaps the same number. However, an exaggeration of the usual relationship of digits forward to digits backward has been found to occur primarily with depressive psychotics and schizophrenics.

WAIS Block Design. This was found to be the most popular subtest in the battery and was strategically placed to sustain interest in the battery. It is important to note the fact that the Block Design subtest demands synthetic and analytic skills as well as visual-motor coordination, a set of skills that provides the basis of concept formation, a higher order intellectual function.

Wide Range Achievement Test (WRAT) Reading. This measure was administered according to the standardized procedure, as described in the initial battery, except that testing was discontinued after five consecutive errors instead of twelve. It was found that almost without exception, those persons who missed five words were bound to miss twelve as well. Therefore, it was both expedient and merciful to terminate after five errors.

This Wide Range Achievement Test (WRAT) Reading subtest was included in the final battery because it was found to be diagnostic and relatively

easy and brief to administer. This measure, taken with the WRAT spelling subtest and the Gates-MacGinitie Comprehension subtest was found to meet the need for an accurate assessment of the persons ability to process the written word. It is important to note that the PPVT was found to have a correlation coefficient of .536 with the Wide Range Achievement Test (WRAT) Reading Level at the .001 level of significance. This is of particular interest to those who are concerned with the relationship of intelligence and reading ability. This battery, of course, includes a number of other factors in addition to general intelligence.

Wide Range Achievement Test (WRAT) Spelling. According to the standardized procedure, one word at a time was read to the participant and used in a sentence. Testing was either begun with the first (simplest) word, or a baseline of five consecutive correct spellings was established. Testing was discontinued following five consecutive errors. Measurement is in terms of grade level performance and can be compared to expected grade level performance.

Gates-MacGinitie Comprehension. At all grade levels, the participant was asked to read silently a series of short paragraphs, then indicate which of four choices was most correct based on the content of the paragraph. The exact task is slightly different at different grade levels, e.g., at grade 1, the participant merely marks which one of four pictures illustrates what happened in the story. At grades 7-12, the subject is asked to underline the word which best fits into the blank space on the paragraph.

The following numbers of items were administered at each grade level:

Grade 1	2
Grade 2	2
Grade 3	8
Grade 4 - 6	8
Grade 7 - 9	10
Grade 10 - 12	10
TOTAL	40

Since time was an important factor, the subtest was reduced to the 40 items indicated above. Every attempt was made to include items that maintained the interest of this juvenile population.

Analysis and Results

The comprehensiveness of the data analysis is largely due to the skills of Steve Northam, a statistical consultant to the project. In addition, Drs. Tony Apolloni and Thomas Cooke of the Department of Special Education, Sonoma State College, provided valuable assistance.

Demographic Variables

There were 27 variables that composed the demographic data; these were based on the participants' self-reports in the initial portion of the learning disabilities examination. This broad spectrum of information was felt to be necessary not only to develop a base of important historical data, but it was also realized that it is disinhibiting to a potentially resistive person to exhibit close attention and detail concerning essentially nonthreatening personal data.

The demographic variables are listed below, with more specific information available in Appendix A.

Variable 1	Age in months
Variable 2	Position in family; e.g., if the subject was the second oldest, a "2" was entered
Variable 3	Total children in family--the number of children born to the participant's mother (including step-children)
Variable 4	Ethnicity--based on interviewer's observation, one of the following was marked: White, Black, Spanish surname, American Indian, Oriental, or Other
Variable 5	Present status--601, 602, 600, or don't know
Variable 6	Prior record--yes or no
Variable 7	Current living situation--natural family, foster home, group home, or other
Variable 8	Other family member(s) ever institutionalized? yes or no

Variable 10	School attendance--"yes" if currently attending school, no if not
Variable 11	Reason for no school attendance--if the answer to 10 was "no," one of the following reasons was entered: "graduate," "dropped out," or "expelled."
Variable 12	Highest grade completed--if the answer to 10 was no, the highest grade previously completed was entered
Variable 13	Type of school--if the answer to 10 was "yes," "public" or "private" was entered
Variable 14	Attitude toward school--"like," "indifferent," or "dislike"
Variable 15	General school performance--"above average," "average," or "below average"
Variable 16	Grades in English--"above average," "average," or "below average"
Variable 17	Remedial Reading--if the participant had ever been in a remedial reading class, "yes" was entered; if never, "no" was indicated
Variable 18	When in Remedial Reading--if the answer to 17 was "yes," then "currently," "formerly," or "both" was entered
Variable 19	Currently receiving professional help--"yes" or "no"
Variable 20	Type of professional help--if the answer to 19 was "yes," "psychologist," "psychiatrist," "counselor," "physician," "speech therapist," or "other" was entered
Variable 21	Currently taking medication? "yes" or "no"
Variable 22	Currently using sensorimotor aids--"yes" or "no"
Variable 23	Type of sensorimotor aid--if the answer to 22 was "yes," "glasses," "prosthesis," "hearing aid" or "other" was indicated
Variable 24	Notable illnesses/accidents in the family--"yes" or "no"
Variable 25	Whose illness--"self," "others," or "both"

Variable 26 "Disturbance" was entered if in the opinion of the examiner the participant obviously manifested a serious emotional disturbance; if a disturbance was felt to be possible; or if there appeared to be no disturbance at all, this was noted

Variable 27 Sex

Participant Profile and Characteristics of Sample

Based on a preliminary analysis of the above demographic variables, a profile of the typical participant in the study would be the following: a 17-year-old, white, male, younger child living with his natural (relatively large) family. He was currently enrolled in school and reported either being indifferent to or disliking school. However, he reported average or above average school performance. He had a prior juvenile record.

Thirty percent of the participants reported that at least one other member of their family had been in a correctional facility, and 26% reported that at the time of the examination at least one other family member was currently in a correctional facility. In three cases, two children from the same family were being held at the Los Guilucos Juvenile facility.

Of those participants not currently enrolled in school, the majority had been expelled. Furthermore, the highest grade completed typically did not reflect the level of academic achievement. That is to say, notwithstanding attendance or achievement, the results indicated that students were carried on the school records and promoted through the grades.

Sixty-one percent of the participants informed the examiner that

their grades in English were average or above. As a point of contrast, 38% reported that they had at one time attended special or remedial reading classes, with only 19% being currently enrolled in a class of this type.

Eighty-nine percent of the participants were not receiving any type of professional help, but of those few who were, it was invariably psychological or psychiatric. In addition, medication was not prescribed in 91% of the cases, and only 20% used a sensorimotor aid. The sensorimotor aids were limited to eye glasses (89%) and hearing aids (11%).

A notable illness or accident to themselves or another family member was reported for only 16% of the participants. Of this proportion, the majority revealed that the misfortune had occurred to them rather than another family member.

Finally, the examiners had made a notation of any obvious form of emotional disturbance manifested during the examination or volunteered by the participant. Eighty-three percent did not evidence any obvious signs of disturbance. This consideration was limited to unequivocably bizarre behavior, or reports of hospitalization due to psychiatric reasons.

Performance Variables

The major performance variables of interest are listed below, with a complete listing of all variations and transformations of these scores in Appendix C.

Variable 28 Story Recall--the total number of correctly recalled segments on the Babcock Story Recall Test: the sum from Trial 1, general idea; Trial 2, general idea; Trial 1, verbatim; and Trail 2, verbatim.

Variable 29 — Bender Gestalt--the score according to the Koppitz scoring method on Designs A, 3, 6, 7, and 8 of the Bender Visual Motor Gestalt Test (BVMG).

Variable 31 — PPVT IQ--the Peabody Picture Vocabulary Test (PPVT) IQ score.

Variable 47 — Digit Span--the total number of digits correctly recalled, both forward and backward.

Variable 51 — Block Design--(scaled score) the standard score is based on the raw score such that the mean of the normative population (with age considered) is 10 and the standard deviation is 3.

Variable 54 — Reading Grade Level--the grade level, to the nearest decimal, at which the participant performed on the WRAT Reading Test.

Variable 64 — Vocabulary--the number of Gates--MacGinitie Vocabulary items (out of eight) correctly identified.

Variable 65 — Comprehension--the number of Gates-MacGinitie Comprehension items (out of seven) correctly identified.

Variable 66 — Spelling (Errors)--the number of words incorrectly spelled on the dictation paragraph.

Classification of Groups

As discussed earlier, the diagnosis of "learning disabled" or not learning disabled is in many cases not a simple one. A number of factors must be considered; e.g., how far behind expected grade level must a youth read to be diagnosed as learning disabled? Should the rules apply equally at all ages? For example, it is more serious for a nine-year old fourth grader to be three years behind in reading than it is for a 17-year old 12th grader to be three years behind. What is the relationship of intelligence to learning disability? If a child with an IQ of 120 is reading well below grade level, he clearly has a learning disability or at least a learning problem. If a child with an IQ of 70 is reading well below grade level, this is at least partially due to low

intelligence. Finally, if reading is a child's sole area of deficiency, is he or she learning disabled or reading disabled? Must other "indicators" or additional areas of deficiency be present to consider this a true disability?

With the above considerations in mind, and with full recognition that diagnosis and classification have a number of shortcomings, for purposes of analysis, the participants in our sample have been classified as Developmentally Disabled (DD), Learning Disabled (LD), or Not Learning Disabled (NLD) on the basis of the following variables:

Variable 1	Age in months
Variable 54	WRAT reading grade level
Variable 86	Expected minus actual reading grade level
Variable 90	Story Recall Percentile (a transformation of Variable 48 based on norms from the sample of the present study)
Variable 87	Bender-Gestalt Percentile (a transformation comparable to Variable 90)
Variable 31	PPVT IQ
Variable 51	Block Design Scaled Score
Variable 88	Reading Vocabulary Percentile (a transformation comparable to Variable 90)
Variable 89	Reading Comprehension Percentile (a transformation comparable to Variable 90)

If the PPVT was found to be below 80, the participant was classified "developmentally disabled" (DD). It is recognized that some of the individuals would attain a higher IQ score on more broadly based measures than the brief culturally-involved PPVT measure. It was decided,

however, that the inclusion of individuals with PPVT IQs below 80 could potentially confound reading disability with low intelligence. IQs below 70 are in the range of mild retardation. Those with PPVT IQs between 70 and 79 were reviewed on a case by case basis for a possible "special disability," i.e.,learning difficulties which are more serious than what would be predicted on the basis of low intelligence alone. This area is elaborated upon in the discussion section. For the present, those with PPVT IQs below 80--no matter how poorly they read--were not considered LD but were classified as DD. Each individual with a PPVT IQ of 80 or above was classified "learning disabled" (LD) or "not learning disabled" (NLD) as follows:

1. If the age of the participant was 180 months (15 years, 0 months) or greater at the time of examination, the following rules applied.

   a. If reading was above grade level, at grade level, or not more than 2.0 years behind grade level, s/he was classified as NLD, nothwithstanding any other performance criteria.

   b. If the reading was more than 3.5 years below grade level, s/he was classified as LD.

   c. If the reading was between 2.0 and 3.5 years below grade level, the protocol was considered as follows: If both the reading Vocabulary and Reading Comprehension scores were above the 75th percentile in our sample, the participant was considered to be adequately "compensating" for word calling below grade level and s/he was classified NLD. If these compensators were not satisfied, the following "indicators" were examined for performance at or below the indicated level:

(1) Story Recall--25th percentile

(2) Bender Gestalt--25th percentile

(3) Digit Span--Scaled Score 6

(4) Block Design--Scaled Score 6

If two or more scores on these indicators were equal to or less than the levels mentioned above, the participant was classified LD. If fewer than two scores met these criteria, the participant was classified NLD.

2. If the age of the participant was less than 180 months at the time of testing, the following rules applied:

a. If the reading was above grade level, at grade level, or no more than 1.5 years below grade level, s/he was classified NLD.

b. If reading was more than 2.5 years below grade level, s/he was classified as LD.

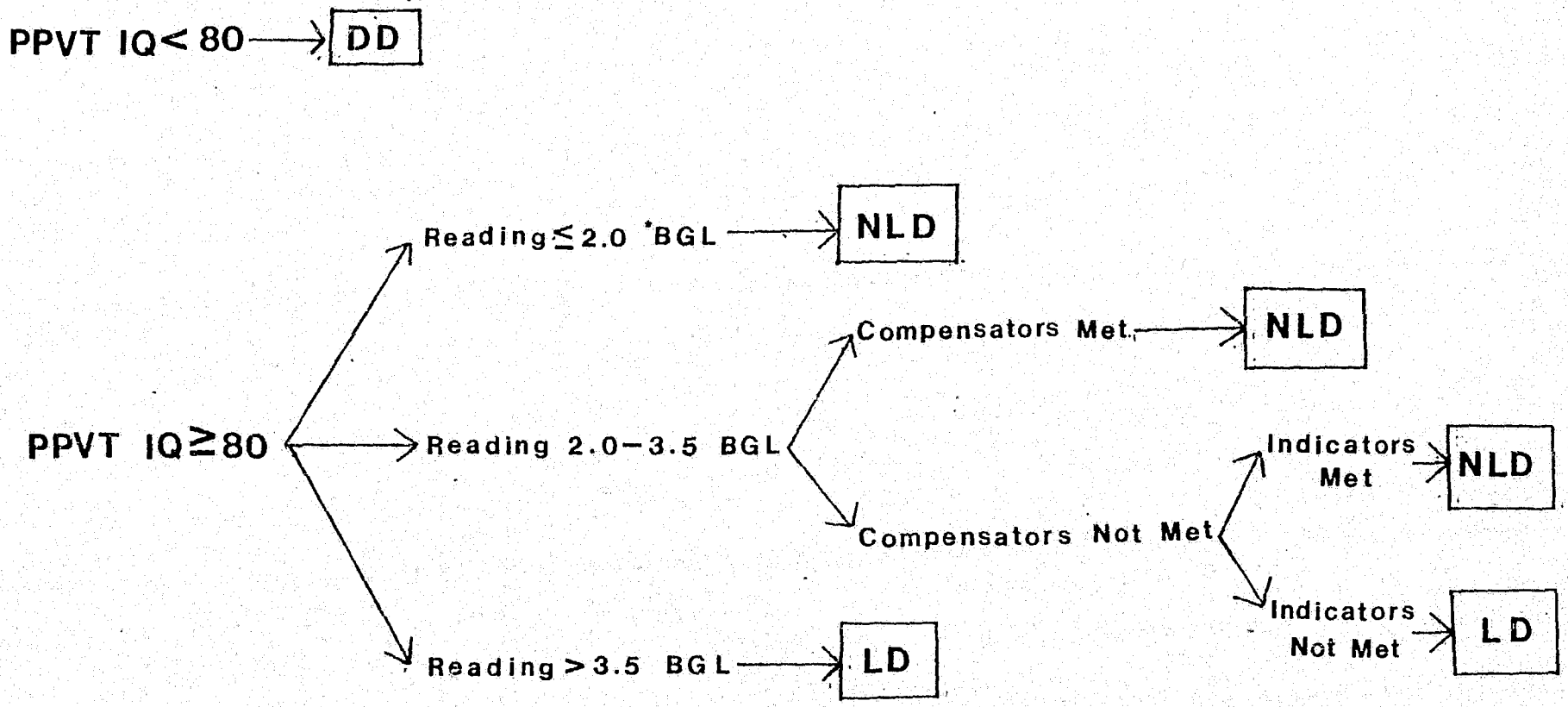
c. If reading was between 1.5 and 2.5 years below grade level, the decision was made according to the same rules as for the older participants.

Thus, a classificatory system has been developed which takes into account age, IQ, reading grade level, "compensators" (other reading abilities), and "indicators" (other language-related abilities). This is presented graphically in Figure 1 for those participants who were 15 years of age or older. Figure 2 similarly depicts the system for those participants who were less than 15 years of age.

Table 1 presents the results of this classificatory technique for

FIG. 1 ILLUSTRATIVE MODEL FOR CLASSIFICATORY SCHEME:

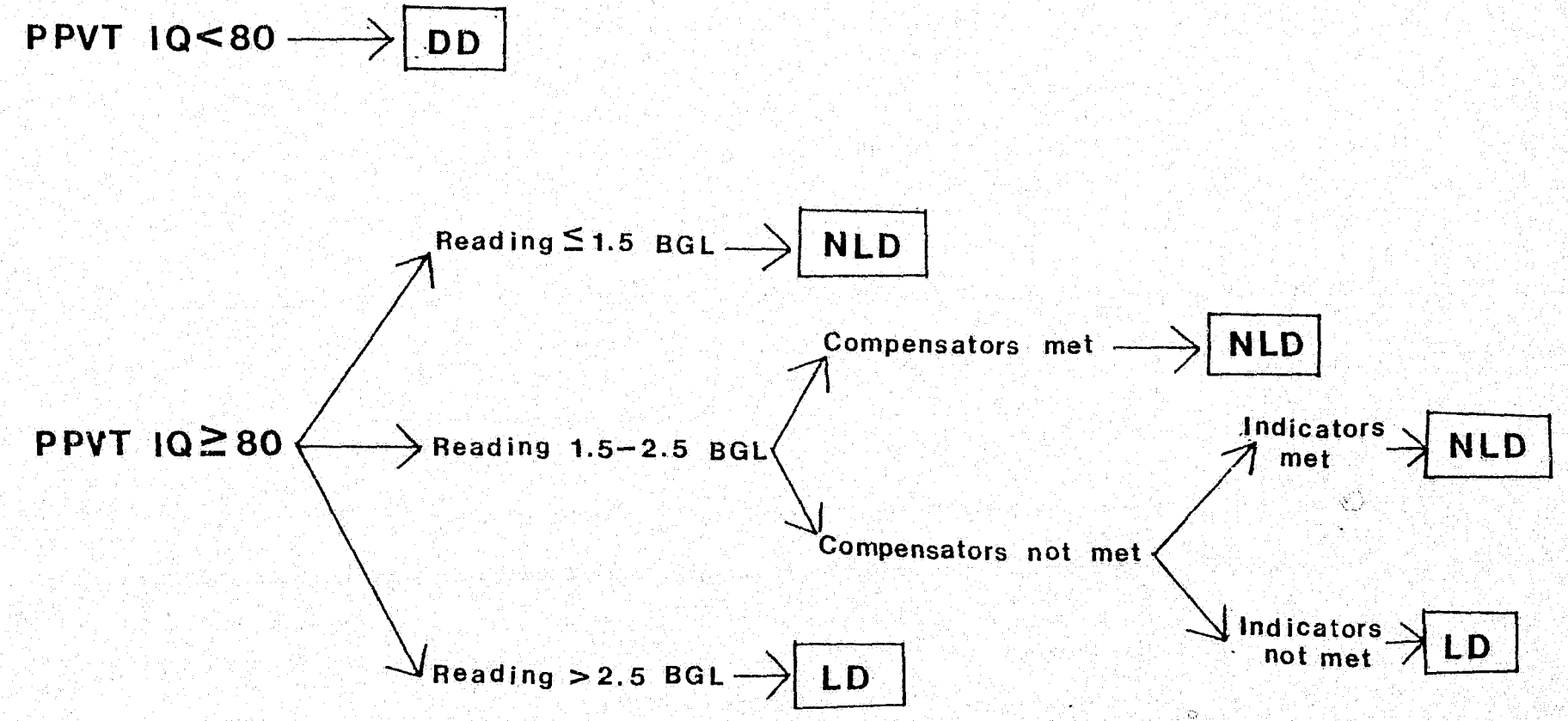
15 Years and Older



*BGL = Below Grade Level

FIG. 2 ILLUSTRATIVE MODEL FOR CLASSIFICATORY SCHEME:

Less than 15 Years of Age



BGL= Below Grade Level

Table 1

Distribution of Sample by Classificatory Group

	DD	LD	NLD	Total
Boys	20 (11.7%)	90 (52.6%)	61 (35.6%)	171
Girls	10 (16.1%)	24 (38.7%)	28 (45.2%)	62
Total	30 (12.9%)	114 (48.9%)	89 (38.2%)	233

boys, for girls, and for the entire sample. Thus, 48.9% of the sample was found to be LD, while this proportion was somewhat higher for boys (52.6%) than for girls (38.7%). It is also important to note that 211 of the 233 participants (90.6%) were found to read below grade level. Reading below grade level, however, is quite different from being diagnosed or classified as learning disabled.

Analysis of Demographic and Interview Data

The interview questions and demographic scores that significantly separated the three classificatory groups (DD, LD, and NLD) are illustrated in Table 2. These results indicate that DD and LD participants tended to come from larger families; have poorer school performance, poorer English grades, and are more likely to have been in a remedial reading class than their NLD counterparts. All other demographic and interview variables showed nonsignificant group differences. Group differences in the number of children per family may be seen graphically in Figure 3.

Table 3 illustrates those demographic and interview scores which were found to be significantly different for males and females, 601s and 602s, and those with a prior record as opposed to no prior record. The results from Table 3 demonstrate a number of significant differences in the reported backgrounds of the boys and the girls. Namely, the boys in our sample tended to be older, more likely to have been charged with an offense and more likely to have had a prior record. Boys had completed more school, although girls were more likely to be currently attending school. Girls reported better English grades and were less

Table 2

Significant Classificatory Group Differences on

Demographic and Interview Scores

Variable	DD	LD	NLD	F	P
3 Number of Children	$\overline{X}$ = 4.27	$\overline{X}$ = 5.20	$\overline{X}$ = 3.68	8.81	.001
15 School Performance	$\overline{X}$ = 2.31	$\overline{X}$ = 2.38	$\overline{X}$ = 2.22	1.51	.001
16 English Grades	$\overline{X}$ = 2.41	$\overline{X}$ = 2.32	$\overline{X}$ = 2.12	5.39	.005
17 Remedial Reading	$\overline{X}$ = 1.54	$\overline{X}$ = 1.53	$\overline{X}$ = 1.74	3.83	.023

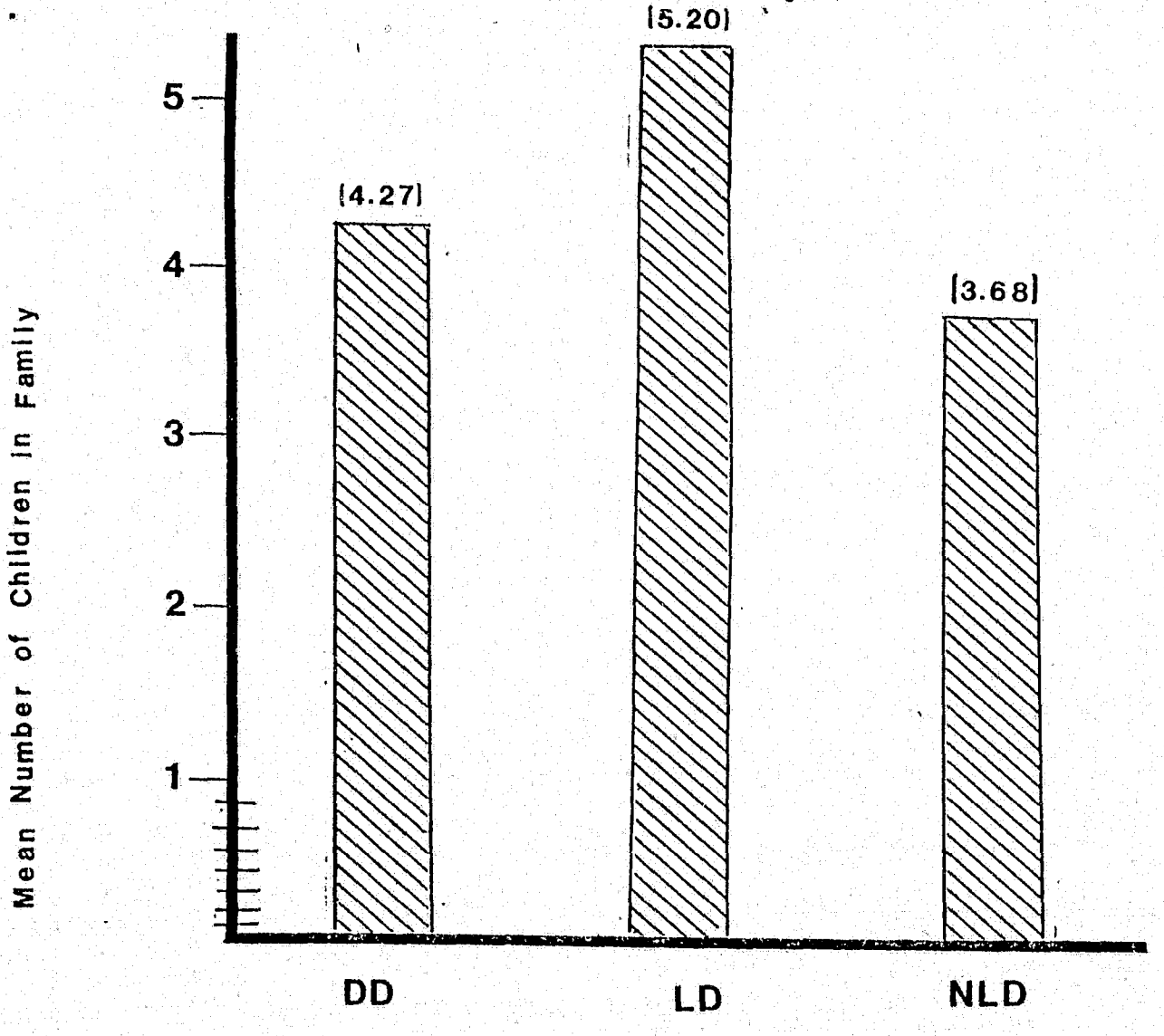


FIG. 3 Number of Children in Family by Classificatory Group

Table 3

Significant Group Differences on Demographic and Interview Scores

A. SEX	MALES	FEMALES	t-VALUE	p
Age in Years	$\bar{X}$ = 16.36	$\bar{X}$ = 15.65	3.63	.001
Status (601 or 602)	$\bar{X}$ = 1.64	$\bar{X}$ = 1.22	6.56	.001
Prior Record	$\bar{X}$ = 1.18	$\bar{X}$ = 1.34	-2.38	.019
Highest Grade	$\bar{X}$ = 10.32	$\bar{X}$ = 9.74	2.73	.007
School Attendance	$\bar{X}$ = 2.01	$\bar{X}$ = 1.68	2.78	.006
English Grades	$\bar{X}$ = 2.38	$\bar{X}$ = 2.03	3.84	.001
Remedial Reading	$\bar{X}$ = 1.57	$\bar{X}$ = 1.74	-2.39	.018
Sensorimotor Aid	$\bar{X}$ = 1.83	$\bar{X}$ = 1.68	2.12	.037
Type of Aid	$\bar{X}$ = 1.16	$\bar{X}$ = 1.00	2.41	.023
B. STATUS	601	602	t-VALUE	p
Age in Years	$\bar{X}$ = 15.94	$\bar{X}$ = 16.38	-2.62	.009
English Grades	$\bar{X}$ = 2.16	$\bar{X}$ = 2.40	-2.90	.004
C. PRIOR RECORD	YES	NO	t-VALUE	p
Family Institutionalized	$\bar{X}$ = 1.66	$\bar{X}$ = 1.81	-2.17	.033
Current Institutionalization	$\bar{X}$ = 1.63	$\bar{X}$ = 1.80	-2.30	.023
Sensorimotor Aid	$\bar{X}$= 1.82	$\bar{X}$ = 1.66	2.09	.040

likely to be in remedial reading classes. Girls were more likely to be using some kind of sensorimotor aid and these tended to be glasses.

The 602s were found to be older and had poorer English grades than the 601s. Those with a prior record reported more family members institutionalized, past and present, and were less likely to employ a sensorimotor aid.

Analysis of Performance Variables

An Analysis of Variance was performed on those major performance measures which were either given on both Battery A and Battery B, or those measures given on Battery A only. Table 4 presents the results of this analysis, comparing the classificatory groups on these measures. Figures 4-12 depict those group differences graphically.

Particular attention may be drawn to Figure 5, which deals with reading grade level by classificatory group. It may be recalled that reading grade level is based on age, and not grade in school. Therefore, it is significant that the mean reading grade level of the learning disabled group was only at the sixth grade level when as a function of age the expected reading level was almost the 11th grade. Therefore, Figure 5 extends the mean reading grade level to grade 14 due to the fact that this project included participants who were high school graduates and college students in a few cases. These persons were over 18 years of age, but were allowed to serve their sentences in a juvenile facility for offenses commiteed prior to the age of 18.

The majority of the measures significantly separated the classificatory groups with the non-learning disabled (NLD) performing at a level

Table 4

Scores on Major Performance Measures by Classificatory Group

Measure	DD	LD	NLD	F	p
PPVT IQ	$\bar{X}$ = 74.00	$\bar{X}$ = 89.87	$\bar{X}$ = 97.51	69.06	.001
Reading Grade Level	$\bar{X}$ = 4.60	$\bar{X}$ = 6.03	$\bar{X}$ = 9.69	78.12	.001
Bender Gestalt	$\bar{X}$ = 3.09	$\bar{X}$ = 2.56	$\bar{X}$ = 2.24	2.94	.055
Digit Span	$\bar{X}$ = 9.84	$\bar{X}$ = 10.43	$\bar{X}$ = 11.82	8.51	.001
Story Recall	$\bar{X}$ = 13.97	$\bar{X}$ = 17.76	$\bar{X}$ = 20.76	8.98	.001
Block Design	$\bar{X}$ = 8.26	$\bar{X}$ = 9.58	$\bar{X}$ = 10.91	8.01	.001
Vocabulary	$\bar{X}$ = 1.82	$\bar{X}$ = 3.40	$\bar{X}$ = 6.19	33.74	.001
Comprehension	$\bar{X}$ = 1.48	$\bar{X}$ = 1.83	$\bar{X}$ = 4.31	31.34	.001
Spelling (errors)	$\bar{X}$ = 4.83	$\bar{X}$ = 3.66	$\bar{X}$ = 1.52	16.64	.001

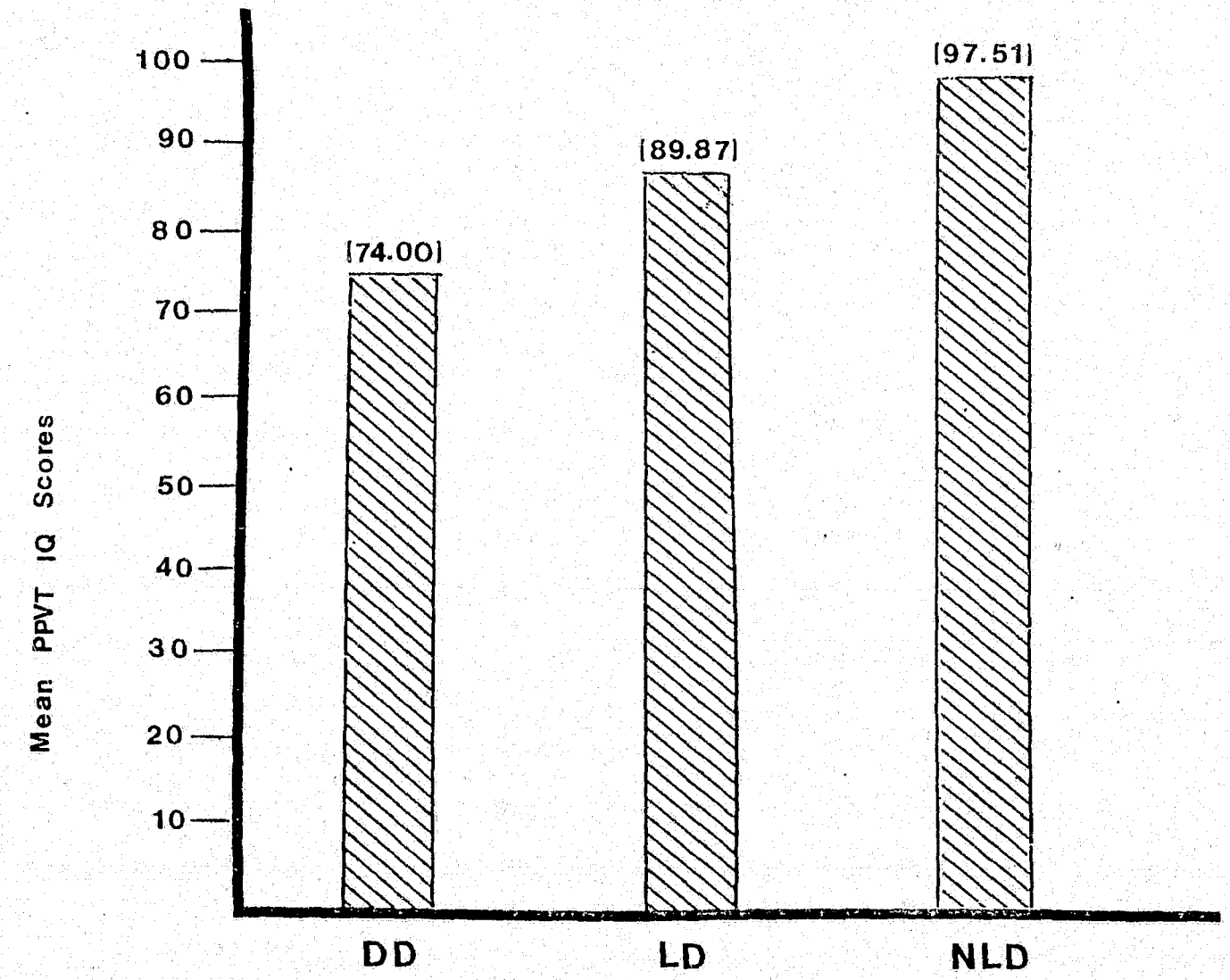


FIG. 4 PPVT IQ Scores by Classificatory Group

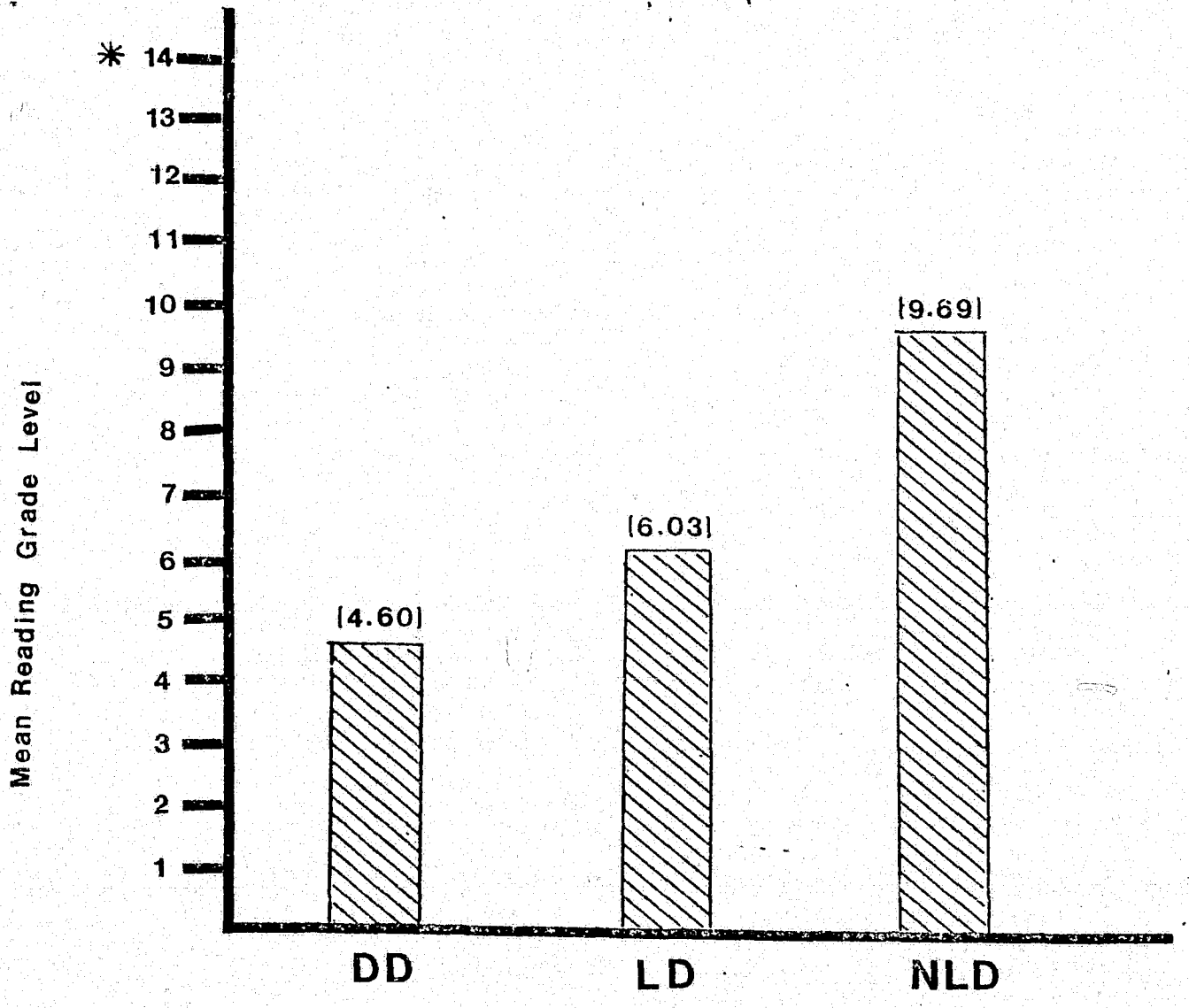


FIG. 5 Reading Grade Level by Classificatory Group

* Maximum Expected Reading Grade Level

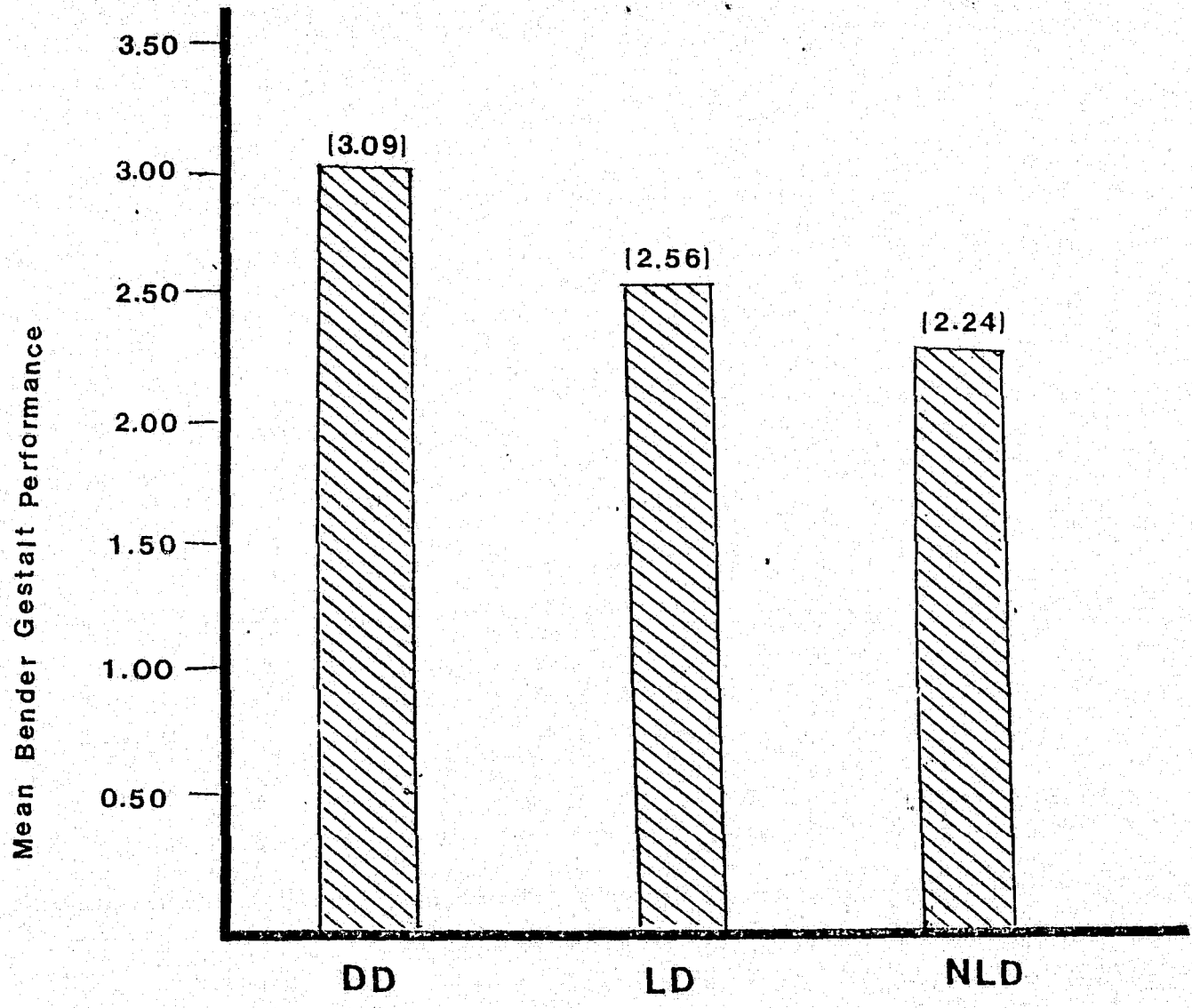


FIG.6 Bender Gestalt Performance by Classificatory Group

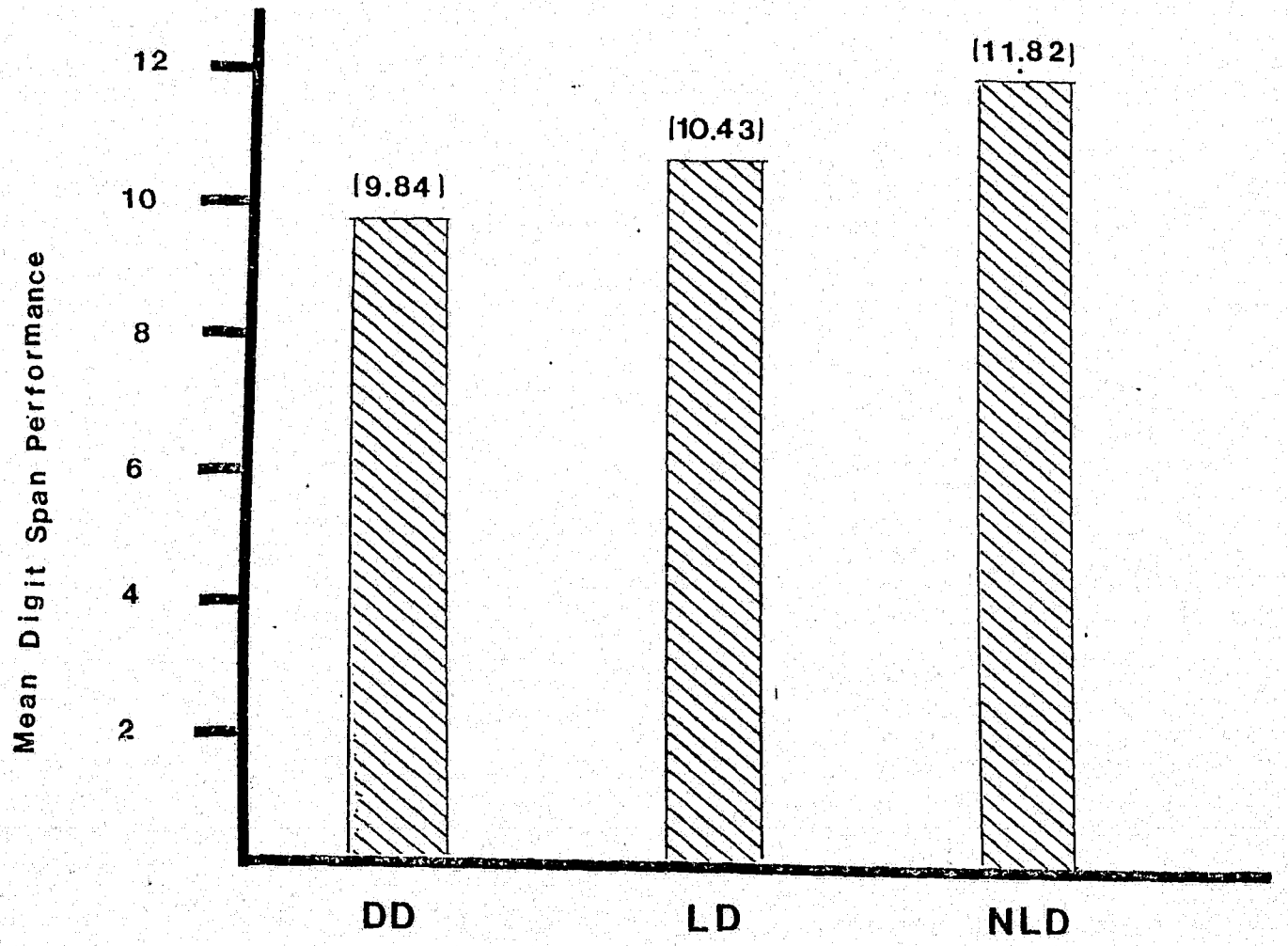


FIG.7 Digit Span Performance by Classificatory Group

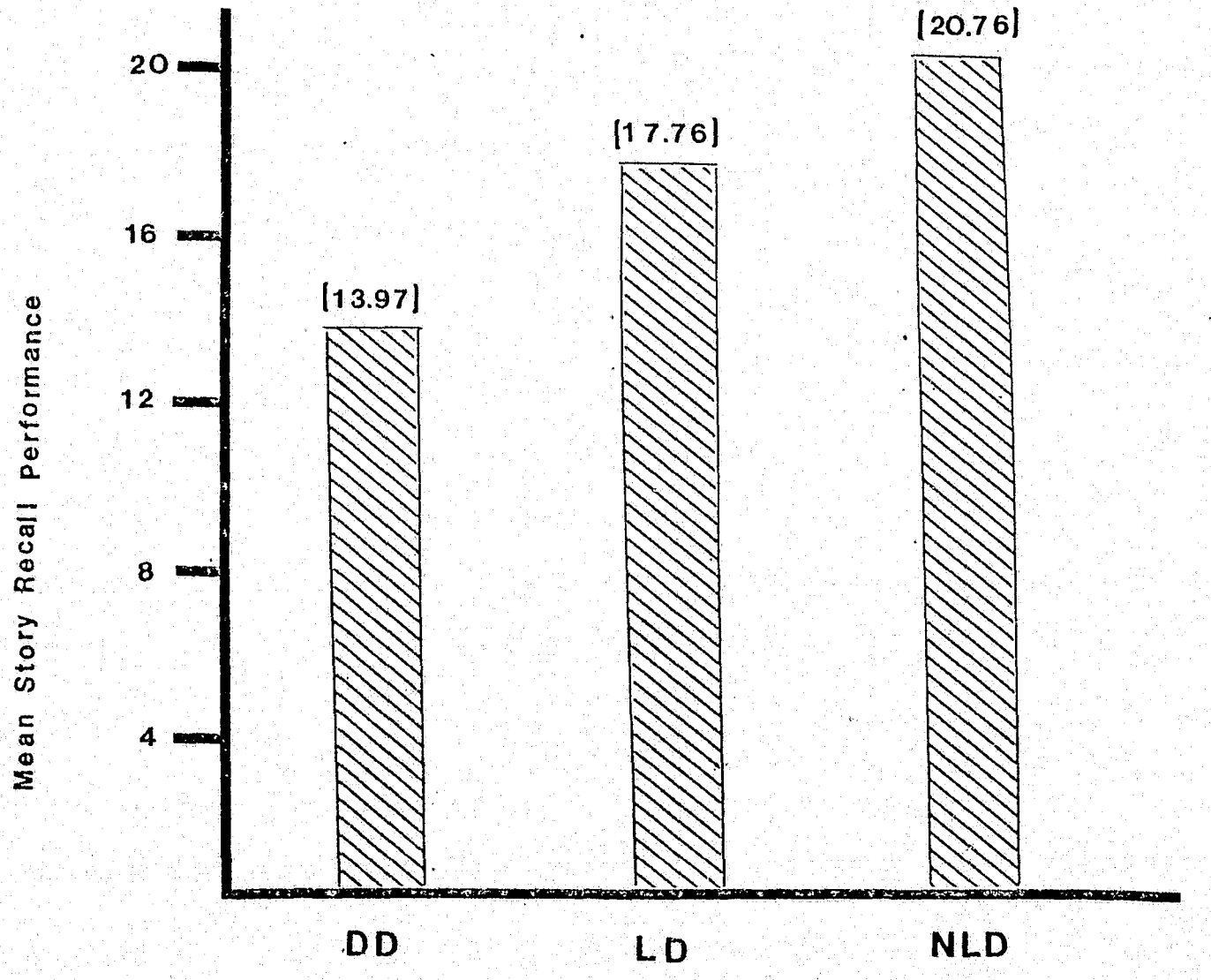


FIG.8 Story Recall Performance by Classificatory Group

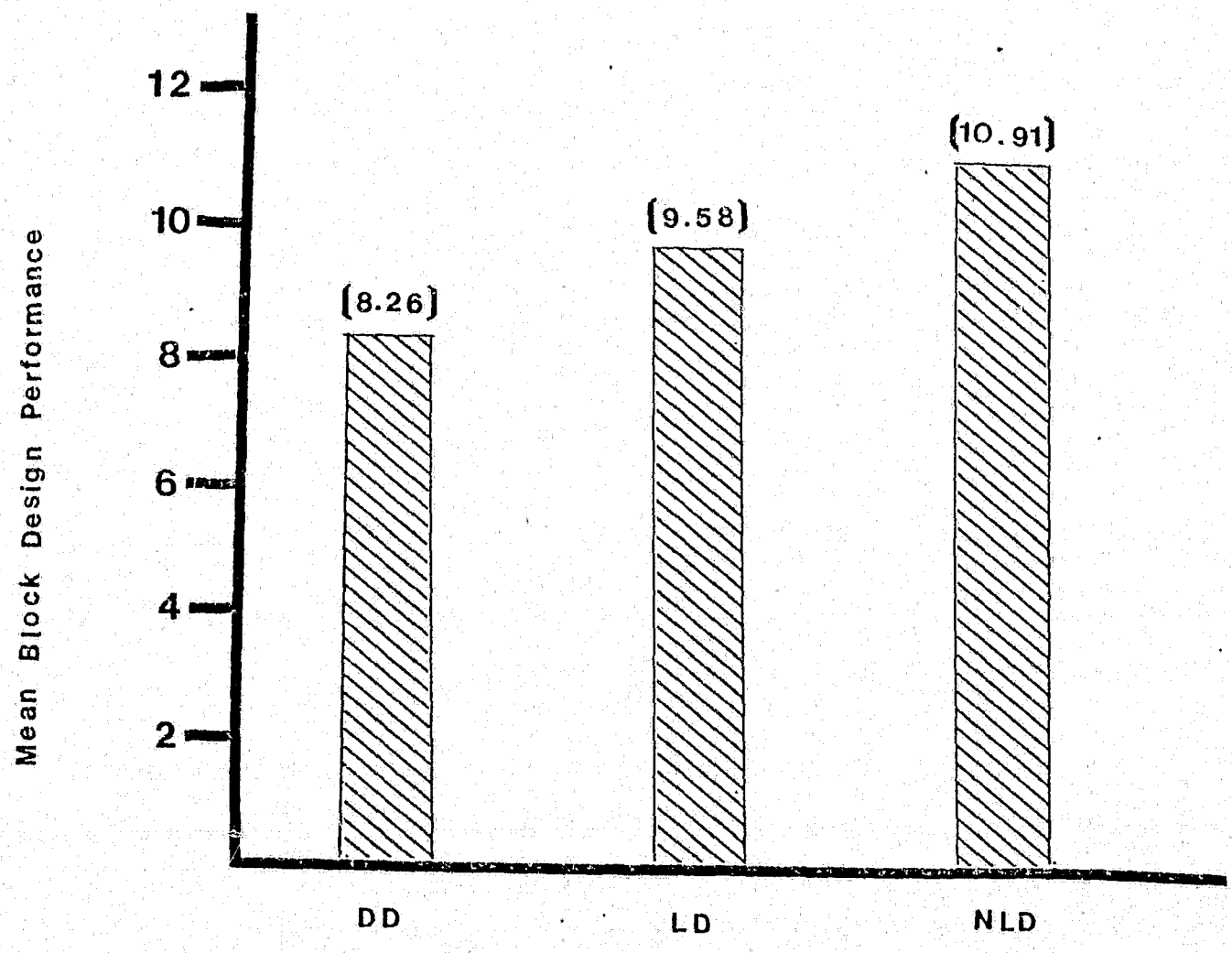


FIG. 9 Block Design Performance by Classicatory Group

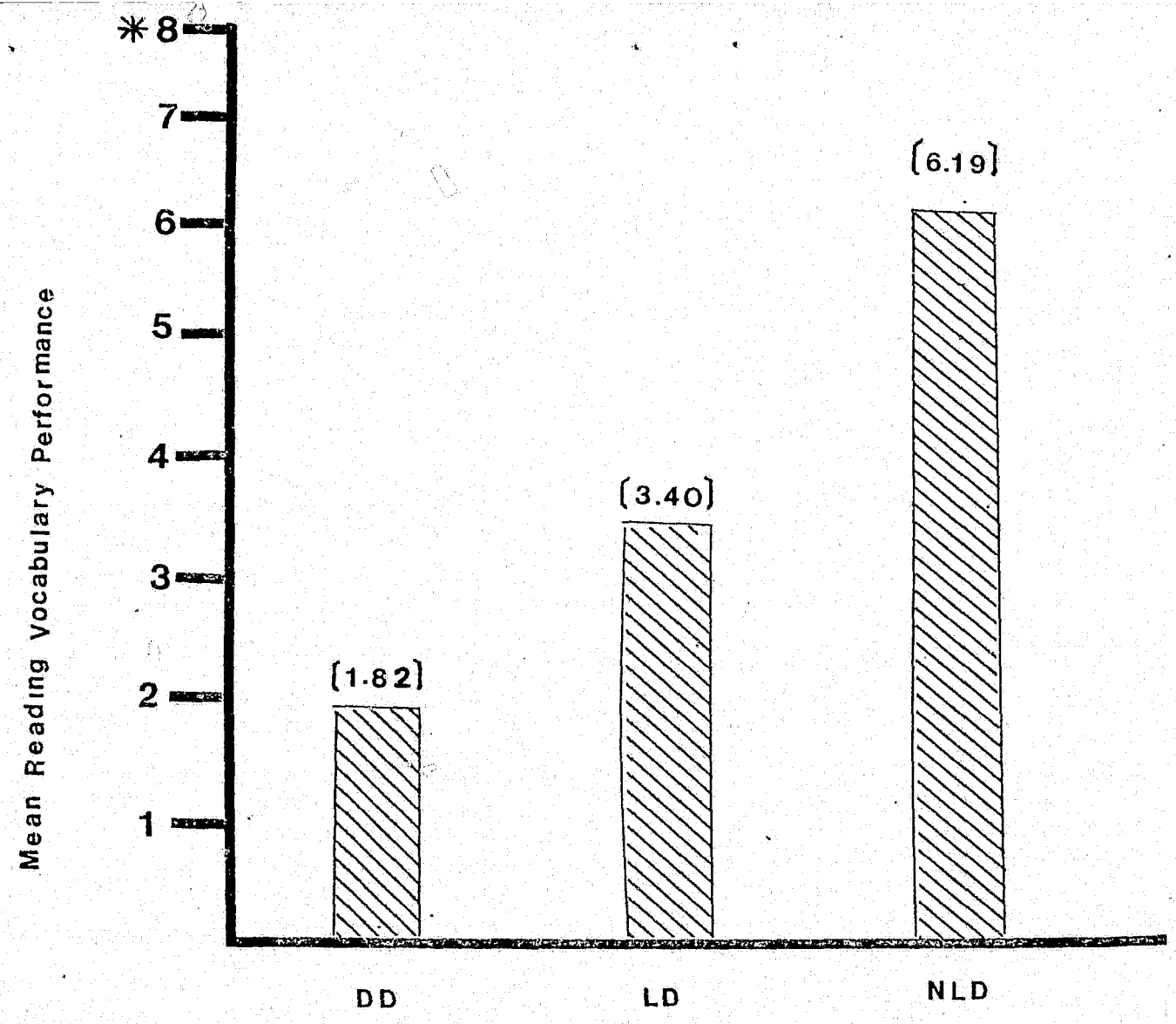


FIG. 10 Reading Vocabulary Performance by Classificatory Group

* Maximum possible performance

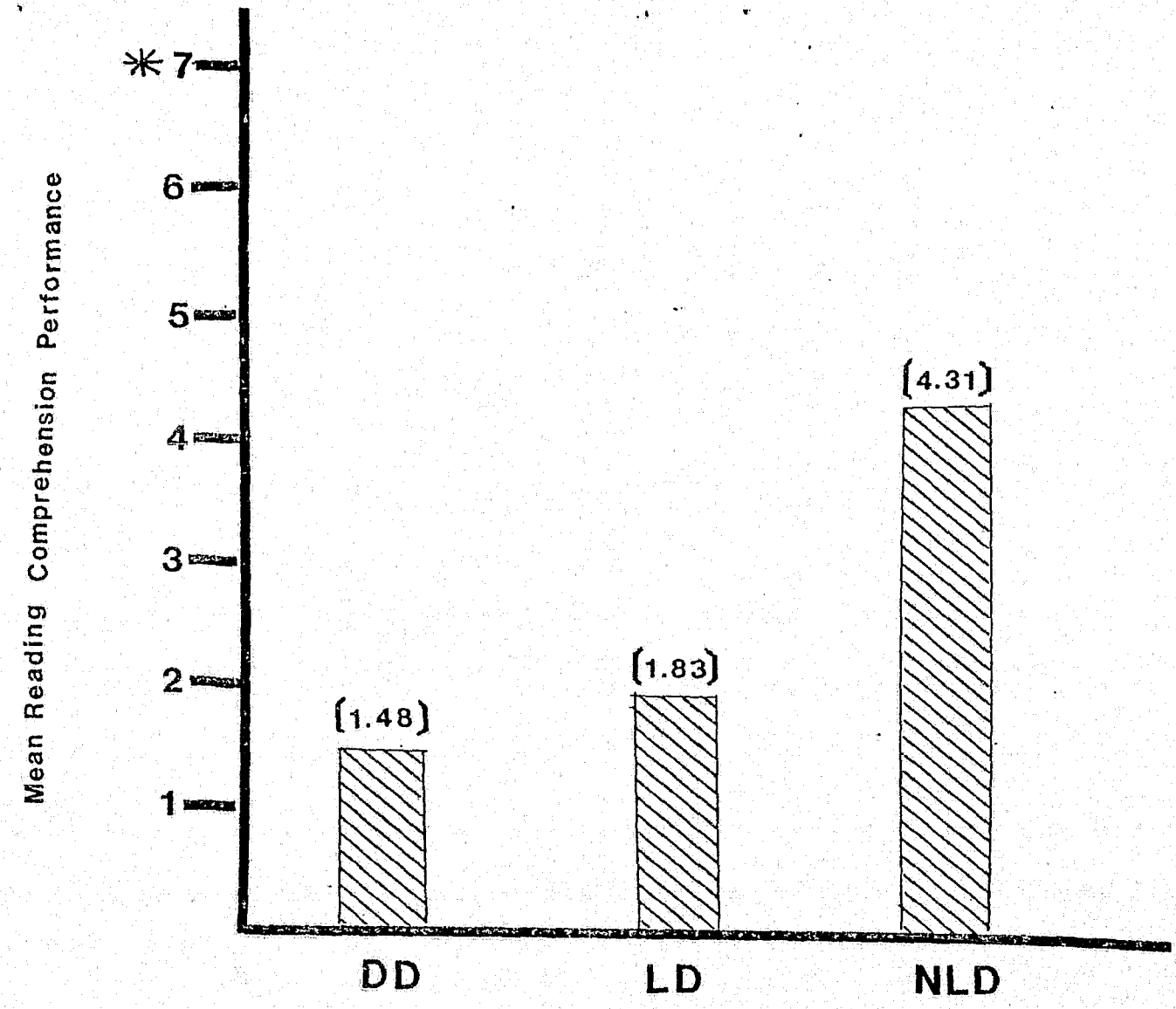


FIG.11 Reading Comprehension Performance by Classificatory Group

* Maximum possible performance

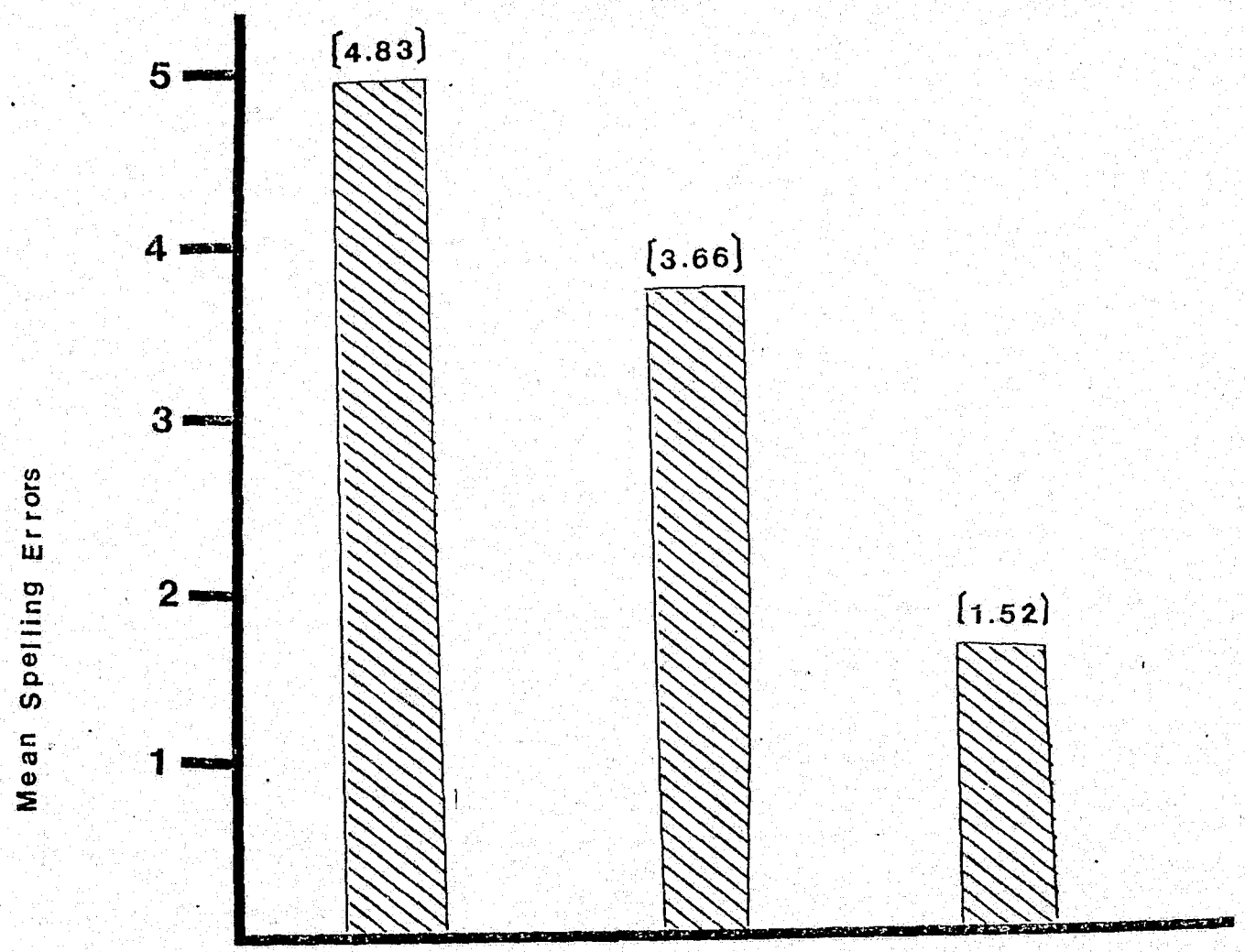


FIG. 12 Spelling [Errors] by Classificatory Group

superior to that of the learning disabled (LD) who in turn performed at a level superior to that of the developmentally disabled (DD). It is important to remember that high scores on the Bender Gestalt and Spelling tests indicate poor performance, whereas on the balance of the measures, high scores are associated with good performance. Mean scores for all variables for these groups may be found in Appendix D.

The next analysis concerned the comparisons of these measures between the 601s and 602s, as illustrated in Table 5. It will be noted that only the test of spelling errors showed a significant difference; the 602s made more errors than did the 601s.

In similar fashion, males were compared to females on these major measures. These data appear in Table 6. It will be recalled that a greater proportion of boys than girls had been classified as LD. Girls read better than boys and had significantly fewer spelling errors than boys. No other measures showed significant sex differences.

Finally, those with a prior record were compared to those with no prior record. These data are included in Table 7. The performance of those with no prior record was superior to that of those with prior records on the Story Recall Test and the Reading Comprehension subtests. The balance of the differences were nonsignificant.

Table 8 presents the intercorrelations on the major variables for all participants. It is seen that most of the correlations were significant that that the highest correlations were among IQ and the various reading measures. Bender Gestalt, Story Recall, Digit Span, and Block Design tended to correlate less with one another than they did with

Table 5

Scores on Major Measures by Offense Status

Measure	601	602	t	p
PPVT IQ	$\bar{X}$ = 91.29	$\bar{X}$ = 90.14	0.69	.493
Reading Grade Level	$\bar{X}$ = 7.48	$\bar{X}$ = 6.89	1.56	.121
Bender Gestalt	$\bar{X}$ = 2.48	$\bar{X}$ = 2.45	0.12	.907
Digit Span	$\bar{X}$ = 10.16	$\bar{X}$ = 10.63	-1.26	.210
Story Recall	$\bar{X}$ = 17.93	$\bar{X}$ = 18.64	-0.66	.512
Block Design	$\bar{X}$ = 9.64	$\bar{X}$ = 10.02	-0.91	.363
Vocabulary	$\bar{X}$ = 4.48	$\bar{X}$ = 4.39	0.21	.833
Comprehension	$\bar{X}$ = 3.12	$\bar{X}$ = 2.74	1.09	.279
Spelling Errors	$\bar{X}$ 2.32	$\bar{X}$ = 3.28	-2.49	.014

Table 6

Scores on Major Measures by Sex

MEASURE	MALE	FEMALE	t	p
PPVT IQ	$\overline{X}$ = 90.89	$\overline{X}$ = 90.06	0.37	.710
Reading Grade Level	$\overline{X}$ = 6.91	$\overline{X}$ = 7.82	-2.00	.049
Bender Gestalt	$\overline{X}$ = 2.53	$\overline{X}$ = 2.26	1.06	.290
Digit Span	$\overline{X}$ = 10.36	$\overline{X}$ = 10.39	-0.06	.950
Story Recall	$\overline{X}$ = 17.87	$\overline{X}$ = 19.46	-1.21	.229
Block Design	$\overline{X}$ = 9.98	$\overline{X}$ = 9.49	1.04	.300
Vocabulary	$\overline{X}$ = 4.29	$\overline{X}$ = 4.79	-1.16	.251
Comprehension	$\overline{X}$ = 2.77	$\overline{X}$ = 3.31	-1.33	.188
Spelling Errors	$\overline{X}$ = 3.12	$\overline{X}$ = 2.08	2.53	.013

Table 7

Scores on Major Measures by Record

	PRIOR	NO PRIOR	t	p
PPVT IQ	$\bar{X}$ = 90.48	$\bar{X}$ = 91.34	0.42	.677
Reading Grade Level	$\bar{X}$ = 7.10	$\bar{X}$ = 7.33	0.50	.617
Bender Gestalt	$\bar{X}$ = 2.48	$\bar{X}$ = 2.38	0.36	.718
Digit Span	$\bar{X}$ = 10.48	$\bar{X}$ = 10.01	0.90	.371
Story Recall	$\bar{X}$ = 17.58	$\bar{X}$ = 20.68	-2.45	.016
Block Design	$\bar{X}$ = 9.88	$\bar{X}$ = 9.74	0.26	.793
Vocabulary	$\bar{X}$ = 4.29	$\bar{X}$ = 5.09	-1.55	.127
Comprehension	$\bar{X}$ = 2.73	$\bar{X}$ = 3.71	-2.17	.035
Spelling Errors	$\bar{X}$ = 2.83	$\bar{X}$ = 2.80	0.06	.951

Table 8

Intercorrelations of Major Variables: All Participants

	PVVT IQ	Read Level	Bender Gest.	Digit Span	Story Recall	Block Design	Read. Vocab.	Read. Comp.	Spell. Errors
PVVT IQ	1.000	.461	-.285	.138	.332	.251	.411	.359	-.234
Reading Level	.461	1.000	-.253	.270	.243	.252	.558	.522	-.460
Bender Gestalt	-.285	-.253	1.000	.048	-.196	-.227	-.153	-.118	.217
Digit Span	.138	.270	.048	1.000	.058	.140	.156	.184	-.166
Story Recall	.332	.243	-.196	.058	1.000	.271	.229	.198	.138
Block Design	.251	.252	-.227	.140	.271	1.000	.168	.098	-.084
Reading Vocabulary	.411	.558	-.153	.156	.229	.168	1.000	.828	-.103
Reading Comprehension	.359	.522	-.118	.184	.198	.098	.828	1.000	-.100
Spelling Errors	-.234	-.460	.217	-.166	-.138	-.084	-.103	-.100	1.000

$r = .130$, $p < .05$; $r = 170$, $p < .01$

CONTINUED

1 OF 2

reading level. They each correlated with reading level at close to .250 ($p < .01$). Thus, each of these measures may be seen as relatively independent "indicators" of reading disability.

Tables 9 and 10 present the intercorrelations on the same set of performance measures for the LD and DD participants taken as a single group, and the NLD participants, respectively. Essentially the variables correlate to the same extent for each of these groups, suggesting that basically the same processes are at work at two levels; i.e. similar abilities go together and are associated with reading performance regardless of whether one is a good reader, a poor reader, or has a low IQ.

The analysis for those participants who received Battery B follows. Table 11 shows the mean scores by classificatory group on each of the major performance variables and on those new measures which were given only on Battery B. On most of the major performance measures there was a clear and significant trend for successively increased performance from DD to LD to NLD. The trend was usually in the same direction for the new measures; i.e. additional Bender-Gestalt variables and the various types of Digit Span error scores. However, the sample size (n=36) of all three groups combined was relatively small for a detailed analysis of this type to adequately test for significance.

Table 12 presents the intercorrelations of major performance measures for those 36 participants who received Battery B. Some of the new variables correlate significantly with one another and are associated with reading ability. A complete analysis of the extent to which the

Table 9

Intercorrelations of Major Variables: LD and DD Participants

	PPVT IQ	Read. Level	Bend. Gest.	Digit Span	Story Recall	Block Design	Read. Vocab.	Read. Comp.	Spell. Error
PPVT IQ	1.000	.229	-.210	.198	.217	.223	.208	.096	-.190
Reading Level	.229	1.000	-.239	.231	.186	.173	.359	.294	-.367
Bender Gestalt	-.210	-.239	1.000	-.339	-.165	-.270	-.116	-.121	.229
Digit Span	.198	.231	-.339	1.000	.244	.236	.082	.115	-.150
Story Recall	.217	.186	-.165	.244	1.000	.254	.243	.163	-.173
Block Design	.223	.173	-.270	.236	.254	1.000	.034	-.008	-.116
Reading Vocabulary	.208	.359	-.116	.082	.243	.034	1.000	.747	.049
Reading Comprehension	.096	.294	-.124	.115	.163	-.008	.747	1.000	.048
Spelling Error	-.190	.367	.229	-.150	-.173	-.116	.049	.048	1.000

$r = .164$; $p < .05$; $r = .212$, $p < .01$

Table 10

Intercorrelations of Major Variables: NLD Participants

	PPVT IQ	Read. Level	Bend. Gest.	Digit Span	Story Recall	Block Design	Read. Vocab.	Read. Comp.	Spell. Errors
PPVT IQ	1.000	.279	-.323	.636	.352	.086	.276	.240	-.121
Reading Level	.279	1.000	-.229	.034	-.035	.033	.331	.308	-.280
Bender Gestalt	-.323	-.229	1.000	-.493	-.195	-.094	-.109	-.038	.122
Digit Span	.636	.034	-.493	1.000	-.289	-.071	.015	.068	-.071
Story Recall	.352	-.035	-.195	-.289	1.000	.168	.050	.112	.141
Block Design	.086	-.033	-.094	-.071	.168	1.000	.119	-.004	.250
Reading Vocabulary	.276	.331	-.109	.015	.050	.119	1.000	.793	.095
Reading Comprehension	.240	.308	-.038	.068	.112	-.004	.793	1.000	.077
Spelling Errors	-.012	-.280	.122	-.071	.141	.250	.095	.077	1.000

$r = .207$, $p < .05$; $r = .269$, $p < .01$

Table 11

Scores on Major Performance Measures by Classificatory Groups

Battery B

	DD (n = 2)	LD (n = 24)	NLD (n = 10)	F	p
(31) PPVT IQ	$\bar{X}$ =64.50	$\bar{X}$ =90.52	$\bar{X}$ =97.36	13.46	.001+
(54) Reading Level	$\bar{X}$ = 4.80	$\bar{X}$ = 5.85	$\bar{X}$ = 1.91	9.09	.001+
(29) Bender Gestalt	$\bar{X}$ = 6.50	$\bar{X}$ = 2.17	$\bar{X}$ = 9.39	6.11	.006+
(46) Digit Span	$\bar{X}$ =11.00	$\bar{X}$ =11.04	$\bar{X}$ =10.73	0.12	.889
(28) Story Recall	$\bar{X}$ =17.00	$\bar{X}$ =20.78	$\bar{X}$ =22.55	0.82	.451
(51) Block Design	$\bar{X}$ = 7.00	$\bar{X}$ =10.76	$\bar{X}$ = 9.82	1.95	.159
(56) Spelling Raw	$\bar{X}$ =10.50	$\bar{X}$ =14.91	$\bar{X}$ =26.18	5.22	.013+
(57) Spelling Grade	$\bar{X}$ = 3.85	$\bar{X}$ = 4.75	$\bar{X}$ = 7.84	4.87	.017+
(58) Comp. # Correct	$\bar{X}$ =16.00	$\bar{X}$ =17.30	$\bar{X}$ = 28.91	3.36	.052+
(59) Comp. Level	$\bar{X}$ = 2.00	$\bar{X}$ = 5.83	$\bar{X}$ = 8.29	2.33	.119
(60) B-G 5 sec.	$\bar{X}$ = 4.50	$\bar{X}$ = 4.44	$\bar{X}$ = 4.55	0.35	.706
(61) B-G 90 sec.	$\bar{X}$ = 4.50	$\bar{X}$ = 4.39	$\bar{X}$ = 4.46	0.02	.983
(62) B-G Recog.	$\bar{X}$ = 4.00	$\bar{X}$ = 3.86	$\bar{X}$ = 4.64	2.01	.151
(63) B-G Seq.	$\bar{X}$ = 3.00	$\bar{X}$ = 2.65	$\bar{X}$ = 3.27	0.76	.478
(73) DS Int Fwd	$\bar{X}$ = 0.50	$\bar{X}$ = 0.09	$\bar{X}$ = 0.18	1.43	.254
(74) DS Omn Fwd	$\bar{X}$ = 0.00	$\bar{X}$ = 0.65	$\bar{X}$ = 0.91	1.13	.336
(75) DS Nr Rwd	$\bar{X}$ = 1.00	$\bar{X}$ = 0.44	$\bar{X}$ = 0.55	0.56	.578
(76) DS Rev Fwd	$\bar{X}$ = 1.50	$\bar{X}$ = 1.04	$\bar{X}$ = 1.18	0.19	.831
(77) DS Add Fwd	$\bar{X}$ = 0.50	X = 0.26	$\bar{X}$ = 0.09	1.07	.355
(78) DS $\leq$ Err Fwd	$\bar{X}$ = 3.50	$\bar{X}$ = 2.48	$\bar{X}$ = 2.91	0.85	.435
(79) DS Int Bkd	$\bar{X}$ = 0.50	$\bar{X}$ = 0.22	$\bar{X}$ = 0.27	0.12	.884
(80) DS Omn Bkd	$\bar{X}$ = 1.50	$\bar{X}$ = 0.65	$\bar{X}$ = 0.55	1.26	.298

Table 11 (continued)

	DD	LD	NLD	F	p
(81) DS NR Bkd	$\bar{X}$ = 0.00	$\bar{X}$ = 0.48	$\bar{X}$ = 0.91	1.86	.172
(82) DS Rev Bkd	$\bar{X}$ = 0.50	$\bar{X}$ = 0.87	$\bar{X}$ = 0.73	0.20	.823
(83) DS Add Bkd	$\bar{X}$ = 0.00	$\bar{X}$ = 0.04	$\bar{X}$ = 0.00	0.27	.764
(84) DS ΣErr Bkd	$\bar{X}$ = 2.50	$\bar{X}$ = 2.26	$\bar{X}$ = 2.46	0.14	.869
(85) DS Err Fwd + Bkd	$\bar{X}$ = 6.00	$\bar{X}$ = 4.71	$\bar{X}$ = 5.36	0.82	.449

+ .05 level or better

Table 12

Intercorrelations on Major Performance Measures

Battery B

	Story Rec	Bend Gest	PPVT IQ	Digit Span	Block Des	Read Grade	WRAT Spell	WRAT Comp	B-G 5 sec	B-G 90 sec	B-G Recog	B-G Seq	DS Errors
Story Recall	1.000	-.167	.271	.204	.140	.204	.334	.098	.155	-.048	.273	.216	-.022
Bender Gestalt	-.167	1.000	-.256	-.210	-.402	-.281	-.283	-.262	.043	-.093	-.344	-.038	.165
PPVT IQ	.271	-.256	1.000	.062	-.082	.482	.529	.313	.082	.067	.181	.102	-.110
Digit Span	.204	-.210	.062	1.000	.198	.035	.044	.024	.190	.004	-.012	.023	-.396
Block Design	.140	-.402	-.082	.198	1.000	.183	.208	.086	.102	-.115	.101	.147	-.038
Reading Grade	.204	-.281	.482	.035	.183	1.000	.810	.726	.271	-.131	.220	.074	-.168
WRAT Spelling	.334	-.283	.529	.044	.208	.810	1.000	.545	.085	.010	.376	.125	-.045
WRAT Comp.	.098	-.262	.313	.024	.086	.726	.545	1.000	.253	-.033	.228	.219	-.051
B-G 5 sec	.155	.043	.082	.190	.102	.271	.085	.253	1.000	-.004	.216	.349	-.085
B-G 90 sec	-.048	-.093	.067	.004	-.115	.131	.010	-.033	.004	1.000	.375	.116	-.149
B-G Recogn	.273	-.344	.181	-.012	.101	.220	.376	.228	.216	.375	1.000	.540	-.208
B-g Seq	.216	-.038	.102	.023	.147	.074	.125	.219	.349	.116	.540	1.000	-.293
DS Errors	-.022	.165	-.110	-.396	-.038	-.168	-.045	-.051	-.085	-.150	.208	.293	1.000

$r = .319$, $p < .05$; $r = .413$, $p < .01$

scores unique to Battery B are independent indicators of reading disability would require a larger sample size.

Discussion

Review of Background and Purpose

As was reviewed in the first chapter, the past several decades have witnessed an interest on the part of psychologists and educators in atypical learning patterns in otherwise normal youth. This finding has been known as "minimal brain dysfunction," "hyperkinesis," "dyslexia," and most recently, "learning disabilities." The concept has attracted the attention of numerous juvenile justice personnel who have pointed to the disordered learning behavior of many of the youths who become involved with the juvenile justice system. It has been proposed by some of these field personnel that there is an unusually high proportion of juvenile delinquents who manifest grossly disordered learning that upon inspection may be the "learning disability" syndrome conceived of by theoreticians.

Although this as well as other speculation has been proposed concerning the causes of juvenile delinquency, very little meaningful research has evaluated the contribution of learning disabilities to delinquent behavior. The postulated relationship has been referred to as the LD/JD link and some have assumed that this supposed causal relationship has been exhaustively studied. This is not the case. On the contrary, it appears that most of the research in this area is of little help in formulating conclusions concerning the incidence of learning disabilities among juvenile delinquents.

By way of contrast, the present study has been a systematic endeavor to identify delinquent youths who have a clearly diagnosed learning

disability. The study took the position that if a learning disability was substantial enough to contribute to a serious acting-out, compensatory behavior pattern, then a standardized clinical examination would diagnose this disability without difficulty. Furthermore, the purpose of this study was to develop a diagnostic battery that could be administered by paraprofessional personnel, and did not require a formal psychological, psychiatric or neurological workup. The definition of learning disabilities that served as a conceptual backdrop for the study was that adopted by the National Advisory Committee on Handicapped Children.

The diagnosis was to be made on the basis of a severe discrepancy between achievement and expectation that was not due to a developmental disability (mental retardation), severe psychological disturbance or physical disability. In addition, there were multiple indicators which were taken into diagnostic consideration if the youth was found to have at least normal intelligence. Operationally, every effort was made to be diagnostically conservative; that is, to have considerable evidence to support the diagnosis of learning disabled.

Review of Approach and Method

This study was conducted with volunteer youth participants at the Los Guilicos Juvenile Facility, Santa Rosa, California. Approximately 250 youths were randomly selected from 3500 who were detained at Los Guilucos the year of the study. The volunteers were examined by one of three doctoral level psychologists who modified and refined the battery during the course of the year long examination schedule. Expert technical

assistance was provided by persons uniquely qualified in this area.

There was a standardized approach to the prospective participants, and the study was generally met with acceptance on the part of the youths and staff alike. Extensive interview and demographic information was requested, and the battery itself was presented in a manner to sustain interest and maximize performance. The initial examination was found to take approximately 65-80 minutes.

To ensure standardization of administration by the three examiners, examination rehearsals were conducted and critiques were presented until a uniform procedure was developed that allowed for a wide variety of response variation. Weekly case conferences were held to discuss questions of scoring and otherwise maintain standardization.

Summary of Battery A Results

According to our classificatory system, it was found that 13.3% of the sample was Developmentally Disabled (DD), 48.9% was Learning Disabled (LD), and 37.8% was Not Learning Disabled (NLD). While a non-delinquent sample was not directly compared in this study, the figure of approximately 50% learning disabled is clearly higher than most estimates in the general population, which cluster around 10-20% (e.g., Myklebust, 1968).

A few of the demographic characteristics differentiated the three groups, although most did not. It was not surprising that the DD and LD participants would tend to report doing more poorly in school than the NLD youth. It was interesting that the LD youths tended to come from larger families than DD youths, who in turn came from larger families

than NLD youths. It is clear then that family size was a significant factor that was associated with a discrepancy between expectation and achievement.

There were a number of demographic characteristics on which boys differed significantly from girls. Generally the boys were older, more likely to have had a prior record, and performed less adequately in school. On the performance measures girls read better than boys and had fewer spelling errors.

The only demographic variables that distinguished the 601's from the 602's were that the latter tended to be older and received poorer grades in English than the 601's. Interestingly, while 602's made more spelling errors than 601's, the groups did not differ on any other performance variables.

Similarly, those with a prior record showed few demographic differences. The differences were limited to the fact that those with a prior record reported more family members institutionalized past and present and were less likely to employ a sensorimotor aid. Those with no prior record were superior to those with a prior record on the Story Recall Test and the Reading Comprehension Test.

All major performance measures separated the classificatory groups, with NLD performing superior to LD, who performed superior to DD. This indicates that each measure in the battery was an important indicator of learning disability.

The intercorrelations among all major variables for all participants were statistically significant, primarily in the range of .20 to .30,

with the exception of the reading measures which correlated more highly with one another. To summarize, the measures are all deemed to be appropriate "indicators" that are sufficiently independent to be useful in their own right.

When the intercorrelations were computed separately for the LD and DD participants and for the NLD participants, it was found that the correlations were of essentially the same order. Thus, it may be concluded that basically the same pattern of performance trends are associated with reading abilities at two different levels.

The Need for and the Process of Revision

A "reasonable period of time" was considered to be 45 minutes, and it was obvious that the initial battery failed to meet this criterion. It was apparent that a modified Bender Motor Gestalt Test could be developed utilizing only 5 of the 9 available Bender cards, but using the 5 cards in a novel fashion to check immediate and delayed memory, recognition and visual sequencing.

Furthermore, the Wide Range Achievement Test (WRAT) Reading subtest was modified to discontinue testing after five consecutive errors rather than twelve. Likewise, the Wide Range Achievement Test (WRAT) Spelling subtest was modified to allow for a quicker screening determination; again, five consecutive errors rather than twelve.

The Gates-MacGinitie Comprehension Test was especially arranged to allow a total of 40 items, screening from grades 1 through 12. However, grades 7 through 12 were emphasized because of the age and expected reading level of the majority of the participants.

The dictation paragraph which was a graphic representation of the level of written language function was reluctantly dropped. This measure, primarily concerned with spelling and dictation, had been pitched at the 10th grade level.

The Draw A Person (DAP) test is a fascinating measure and while it did not correlate significantly with any of our other findings, it can be recommended as a worthwhile and therapeutic conclusion to an examination or testing session.

This revised battery was reviewed by our consultants as well as by field personnel who were asked to respond to the battery without detailed introduction. It was decided that the revised battery was diagnostically sound and well-suited for the unusual and demanding clinical application for which it was intended. With consistent endorsement, it was evaluated as a battery which could readily be grasped from an administrative and diagnostic perspective by persons with little or no training or experience in assessment. It was pointed out that there had been considerable skepticism on the part of probation personnel surrounding the use of some elaborate psychodiagnostic tools; however, this battery was felt to be obvious in purpose and lent itself to brief explanations concerning the details of administration.

Summary of Battery B Results

In a limited sample of 36 participants, it was found that most of the same performance measures which were part of Battery A continued to differentiate the three groups. In addition, the new Spelling and Comprehension subtests not given on Battery A were found to significantly

separate the groups. However, the expanded variables from the Bender-Gestalt and the additional error scores from the Digit Span, did not separate the groups.

It has been previously discussed that this revised battery is more diagnostic and parsimonious than its predecessor. This was achieved by the revisions mentioned which included deleting entire subtests as well as modifying subtests that were retained.

A larger sample would be needed to adequately test the contribution of all of the new measures. It may be concluded that such a revised battery shows promise for future research in examining the incidence of learning disabilities among the juvenile delinquent population.

The Issue of Definition

Neither the term "juvenile delinquent" nor the term "learning disability" have readily agreed upon definitions. For the purpose of this study we have defined a juvenile delinquent - or a youth in danger of becoming a delinquent - as one who was temporarily detained at the county Juvenile Facility. The position could be taken that some 601's or those charged with minor juvenile offenses such as beyond parental control, or even some 602's who may not have yet been proven guilty or are first offenders, are not in fact "delinquents". Case work experience has shown, however, that youths who are placed in the Detention Facility quite often associate with or in some way identify with the delinquent subculture. Unfortunately, a number of these youths, if they are not already "delinquents", share many characteristics with the delinquent population and the probability that they have engaged or will

engage in illegal acts, is high. Thus, while there is some room for discussion, we limit our definition of delinquency to those currently legally detained pending further Juvenile Justice system proceedings. As was detailed previously, the definition of "learning disability" is in the process of evolution. The definition most frequently encountered is the so-called "national definition" or that adopted by the previously mentioned National Advisory Committee on Handicapped Children. It reads as follows:

> Children with special learning disabilities exhibit a disorder in one or more of the basic psychological processes involved in understanding or using spoken or written languages. 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 disorders, brain injury, minimal brain dysfunction, dyslexia, developmental aphasia, etc. They do not include learning problems which are due primarily to mental retardation, emotional disturbance, or to environmental disadvantage.

Our definition is in keeping with this general statement and is an outgrowth of it. This definition is explained in operational terms in Chapter III and takes into account age, IQ score, years behind in reading, and performance on measures other than reading. According to our definition, it will be recalled, we have classified 48.9% of our sample as learning disabled, 37.8% as not learning disabled, and 13.3% as developmentally disabled. This is a conservative approach, i.e., it

could be argued that the actual proportion of learning disabled youths in our sample is higher. Certainly the vast majority of those examined (90.6%) read below grade level and performed below average for their age on other measures as well. In any case, this study has provided solid evidence, in a large sample, that the proportion of those with learning disabilities is greater in delinquent youths than the proportion reported in the general population. Furthermore, there are very real learning-related problems with many youths who may not be classified as learning disabled. For example, consider the 16-year-old eleventh grader who may have "gotten by" thus far in school. Although he has had a negative attitude towards school for several years, he managed to receive passing, if mediocre, grades with little effort because of average or above average intelligence. While he is not "learning disabled", he is significantly behind grade level. Such youths, along with the learning disabled population, are prime candidates to drop out of school and pose high risks for delinquent activity.

Previous studies that have investigated the incidence of learning disabilities among juvenile delinquents have been beleaguered by definitional, procedural, diagnostic, analytic, and conclusional problems. These shortcomings have been serious enough to render most of these studies difficult to interpret and virtually impossible to replicate.

While this current study was unable to compare the incidence of learning disabilities among a group of youths in the general population, many points of contrast can be made between the 601 population and the 602 population.

The 601 offender tended to be younger and from a less delinquent background. The examiners encountered shorter delinquent histories, less verbal agression and less uniform behavior patterns among the 601 group. The typical 602 offender was found to be more characteristic of the delinquent profile. Specifically, these youths often had extensive delinquent backgrounds, and not uncommonly made verbal threats to the examiner. It was not unusual for these youths to exhibit tatoos and refer to recent fights and weightligting achievements as frequently noted among institutionalized adult delinquent pupulations. As an interesting clinical note, this study encountered three military enlisted juveniles, one marine, one navy, and one army person. All three were AWOL from California military bases, and all three were readily diagnosed as learning disabled.

This is all to say that while there are admittedly significant differences between the general population and those who come into contact with a juvenile detention facility, it is clear that there are specifiable subgroups of this delinquent population.

Implications from the Evidence

The real impact of this project will be realized by the extent to which such a battery is implemented in juvenile justice decision-making and remediation. The causes of juvenile delinquency are clearly multivariate and complex, but much of the data generated by this project is significant nonetheless.

The idea that approximately 13% of those who enter the juvenile justice system may be substantiatially substandard from an intellectual

perspective is certainly alarming. No less disconcerting is the fact that a little less than 50% of the juvenile delinquent population in Sonoma County may very well be learning disabled according to rather rigorous guidelines, i.e., efforts were made to be diagnostically conservative. What does this reflect about our schools, the probation department and the courts? Now that we recognize this fact, what can we do about it?

The answers to these questions are beyond the purview of this report, and require the participation of a wide variety of community personnel. While no reduction in delinquency can be immediately predicted, it does seem apparent that alternatives to standard juvenile justice processing can be devised and, armed with diagnostic information, more knowledgeable dispositions can be made in juvenile cases.

At this juncture, it is the hope of the project consultants that widespread dissemination of this data will be achieved. This is due to the fact that little solid evidence has been previously presented concerning the incidence of learning disabilities among this particular population. It is felt that this effort is an important achievement in filling this gap. It is also important to note that it is not difficult to learn how to administer this battery, and pilot runs indicate that a person with no prior experience can become thoroughly familar with the battery in a relatively short time. Furthermore, field utilization appears to be possible due to the low cost and minimal time involved.

Recommendations

There are a number of specific recommendations for future researchers to consider if this project is complemented by additional investigations.

First, it would be helpful to consider an inner-city population that would be representative of a broader cross section than that available in Sonoma County. Second, a comparable school population could be evaluated with the same battery. It would be important for investigations of this nature to address themselves to the still unanswered question of the "LD/JD" link.

The present project should prove sufficiently provocative to stimulate juvenile justice personnel to systematically inventory the learning status of the major sub-groups which they serve. For example, status offenders and chronic offenders should be evaluated and on the basis of this data, dispositions as well as rehabilitation efforts would be well served with this available information.

It has, of course, been repeatedly shown in treatment efforts of many different types that it is an absolute necessity to have precise diagnoses precede attempts to remediate or correct. This has been true with those specific problems categorized by the amorphous term of learning disabilities. It now appears that we have an effective and reasonable diagnostic capability with the added bonus of wide-spread applicability.

The timing for this project has been serendipitous due to the fact that "learning disabilities" have captured considerable congressional attention of late. Rep. Claude Pepper (D. - Fla.), former chair of the now defunct House Select Committee on Crime, introduced a bill this year providing $5 million for a national conference on learning disabilities and juvenile delinquency. In addition, Sen. Jacob Javits (R. - N.Y.), Sen. Edward Kennedy (D. - Mass.) and Hubert Humphrey (D. - Minn.) have

all called for increased funding for research in identification and theory testing as well as the development of model treatment and intervention programs.

Against this backdrop of accelerated national interest, it is fortunate beginning with Chief William Mulligan and currently with Project Director John H. Barnes that Sonoma County has had the perspicacity to pursue this area over the years. The county is now prepared and has committed itself to the next stage of remediation of specific learning disabilities.

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Appendix A

Checklist for Interview and Demographic Data

1. NAME _____ 2. I.D. NO. _____

3. TESTER _____ 4. DATE _____

5. AGE _____ 6. DATE OF BIRTH _____ 7. BIRTH ORDER _____

8. ETHNICITY:

White	= 1 ☐
Black	= 2 ☐
Sp.Sur.	= 3 ☐
Am.Ind.	= 4 ☐
Oriental	= 5 ☐
Other	= 6 ☐

9. PRESENT STATUS

601	= 1 ☐
602	= 2 ☐
600	= 3 ☐
DK	= 9 ☐

10. PRIOR RECORD:

Yes	= 1 ☐
No	= 2 ☐
DK	= 9 ☐

11. CURRENT LIVING SITUATION:

Natural Family	= 1 ☐
Foster Home	= 2 ☐
Group Home	= 3 ☐
Other	= 4 ☐

11(a). If Yes, explain:

_____

_____

12. ANY OTHER FAMILY MEMBERS EVER BEEN INSTITUTIONALIZED?:

Yes	= 1 ☐
No	= 2 ☐

12(a). If Yes, relationship:

_____

_____

13. OTHER FAMILY MEMBERS CURRENTLY INSTITUTIONALIZED?:

Yes	= 1 ☐
No	= 2 ☐

13(a). If Yes, relationship:

_____

_____

_____

14. SCHOOL ATTENDANCE:

Yes	= 1 ☐
No	= 2 ☐

14(a). If No, reason:

Graduated	= 1 ☐
Dropped Out	= 2 ☐
Expelled	= 3 ☐

14.(b). If Not in School, Highest Grade:

_____

15. TYPE OF SCHOOL:

Public = 1 ☐
Private = 2 ☐

15(a). If public school, type of program:

_____

16. ATTITUDE TOWARD SCHOOL:

Like = 1 ☐
Indifferent = 2 ☐
Dislike = 3 ☐

17. GENERAL SCHOOL PERFORMANCE:

Above Average = 1 ☐
Average = 2 ☐
Below Average = 3 ☐

18. GRADES IN ENGLISH:

Above Average = 1 ☐
Average = 2 ☐
Below Average = 3 ☐

19. EVER IN REMEDIAL OR SPECIAL READING CLASS(ES)?:

Yes = 1 ☐
No = 2 ☐

19(a). If Yes, when?:

Currently = 1 ☐
Formerly = 2 ☐
Both = 3 ☐

20. CURRENTLY RECEIVING PROFESSIONAL HELP?:

Yes = 1 ☐
No = 2 ☐

20(a). If Yes, type:

Psychologist, Psychiatrist, Counselor = 1 ☐
Physician = 2 ☐
Speech Therapist = 3 ☐
Other = 4 ☐

20(b). If other, explain:

_____

21. CURRENTLY TAKING PRESCRIBED MEDICATION?:

Yes = 1 ☐
No = 2 ☐

21(a). If Yes, name of medication:

_____

_____

21(b). For what condition(s):

_____

_____

22. SENSORIMOTOR AIDS REQUIRED:

Yes = 1 ☐
No = 2 ☐

22(a). If Yes, type:

Glasses = 1 ☐
Hearing Aid = 2 ☐
Prosthesis = 3 ☐
Other = 4 ☐

22(b). If Other, explain:

_____

_____

23. NOTABLE ILLNESSES/ACCIDENTS TO SELF OR FAMILY?:

Yes = 1 ☐
No = 2 ☐

23(a). If Yes, involved:

Self = 1 ☐
Others = 2 ☐
Self & Others = 3 ☐

23(b). If Yes, explain:

_____

_____

_____

CLINICAL OBSERVATIONS:

Appendix B

Copies of Materials

SCORE SHEET—BENDER-GESTALT TEST

Name ..... Age ..... Sex .....

Education ..... I.Q. ..... Diagnosis .....

DESIGN 1

1. Wavy line (2) .....
2. Dot, dash, cir. (3) .....
3. Dashes (2) .....
4. Circles (8) .....
5. No. dots (2) each .....
6. Dbl. row (8) .....
7. Workover (2) .....
8. Sec. attempt (3 ea.) .....
9. Rotation (8) .....
10. Des. miss. (8) .....

Design Total .....

DESIGN 2

1. Wavy line (2) .....
2. Dash or dots (3) .....
3. Shape cir. (3) .....
4. Cir. miss., ext. (3) .....
5. Cir. touch. (5) .....
6. Dev. slant (3) .....
7. No. col. (2 ea.) .....
8. Fig. on 2 lines (8) .....
9. Guide lines (2) .....
10. Workover (2) .....
11. Sec. attempt (3 ea.) .....
12. Rotation (8) .....
13. Des. miss. (8) .....

Design Total .....

DESIGN 3

1. Asymmetry (3) .....
2. Dot, dash, cir. (3) .....
3. Dashes (2) .....
4. Circles (8) .....
5. No. dots (2) .....
6. Extra row (8) .....
7. Blunting (8) .....
8. Distortion (8) .....
9. Guide lines (2) .....
10. Workover (2) .....
11. Sec. attempt (3 ea.) .....
12. Rotation (8) .....
13. Des. miss. (8) .....

Design Total .....

DESIGN 4

1. Asym. Crv. (3) .....
2. Break crv. (4) .....
3. Crv. not center. (1) .....
4. Curls (4) .....
5. Not joined (8) .....
6. Crv. rotation (3) .....
7. Touch-up (8) .....
8. Tremor (4) .....
9. Distortion (8) .....
10. Guide lines (2) .....
11. Sec. attempt (3 ea.) .....
12. Rotation (8) .....
13. Des. miss. (8) .....

Design Total .....

DESIGN 5

1. Asymmetry (3) .....
2. Dot, dash, cir. (3) .....
3. Dashes (2) .....
4. Circles (8) .....
5. Ext. join. dot (2) .....
6. Ext. rotation (3) .....
7. No. dots (2) .....
8. Distortion (8) .....
9. Guide lines (2) .....
10. Workover (2) .....
11. Sec. attempt (3 ea.) .....
12. Rotation (8) .....
13. Des. miss. (8) .....

Design Total .....

DESIGN 6

1. Asymmetry (3) .....
2. Angles (2) .....
3. Pt. crossing (2 ea.) .....
4. Crv. extra (8) .....
5. Dbl. line (1 ea.) .....
6. Touch-up (8) .....
7. Tremor (4) .....
8. Distortion (8) .....
9. Guide lines (2) .....
10. Workover (2) .....
11. Sec. attempt (3 ea.) .....
12. Rotation (8) .....
13. Des. miss. (8) .....

Design Total .....

DESIGN 7

1. Ends no. join. (8) .....
2. Angles ext. (3) .....
3. Angles miss. (3) .....
4. Ext. scat. (3) .....
5. Dbl. line (1 ea.) .....
6. Tremor (4) .....
7. Distortion (8 ea.) .....
8. Guide lines (2) .....
9. Sec. attempt (3 ea.) .....
10. Rotation (8) .....
11. Des. miss. (8) .....

Design Total .....

DESIGN 8

1. Ends no. join. (8) .....
2. Angles ext. (3) .....
3. Angles miss. (3) .....
4. Ext. scat. (3) .....
5. Dbl. line (1 ea.) .....
6. Tremor (4) .....
7. Distortion (8 ea.) .....
8. Guide lines (2) .....
9. Workover (2) .....
10. Sec. attempt (3 ea.) .....
11. Rotation (8) .....
12. Des. miss. (8) .....

Design Total .....

CONFIG. DESIGN

1. Place. Des. A. (2) .....
2. Overlap (2 ea.) .....
3. Compression (3) .....
4. Lines drawn (8) .....
5. Order (2) .....
6. No order (8) .....
7. Rel. size (8) .....

Total .....

DESIGN TOTALS

1. ..... 5. .....
2. ..... 6. .....
3. ..... 7. .....
4. ..... 8. .....

Config. .....

Total Raw Score ..... Standard Score .....

Dictation

In the far north there is a frozen river which winds between two high mountains. It does not melt even in summer. A river like this is found only in places that are very cold.

December 6 / last week / a river / overflowed / in a small town /

ten miles / from Albany. / Water covered the streets / and entered

the houses. / Fourteen persons / were drowned / and 600 persons /

caught cold / because of the dampness / and cold weather. / In saving /

a boy / who was caught / under a bridge, / a man / cut his hands.

WAIS

9. BLOCK DESIGN		
	Time	SCORE
1. 60"	1 / 2	0 2 4
2. 60"	1 / 2	0 2 4
3. 60"		0 4
4. 60"		0 4
5. 60"		0 4
6. 60"		0 4
7. 120"		0 4 31-40 5 1-30 6
8. 120"		0 4 46-70 5 1-45 6
9. 120"		0 4 61-80 5 1-60 6
10. 120"		0 4 61-80 5 1-60 6

WISC-R

6. BLOCK DESIGN Discontinue after 2 consecutive failures.			
Design	Time	Pass-Fail	Score (Circle the appropriate score for each design.)
1. 45"	1 / 2		0 1 2
2. 45"	1 / 2		0 1 2
3. 45" (8-16 yrs.)	1 / 2		0 1 2
4. 45"			0 — 21-45 4 16-20 5 11-15 6 1-10 7
5. 75"			0 — 21-75 4 16-20 5 11-15 6 1-10 7
6. 75"			0 — 21-75 4 16-20 5 11-15 6 1-10 7
7. 75"			0 — 21-75 4 16-20 5 11-15 6 1-10 7
8. 75"			0 — 26-75 4 21-25 5 16-20 6 1-15 7
9. 120"			0 — 56-120 4 36-55 5 26-35 6 1-25 7
10. 120"			0 — 76-120 4 56-75 5 41-55 6 1-40 7
11. 120"			0 — 81-120 4 56-80 5 41-55 6 1-40 7
			Total — Max.= 62

Digits Forward	Score Circle	Digits Backward	Score Circle
3-8-6	3	2-5	2
6-1-2	3	6-3	2
3-4-1-7	4	5-7-4	3
6-1-5-8	4	2-5-9	3
8-4-2-3-9	5	7-2-9-6	4
5-2-1-8-6	5	8-4-9-3	4
3-8-9-1-7-4	6	4-1-3-5-7	5
7-9-6-4-8-3-	6	9-7-8-5-2	5
5-1-7-4-2-3-8	7	1-6-5-2-9-8	6
9-8-5-2-1-6-3	7	3-6-7-1-9-4	6
1-6-4-5-9-7-6-3	8	8-5-9-2-3-4-2	7
2-9-7-6-3-1-5-4	8	4-5-7-9-2-8-1	7
5-3-8-7-1-2-4-6-9	9	6-9-1-6-3-2-5-8	8
4-2-6-9-1-7-8-3-5	9	3-1-7-9-5-4-8-2	8

F_____ + B_____ = _____
Highest # Circled

VOCABULARY

Directions: Look at the sample test word VI below. The word is rush. Now read the five words just below rush. Find the one word in this group that means most nearly the same as rush. The word hurry means most nearly the same as rush. Draw a line under the word hurry.

Now look at test word number V2. Find the one word in the group below it that means most nearly the same, and draw a line under it. Picture means most nearly the same as illustration. You should have drawn a line under the word picture.

For each numbered word on this page and the next page, draw a line under the word that means most nearly the same. There is no penalty for guessing; no points are subtracted for wrong answers. Even if you are not sure of an answer, make the best guess you can.

SAMPLES

VI. rush
back
grab
grow
hurry
spend

V2. illustration
picture
brightness
sickness
daring
unreal

1. reduce
send
construct
double
decrease
discuss

2. segment
radius
swamp
multiply
clay
portion

3. infinite
deep
limitless
tiny
majestic
binding

4. meddlesome
interfering
exacting
tuneful
tradesman
average

5. controversy
journey
muddle
dispute
scheme
reversal

6. manikin
bowl
wild
dummy
tidbit
cloth

7. larceny
theft
nonsense
decency
delight
burning

8. outlandish
starry-eyed
fantastic
migratory
seaward
noisy

COMPREHENSION

Directions: Read the sample paragraph below. It has numbered blanks in it. The first blank is number C1. Look below the paragraph at the line of words with C1 in front of it. Find the word in line C1 that makes the best sense in blank C1. The word hurricane from line C1 makes the best sense in blank C1. The word hurricane is the answer to number C1. Draw a line under the word hurricane.

Now look at the words in line C2. Find the word in line C2 that makes the best sense in blank C2, and draw a line under it.

SAMPLES

The Weather Bureau gives each hurricane a girl's name. Each year the first ____C1____ is given a name that begins with A, such as ____C2____.

C1. month hurricane name Bureau start

C2. Mary Betsy Linda Susan Alice

The word Alice makes the best sense in blank C2. You should have drawn a line under the word Alice.

When you are given the signal to begin, draw a line under the best word for each of the blanks that follow on this page and the next page. There is no penalty for guessing; no points are subtracted for wrong answers. Even if you are not sure of an answer, make the best guess you can.

All human communities employ some kind of language. Language changes through the ___1___ of new words and the dropping of old ones. These changes in language often ___2___ changes in conditions within the community.

1. deleting return spelling lengthening adding

2. end prevent reflect plan forego

Helium is among the lightest of the elements. Helium is often used instead of hydrogen in balloons because, like other noble gases, it does not readily react with other substances. With ___3___, on the other hand there is always the danger of explosions because of its high ___4___ of reactivity.

3. helium hydrogen atoms oxygen atmosphere

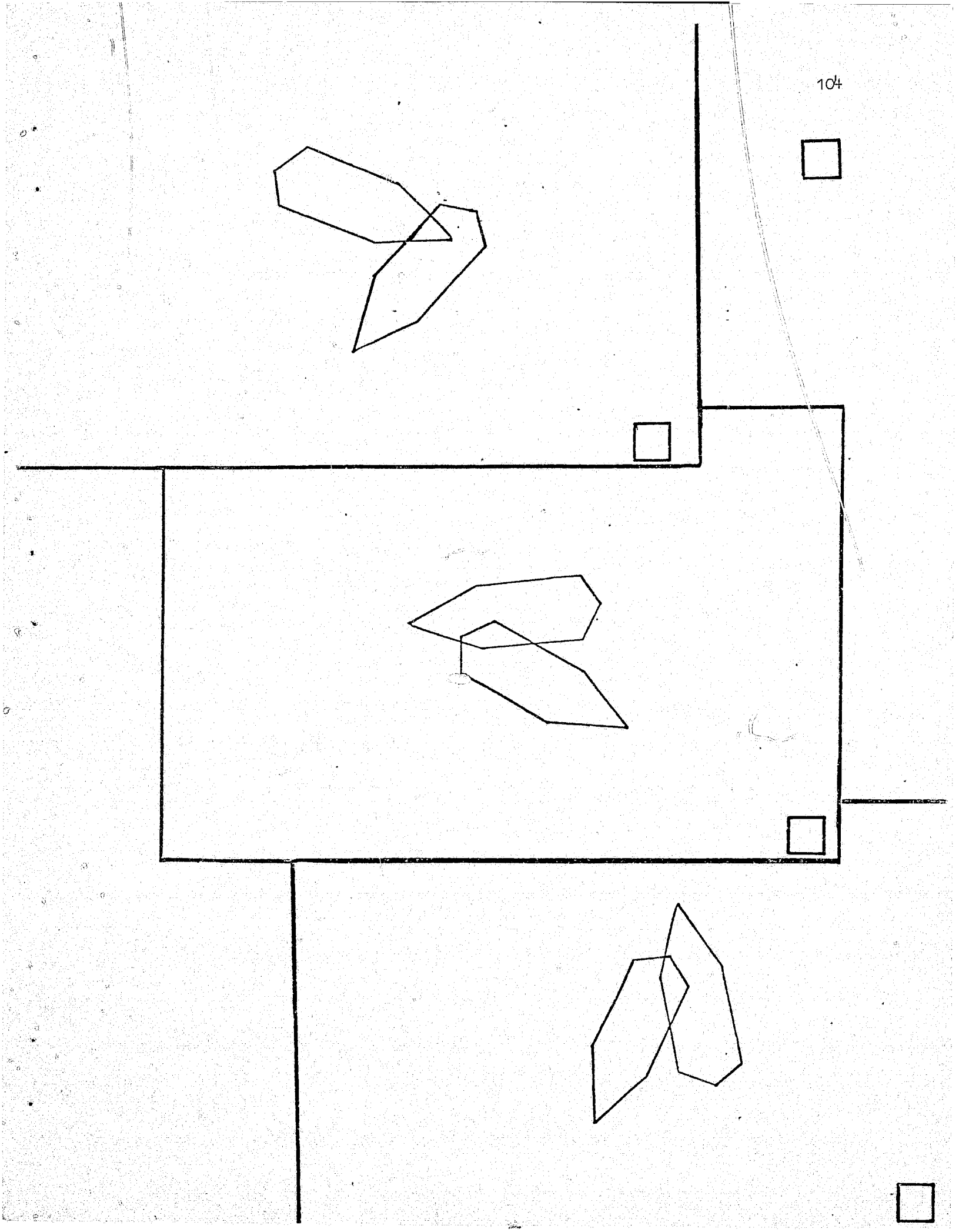
4. content method combination stability degree

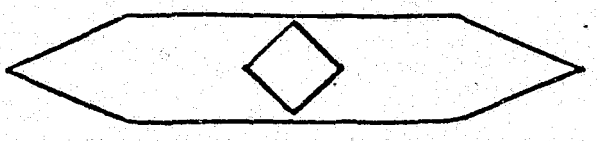
COMPREHENSION

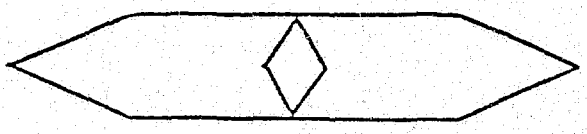
Page 2 Continue Working

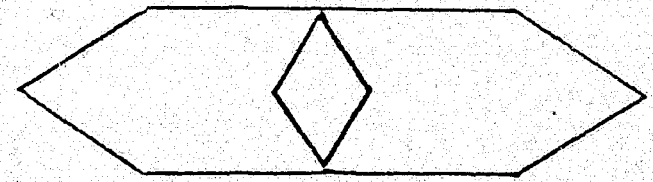
The development and preservation of ___5___ space in urban areas is a growing concern. The problem arises because the growth of ___6___ ordinarily decreases the available area at the same time that it ___7___ the need for parks and playgrounds.

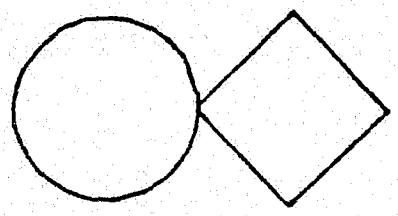
5.	renewal	open	city	classroom	crowded
6.	pollution	noise	freedom	population	space
7.	increases	plans	decreases	overlooks	proves

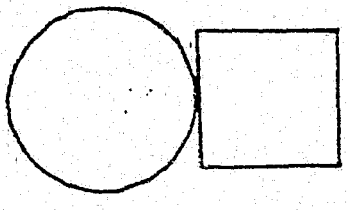


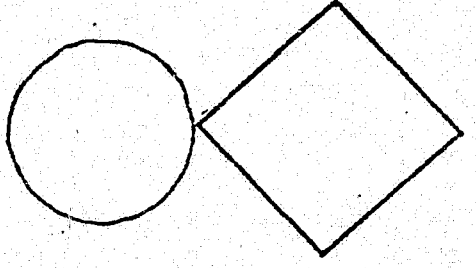


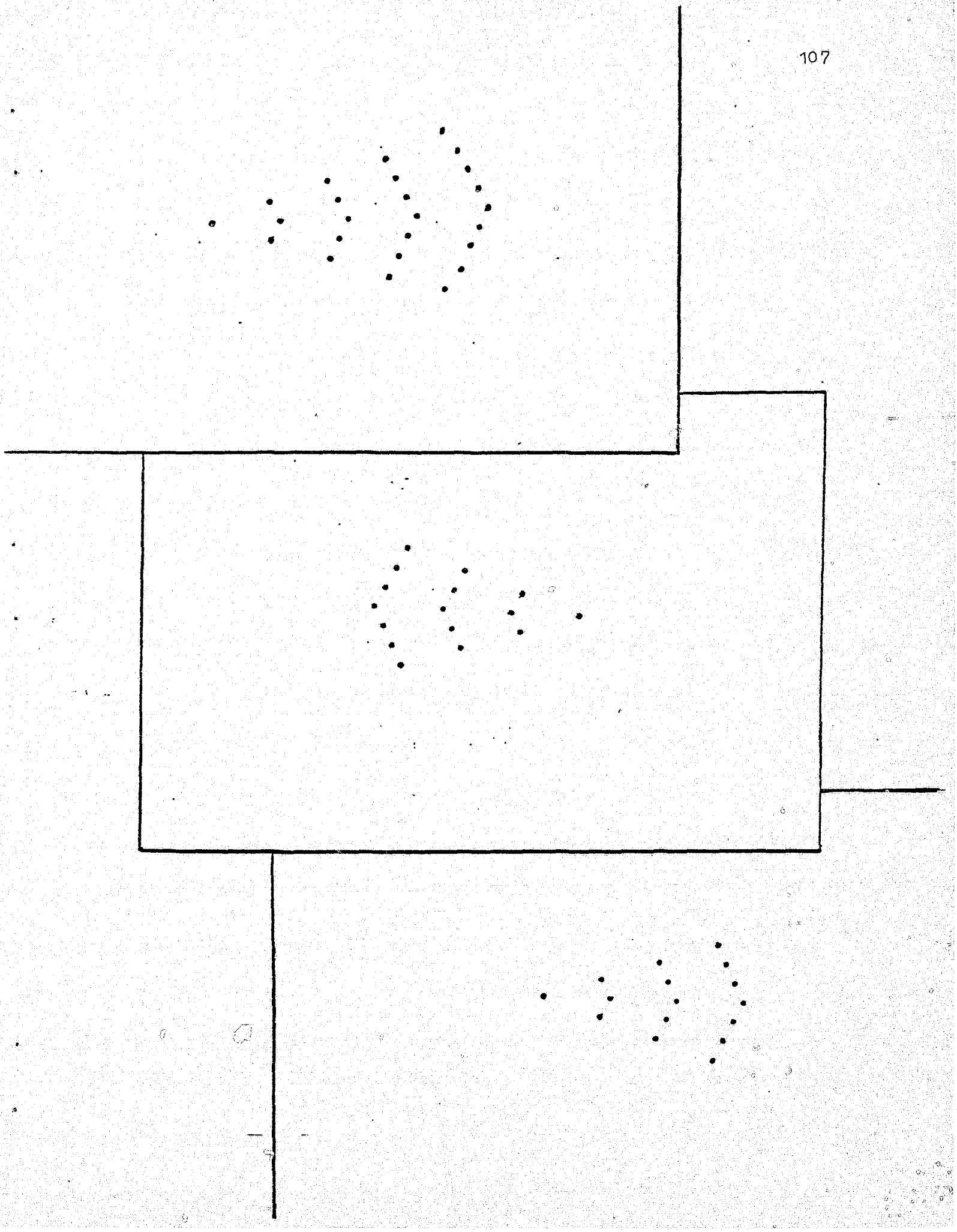


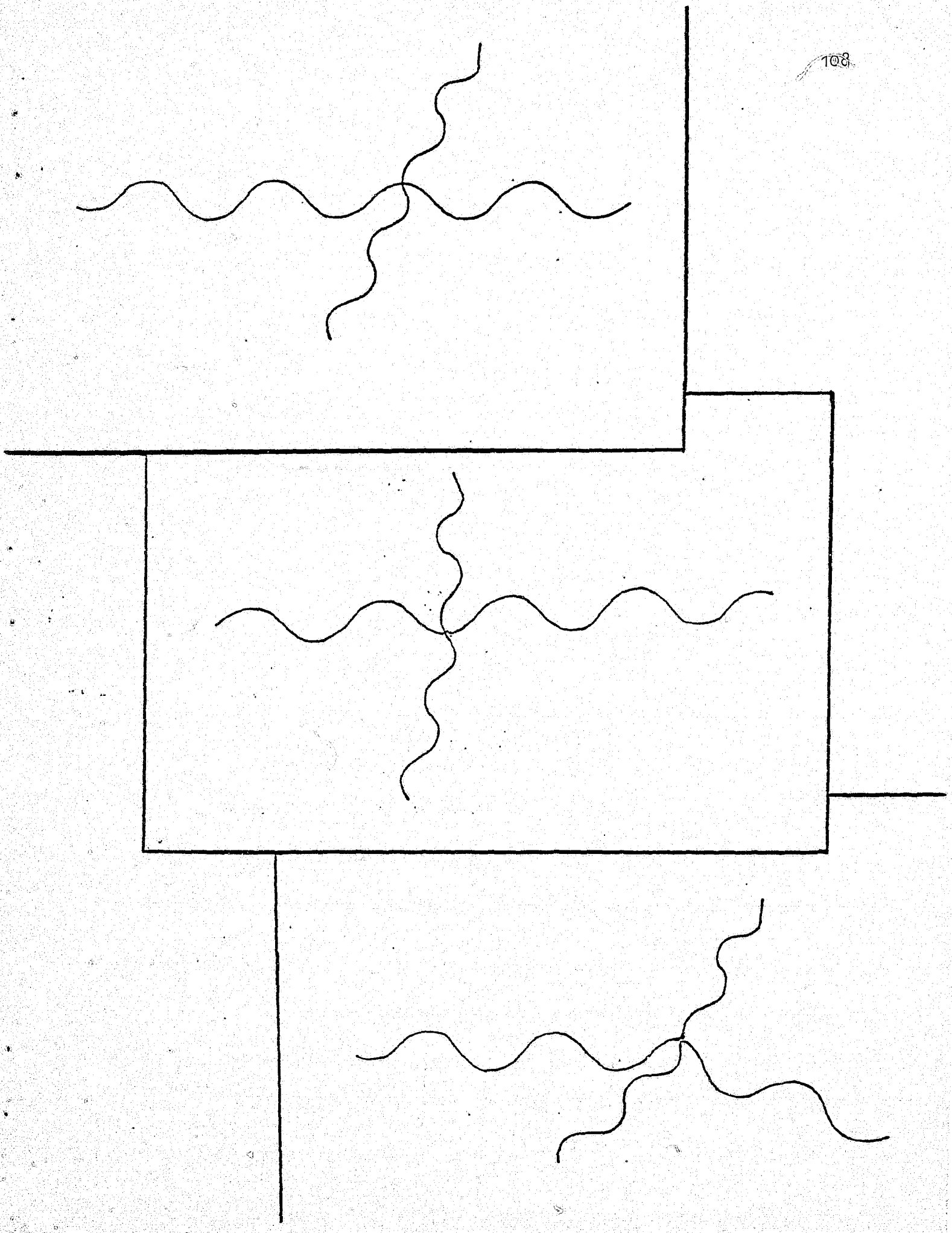












ADMINISTRATION OF THE BENDER VISUAL MOTOR GESTALT TEST

1. Present cards A, 3, 6, 7 and 8 for 5 seconds per card and request a reproduction from memory.

2. Present cards A, 3, 6, 7 and 8 individually and request a direct reproduction. Time limit is a "reasonable" time.

3. Upon the completion of number 2, engage the client in 90 seconds of general conversation and then request that he produce as many designs as possible from memory.

4. Request that the client select the 5 BVGT cards from a predetermined mix with 10 supplemental cards.*

5. Request the client to arrange the 5 BVGT cards in the order originally presented.

SCORING

1. Check the cards completed:

   A_____ 3 _____ 6 _____ 7 _____ 8 _____

2. Check the cards completed:

   A_____ 3 _____ 6 _____ 7 _____ 8 _____

3. List the cards completed in order:

   _____ _____ _____ _____ _____

   TOTAL CORRECT ☐

4. List the five cards selected in order:

   _____ _____ _____ _____ _____

   TOTAL CORRECT ☐

5. List the five cards selected in order:

   _____ _____ _____ _____ _____

   TOTAL CORRECT ☐

* Order of presentation: 7,6,3,9,10,5,8,1,11,12,14,13,2,4,15.

BENDER MOTOR GESTALT RECORD

NAME_____ SEX_____ DATE_____

AGE_____ CASE_____

GRADE_____ EXAMINER_____

ERRORS

DESIGN	DISTORTION OF SHAPE	ROTATION	INTEGRATION	PERSEVERATION	TOTAL ERRORS
A	1a_____ 1b_____	2_____	3_____		
1	4_____	5_____		6_____	
2		7_____	8_____	9_____	
3	10_____	11_____	12a_____ 12b_____		
4		13_____	14_____		
5	15_____	16_____	17a_____ 17b_____		
6	18a_____ 18b_____		19_____	20_____	
7	21a_____ 21b_____	22_____	23_____		
8	24_____	25_____			

STANDARD DEVIATION_____ TOTAL ERRORS_____

PERCEPTUAL MATURITY_____

GRADE_____

REMARKS_____

BABCOCK STORY RECALL

T1.								
T2.								
	December 6	last week	a river	overflowed	in a small town	ten miles	from Albany.	

T1.				
T2.				
	Water covered the streets	and entered the houses.	Fourteen persons	were drowned

T1.				
T2.				
	and 600 persons	caught cold	because of the dampness	and cold weather.

T1.						
T2.						
	In saving	a boy	who was caught	under a bridge,	a man	cut his hands.

	General	Verbatim	Total (G & V)
(1). Immediate			
(2). 10 Minute Delay			

_____ TOTAL

Distortions*	A	B
I.		
II.		

* Degrees of Distortion:

A. Recombination of parts of the story.
B. Introduction of new material of strong emotional tone; arbitrary material, relatively unrelated.

WAIS

9. BLOCK DESIGN						
	Time	SCORE				
1. 60"	1/2	0	2	4		
2. 60"	1/2	0	2	4		
3. 60"		0	4			
4. 60"		0	4			
5. 60"		0	4			
6. 60"		0	4			
7. 120"		0	4	21-40 5	1-20 6	
8. 120"		0	4	46-70 5	1-45 6	
9. 120"		0	4	41-80 5	1-40 6	
10. 120"		0	4	81-80 5	1-40 6	

25

READING

LEVEL II*--Ages 12.0 and over

milk	toughen	predatory	peculiarity	centrifugal
city	aboard	alcove	pugilist	sublety
in	triumph	scald	enigmatic	beatify
tree	contemporary	mosaic	predilection	succinct
animal	escape	municipal	covetousness	regicidal
himself	eliminate	decisive	soliloquize	schism
between	tranquillity	contemptuous	longevity	ebullience
chin	conspiracy	deteriorate	abysmal	misogyny
split	image	stratagem	ingratiating	beneficent
form	ethics	benign	oligarchy	desuetude
grunt	deny	desolate	coercion	egregious
stretch	rancid	protuberance	vehemence	heinous
theory	humiliate	prevalence	sepulcher	internecine
contagious	bibliography	regime	emaciated	synedoche
grieve	unanimous	irascible	evanescence	

LEVEL I*--Through Age 11.11

15

cat	deep	struck	recession	discretionary
see	even	approve	threshold	persevere
red	spell	plot	horizon	anomaly
to	awake	huge	residence	rudimentary
big	block	quality	participate	miscreant
work	size	sour	quarantine	usurp
book	weather	imply	luxurious	novice
eat	should	humidity	rescinded	audacious
was	lip	urge	emphasis	mitosis
him	finger	bulk	aeronautic	seismograph
how	tray	exhaust	intrigue	spurious
then	felt	abuse	repugnant	idiosyncrasy
open	stalk	collapse	putative	itinerary
letter	cliff	glutton	endeavor	pseudonym
jar	lame	clarify	heresy	aborigines

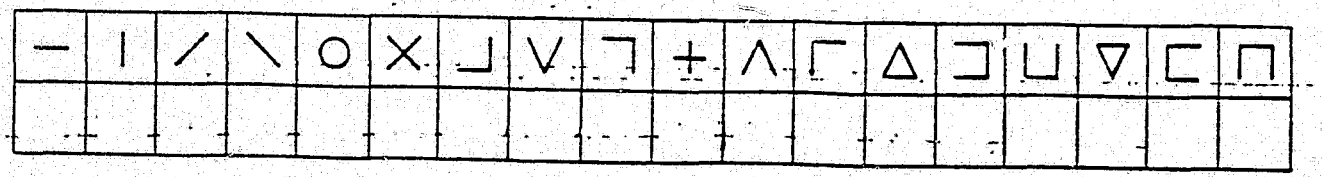
---

* Discontinue after 5 consecutive errors.

Name _____

LEVEL I ☐
LEVEL II ☐

1. _____
2. _____
3. _____
4. _____
5. _____
6. _____
7. _____
8. _____
9. _____
10. _____
11. _____
12. _____
13. _____
14. _____
15. _____
16. _____
17. _____
18. _____
19. _____
20. _____
21. _____
22. _____
23. _____
24. _____
25. _____
26. _____
27. _____
28. _____
29. _____
30. _____
31. _____
32. _____
33. _____
34. _____
35. _____
36. _____
37. _____
38. _____
39. _____
40. _____
41. _____
42. _____
43. _____
44. _____
45. _____
46. _____



PPVT - PEABODY PICTURE VOCABULARY TEST

FORM A

NAME _____

Item	Resp.	Key	Word
1		(4)	car
2		(3)	cow
3		(1)	baby
4		(2)	girl
5		(1)	ball
6		(3)	block
7		(2)	clown
8		(1)	key
9		(4)	can
10		(2)	chicken
11		(4)	blowing
12		(2)	fan
13		(1)	digging
14		(1)	skirt
15		(4)	catching
16		(1)	drum
17		(3)	leaf
18		(4)	tying
19		(1)	fence
20		(2)	bat
21		(4)	bee
22		(3)	bush
23		(1)	pouring
24		(1)	sewing
25		(4)	wiener
26		(2)	teacher
27		(3)	building
28		(3)	arrow
29		(2)	kangaroo
30		(3)	accident
31		(3)	nest
32		(4)	caboose
33		(1)	envelope
34		(2)	picking
35		(1)	badge
36		(3)	goggles
37		(2)	peacock
38		(3)	queen
39		(4)	coach
40		(1)	whip
41		(4)	net
42		(4)	freckle
43		(3)	eagle
44		(2)	twist
45		(4)	shining
46		(2)	dial
47		(2)	yawning
48		(2)	tumble
49		(1)	signal
50		(1)	capsule
51		(4)	submarine
52		(4)	thermos
53		(3)	projector
54		(4)	group
55		(3)	tackling
56		(1)	transportation
57		(1)	counter
58		(2)	ceremony
59		(3)	pod
60		(4)	bronco
61		(3)	directing
62		(4)	funnel
63		(2)	delight
64		(3)	lecturer
65		(2)	communication
66		(4)	archer
67		(1)	stadium
68		(1)	excavate
69		(4)	assaulting
70		(1)	stunt
71		(1)	meringue
72		(3)	appliance
73		(4)	chemist
74		(3)	arctic
75		(4)	destruction
76		(3)	porter
77		(2)	coast
78		(4)	hoisting
79		(1)	wailing
80		(2)	coil
81		(3)	kayak
82		(2)	sentry
83		(4)	furrow
84		(1)	beam
85		(3)	fragment
86		(2)	hovering
87		(3)	bereavement
88		(4)	crag
89		(2)	tantrum
90		(1)	submerge
91		(3)	descend
92		(2)	hassock
93		(1)	canine
94		(1)	probing
95		(1)	angling
96		(3)	appraising
97		(4)	confining
98		(4)	precipitation
99		(1)	gable
100		(1)	amphibian
101		(3)	graduated
102		(2)	hieroglyphic
103		(1)	orate
104		(3)	cascade
105		(4)	illumination
106		(1)	nape
107		(2)	genealogist
108		(2)	embossed
109		(4)	mercantile
110		(2)	encumbered
111		(4)	entice
112		(3)	concentric
113		(3)	vitreous
114		(1)	sibling
115		(2)	machete
116		(4)	waif
117		(1)	cornice
118		(3)	timorous
119		(1)	fettered
120		(2)	tartan
121		(3)	sulky
122		(4)	obelisk
123		(2)	ellipse
124		(2)	entomology
125		(4)	bumptious
126		(2)	dormer
127		(2)	coniferous
128		(4)	consternation
129		(3)	obese
130		(4)	gauntlet
131		(1)	inclement
132		(1)	cupola
133		(2)	obliterate
134		(3)	burnishing
135		(1)	bovine
136		(4)	eminence
137		(3)	legume
138		(4)	senile
139		(2)	deleterious
140		(4)	raze
141		(2)	ambulation
142		(1)	cravat
143		(2)	impale
144		(4)	marsupial
145		(3)	predatory
146		(1)	incertitude
147		(2)	imbibe
148		(3)	homunculus
149		(4)	cryptogam
150		(3)	pensile

NAME _____

Through Age 11.11

LEVEL I *

1.	go	Children *go* to school	gō
2.	cat	The *cat* has fur	kăt
3.	in	We are *in* the room	ĭn
4.	boy	The *boy* plays ball	boi
5.	and	Bill *and* Bob play together	ănd
6.	will	They *will* wait for you	wĭl
7.	make	She can *make* a dress	māk
8.	him	They saw *him* in town	hĭm
9.	say	*Say* it slowly	sā
10.	cut	Mother will *cut* the cake	kŭt
11.	cook	We *cook* our own dinner	kŏok
12.	light	The *light* is bright	līt
13.	must	We *must* do our work	mŭst
14.	dress	The *dress* fits well	drĕs
15.	reach	He couldn't *reach* the ball	rēch
16.	order	The captain's *order* was obeyed	ôr′ dĕr
17.	watch	My *watch* is fast	wôch
18.	enter	*Enter* this way	ĕn′ tĕr
19.	grown	Potatoes are *grown* in the field	grōn
20.	nature	The study of *nature* is interesting	nā′ chĕr
21.	explain	*Explain* how it happened	ĕks plān′
22.	edge	He sat on the *edge* of the chair	ĕj
23.	kitchen	Our *kitchen* is small	kĭch′ ĕn
24.	surprise	He may *surprise* you	sĕr prīz′
25.	result	The *result* of your work is good	rē zŭlt′
26.	advice	My *advice* was forgotten	ăd vīs′
27.	purchase	We did not *purchase* the car	pĕr′ chĭs
28.	brief	I received a *brief* note	brēf
29.	success	*Success* makes people happy	sŭk sĕs′
30.	reasonable	His request was *reasonable* and just	rē z′n ă b′l
31.	imaginary	He told us an *imaginary* story	ĭ măj′ ĭ nĕr ĭ
32.	occupy	We *occupy* a small apartment	ŏk′ ū pī
33.	character	Her fine *character* was praised	kăr′ ăk tĕr
34.	society	Every *society* has rules	sō sī′ ĕ tĭ
35.	official	An *official* invitation came today	ŏ fĭsh′ ăl
36.	recognize	He did not *recognize* me	rĕk′ ŏg nīz
37.	familiar	We are *familiar* with the news	fă mĭl′ yĕr
38.	commission	The *commission* reported to the mayor	kŏ mĭsh′ ŭn
39.	beneficial	Good food is *beneficial* to health	bĕn ĕ fĭsh′ ăl
40.	appropriation	Congress made an *appropriation* for schools	ă prō prĭ ā′ shŭn
41.	enthusiasm	People showed *enthusiasm* for the hero	ĕn thū′ zĭ ăz′m
42.	criticize or criticise	It is easy to *criticize* others	krĭt′ ĭ sīz
43.	prejudice	*Prejudice* is harmful to people	prĕj′ ōō dĭs
44.	belligerent	The soldier was *belligerent* and brave	bĕ lĭj′ ĕr ĕnt
45.	occurrence	War is a tragic *occurrence*	ŏ kĕr′ ĕns

* If 6 or fewer words are spelled correctly, give Marks subtest to Subjects' ages 8 through 11.11.

Discontinue test after 5 consecutive errors.

20 points added if Marks subtest is not given.

AGES 12 and OVER NAME_____

LEVEL II*

1.	cat	The *cat* has fur	kăt
2.	run	Bob can *run* fast	rŭn
3.	arm	His *arm* hurt	ärm
4.	train	The *train* was crowded	trān
5.	shout	If you *shout*, he'll hear you	shout
6.	correct	Put down the *correct* answer	kŏ rĕkt′
7.	circle	The *circle* is a round drawing	sĕr′ k′l
8.	heaven	*Heaven* surrounds the earth	hĕv′ ĕn
9.	educate	Parents *educate* their children	ĕd′ ū kāt
10.	material	The *material* was expensive	mă tēr′ I ăl
11.	ruin	The house was in *ruin* after the fire	rōō′ ĭn
12.	fashion	The dress is now in *fashion*	făsh′ ŭn
13.	believe	I *believe* you are right	bē lēv′
14.	suggestion	My *suggestion* was followed	sŭg jĕs′ chŭn
15.	equipment	The office got new *equipment*	ē kwĭp′ mĕnt
16.	majority	The *majority* voted for the bill	mă jŏr′ ĭ tĭ
17.	institute	The art *institute* held an exhibit	ĭn′ stĭ tūt
18.	literature	Some *literature* is worth reading	lĭt′ ĕr ă tūr
19.	reverence	Old people are treated with *reverence*	rĕv′ ĕr ĕns
20.	museum	The art *museum* held an exhibit	mū zē′ ŭm
21.	precious	Health is *precious*	prĕsh′ ŭs
22.	illogical	His thinking was *illogical*	Il lŏj′ I kăl
23.	decision	Your *decision* was accepted by all	dē sĭzh′ ŭn
24.	quantity	He ate a large *quantity* of food	kwŏn′ tĭ tĭ
25.	executive	The governor is a state *executive*	ĕg zĕk′ ū tĭv
26.	necessity	Food is a *necessity* of life	nĕ sĕs′ I tĭ
27.	opportunity	He had no *opportunity* for success	ŏp ŏr tū′ nĭ tĭ
28.	anxiety	Floods create *anxiety* among people	ăng zī′ ĕ tĭ
29.	conscience	His *conscience* was clear	kŏn′ shĕns
30.	physician	Our family *physician* examined me	fĭ zĭsh′ ăn
31.	courteous	Let's be *courteous* to everybody	kĕr′ tē ūs
32.	possession	He took *possession* of the house	pŏ zĕsh′ ŭn
33.	lucidity	We think best in moments of *lucidity*	lū sĭd′ I tĭ
34.	exaggerate	Don't *exaggerate* your accomplishments	ĕg zăj′ ĕr āt
35.	privilege	It was a *privilege* to meet the astronaut	prĭv′ I lĭj
36.	loquacious	He was *loquacious* during the interview	lō kwā′ shŭs
37.	medieval	*Medieval* times were long ago	mē dI ē′ văl
38.	effeminate	He is an *effeminate* person	ĕ fĕm′ I nĭt
39.	resilient	Steel is more *resilient* than lead	rē zĭl′ I ĕnt
40.	sovereignty	The country kept its *sovereignty*	sŏv′ ĕr In tĭ
41.	assiduous	*Assiduous* effort gets results	ă sĭd′ ū ŭs
42.	irresistible	His idea was *irresistible*	Ir rē zĭs′ tĭ b′l
43.	acquiesce	To *acquiesce* is to comply with a demand	ăk wI ĕs′
44.	charlatan	A *charlatan* is a pretender	shär′ lă tăn
45.	pusillanimous	A *pusillanimous* person is weak in spirit	pū sĭ lăn′ I mŭs
46.	iridescence	*Iridescence* is a play of colors	Ir Idĕs′ ĕns

* If 4 words or less are correct, give the Marks subtest to Subjects'.

5 points added if Marks subtest is not given.

WAIS - DIGIT SPAN
(Circle Number Correctly Recalled)

	Digits Forward	INT	OMN	NR	REV	ADD	Digits Backward	INT	OMN	NR	REV	ADD	
(3)	3-6-8						2-5						(2)
(3)	6-1-2						6-3						(2)
(4)	3-4-1-7						5-7-4						(3)
(4)	6-1-5-8						2-5-9						(3)
(5)	8-4-2-3-9						7-2-9-6						(4)
(5)	5-2-1-8-6						8-4-9-3						(4)
(6)	3-8-9-1-7-4						4-1-3-5-7						(5)
(6)	7-9-6-4-8-3						9-7-8-5-2						(5)
(7)	5-1-7-4-2-3-8						1-6-5-2-9-8						(6)
(7)	9-8-5-2-1-6-3						3-6-7-1-9-4						(6)
(8)	1-6-4-5-9-7-6-3						8-5-9-2-3-4-2						(7)
(8)	2-9-7-6-3-1-5-4						4-5-7-9-2-8-1						(7)
(9)	5-3-8-7-1-2-4-6-9						6-9-1-6-3-2-5-8						(8)
(9)	4-2-6-9-1-7-8-3-5						3-1-7-9-5-4-8-2						(8)
	ERRORS BY TYPE												

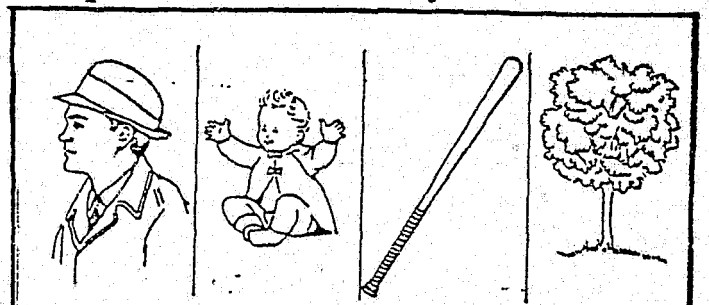
Forward_____ + Backward_____ = _____

TOTAL ERRORS: Forward_____ + Backward_____ = _____

1. INT (Intrusion(s)): Substitution of one or more incorrect digits for a correct digit.
2. OMN (Omission(s)): Omission of one or more digits from any portion of an otherwise correctly produced set.
3. NR (No Recall)): No digits produced (e. g., "I can't remember").
4. REV (Reversal(s)): All correct digits produced, but one or more reversals of order.
5. ADD (Addition(s)): All correct digits produced, but one or more digits added to any portion of the set.

COMPREHENSION SAMPLES

Find the row of pictures that shows a man, a baby, a bat and a tree. Below the row of pictures, it says, "Where is the baby?" Look at the four pictures right above the question "Where is the baby?" One of the four pictures answers the question. Now take your pencil and make a big X on the picture of the baby.



A. Where is the baby?

Read the following story to yourself as I read it to you. Right under the story there are two questions about it. Look at the first question, the question with the letter A in front of it. The first question, asks "Who will go with Eddie and his father?" Below this question are four answers. The four answers are "his mother," "Bill", "Sally," and "an uncle." The story says that Bill will go with Eddie and his father. "Bill" is the best answer. Now, take your pencils and draw a circle around the word "Bill." Now look at the second question, the question with the letter B in front of it. This question is an unfinished sentence. It says "Eddie is going to the circus on ..." There are four endings to choose from. They are "Friday," "his vacation," "his birthday," and "Halloween." Which is the best answer? Which ending is best? The story says that he is going to the circus on his birthday. Draw a circle around the words "his birthday.

Last year, for his seventh birthday, Eddie had a party at home. On his birthday this year, Eddie's father is taking him and his friend Bill to the circus.

A. Who will go with Eddie and his father?

his mother Bill Sally an uncle

B. Eddie is going to the circus on

Friday his vacation his birthday Hallowe'en

DIRECTIONS: Read the sample paragraph below. It has numbered blanks in it. The first blank is number C1. Look below the paragraph at the line of words with C1 in front of it. Find the word in line C1 that makes the best sense in blank C1. The word house from line C1 makes the best sense in blank C1. The word house is the answer to number C1. Draw a line under the word house.

Now look at the words in line C2. Find the word in line C2 that makes the best sense in blank C2, and draw a line under it.

SAMPLE

We have a playroom in our ___C1___ It is down in the basement, so we need to turn on an electric ___C2___ even on sunny days.

C1.	stove	house	bed	car	lake
C2.	storm	friend	ladder	room	light

The word light makes the best sense in blank C2. You should have drawn a line under the word light.

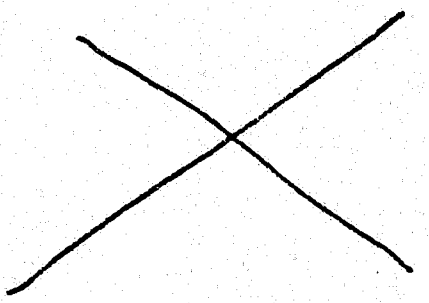
Remember there are three different kinds of items in the test on the following pages.

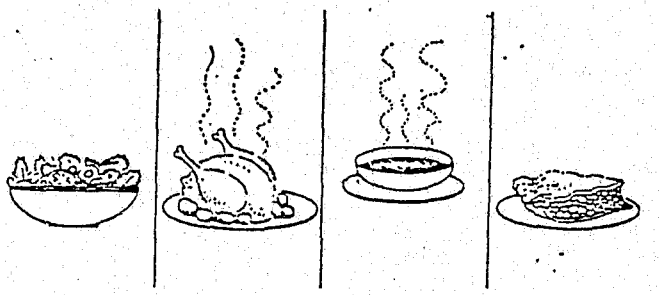
For items 1 through 6, mark with a big X the picture that answers the question or that goes best with the story. Mark only one picture for each question or story. As soon as you have finished marking a picture, go on to the next question or story.

For items 7 through 18, answer each question by drawing a circle around the best answer. Circle only one answer for each question. As you finish one story, go right ahead to the next. If you can't answer a question, don't spend too much time on it; go on to the next one. If you finish all the questions on all four pages, go back and check your work.

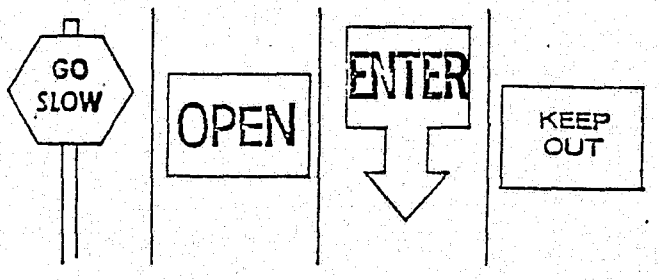
For items 19 through 52, draw a line under the best word for each of the blanks that follow on this page and on the next two pages. If you can't choose the best word for a blank, don't spend too much time on it. Go on to the next one.

If you make a mistake, erase the mark and then draw a circle around the right answer.

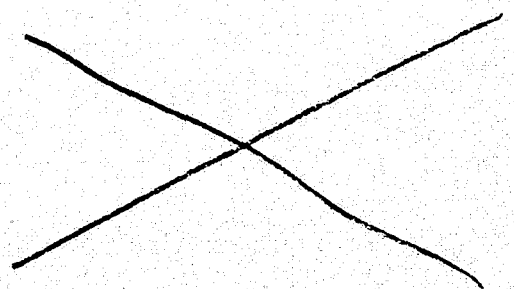


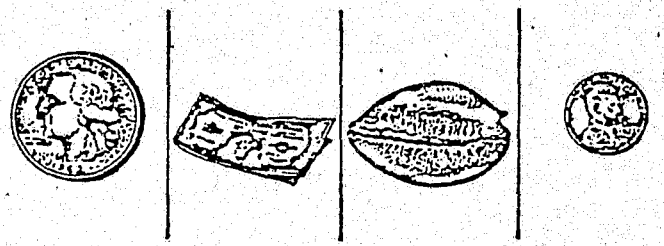


2. We had a big Thanksgiving dinner. First came soup and then turkey with vegetables. Last came pie and cheese. What was the first thing we ate?

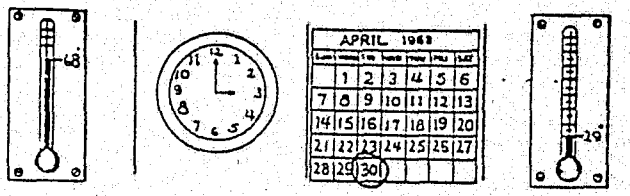


3. Mark the picture of the sign that tells you not to go in.





5. The earliest kinds of money were valuable objects which could be carried around and traded very easily. Shells, precious stones, and even salt were early, simple kinds of money. Now we use valuable metals and we make them into disks or coins. Which is an early form of money?



6. Orange growers watch the weather carefully. In Southern California, there are a great many oil burners ready in case the winter weather turns cold. These oil burners are called smudge pots. They give enough heat to protect the fruit if the temperature drops below the danger point of thirty degrees. What shows that the temperature is below the danger point?

Carol woke up early and hurriedly ate her breakfast. Then, as soon as she was dressed, she ran down to the pond to skate.

7. Before getting dressed, Carol

skated ate played worked

8. Carol was

slow bored eager sad

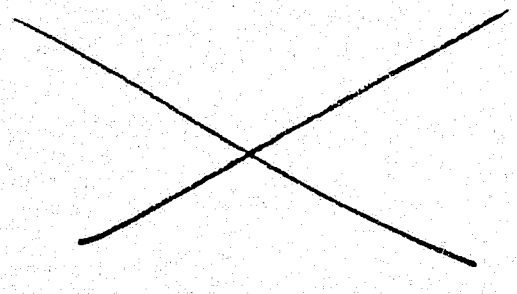
In one city, children five or under ride the bus free. For children between five and twelve years old, the fare is 10 cents. People twelve or over pay 15 cents.

9. An adult would pay

nothing 10¢ 12¢ 15¢

10. The amount a person pays depends upon his

height weight age worth



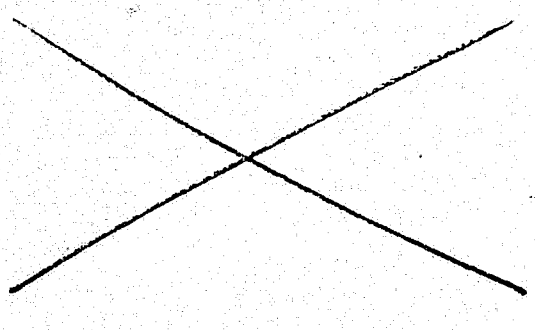
In the first colonies in America, making clothing took a long time. The women first had to spin the yarn and weave the cloth. They colored the cloth with dyes made from roots and berries. Finally they were ready to cut and sew the material into clothes for the family.

13. Clothing for the colonial family was generally made in

factories	homes	luxury	China

14. The color for the cloth came from

pictures	roots	sugar	dew



The cheapest way to get logs to a mill is by water. Teak, a very valuable wood, is too heavy to float when green. Because of this, a deep cut is made around the trunk and the tree is left standing until it is dry enough to float.

17. Teak will float if it has been

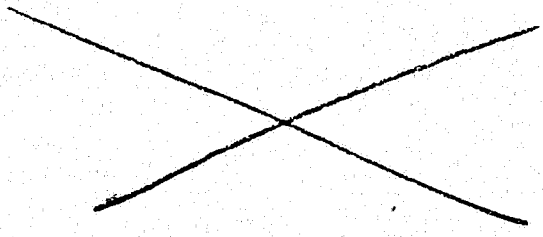
dried	logged	transported	sawed

18. Companies prefer water transportation for logs because it is less

rapid	reliable	expensive	dangerous

The hummingbird has a long slender bill. It thrusts this bill into flowers to get nectar and insects. When ___19___, it beats its wings so rapidly that they sound like the ___20___ of a tiny motor.

19	hopping	resting	flying	flowers	walking
20	hum	scratch	grit	size	crash



The best fancy diving is the result of long practice. However, ___23___, in and of itself, does not bring championship form. Championship diving is the ___24___ of such specifics as muscular ___25___ and coordination plus exact timing.

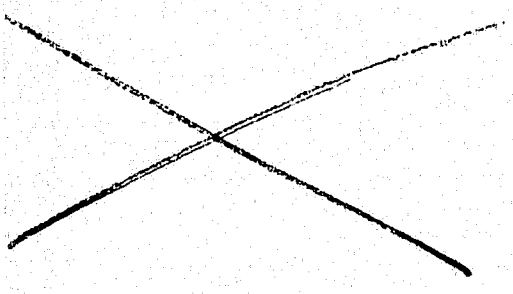
23	prevention	practice	reaction	recognition	a degree
24	importance	spring	result	school	reading
25	rest	punch	pain	springboard	control

Normal air pressure is about sixteen pounds per square inch. If the air pressure suddenly becomes much less than this, you feel lightheaded and dizzy. If the air ___26___ increases to much more than sixteen pounds per square inch, the whole world seems to be pressing down and trying to suffocate you. Air pressure is something that you live in all the time and yet never ___27___ unless it suddenly ___28___.

26	dampness	perhaps	ways	pressure	letter
27	notice	eat	drink	ask	smell
28	appears	changes	stays	explodes	cries

y skin divers have read ___29___ of ships sunk in storms and have become fascinated with the idea ___0___ some of the cargo of sunken ships.

s	gear	denials	nothing	accounts
ering	burning	making	losing	escaping



e recorded conversations or confessions are always t as evidence because it is easy to ___33___ a tape ng by snipping out sections and splicing the cut ogether. The resulting tape can then be played and ed by another machine, producing a final ___34___

at	record	alter	unwind	lengthen
corded	unspliced	punched	original	reliable

important part of our legal system is the jury. A s made up of twelve people selected from a list of qualified to be ___35___ Before a trial begins, swear to ___36___ the facts fairly and to render ___37___.

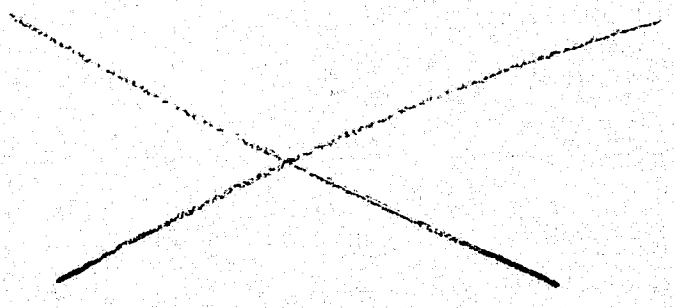
ces	doctors	jurors	exempt	injured
eal	weigh	alter	wave	ignore
	defense	verdict	right	legality

Demographic data are obtained through statistical studies of selected characteristics of a population. The U.S. census, taken every ten years, is an ___38___ of a demographic study. Certain ___39___ of the population of the United States are analyzed ___40___.

38	interesting	event	oversight	example	accident
39	aspects	students	disasters	income	typical
40	statistically	wrongly	chemically	harshly	writing

All human communities employ some kind of language. Language changes through the ___41___ of new words and the dropping of old ones. These changes in language often ___42___ changes in conditions within the community.

41	deleting	return	spelling	lengthening	adding
42	end	prevent	reflect	plan	forego



Since radio waves travel at the known and constant speed of about 186,000 miles a second, by ___45___ the time taken for waves to return to the radar transmitter after reflection from the aircraft it is possible to estimate the distance of the ___46___ from the transmitter.

45	increasing	changing	reducing	measuring	spacing
46	craft	wave	radio	reflection	echo

In reference to a ___47___ acquaintance of ours, a particularly proud and haughty woman, a friend of mine once said, "I cannot recall her name, but she's the only person I know who can ___48___ while sitting down!" Immediately I knew ___49___ whom he spoke.

47	close	shy	mutual	dear	meek
48	walk	sulk	cry	strut	sing
49	to	for	of	with	her

To determine a condition which is necessary for the occurrence of a given event, one must examine instances in which the event in question is ___50___ and also instances in which it is lacking. A feature which ___51___ whenever the event takes place but which is never present in the ___52___ of the desired event may be called a necessary condition.

50	present	sufficient	frequent	distinct	general
51	disappears	occurs	wanes	improves	fails
52	repetition	absence	body	presence	wake

Appendix C

List of Performance Variables

List of Performance Variables

Var #	Name	# of Cases	Mean	Std. Dev.
01	Age in Months	249	194.972	22.274
02	Position in Family	231	2.831	1.586
03	Children in Family	229	4.175	1.888
04	Ethnicity	244	1.311	.822
05	Present Status	247	1.538	.523
06	Prior Record	248	1.226	.429
07	Current Living Situation	229	1.681	1.067
08	Other Family Member Ever in Institution	191	1.681	.489
09	Other Family Currently in Institution	187	1.690	.558
10	School Attendance	247	1.093	.330
11	If No, Reason	16	1.750	.577
12	Highest Grade Completed	247	10.121	1.552
13	Type of School	243	1.021	.169
14	Attitude Toward School	231	1.918	.883
15	General School Performance	237	2.291	.571
16	Grades in English	234	2.286	.668
17	Ever in Special or Remedial Reading	226	1.606	.503
18	When in Remedial Class	38	1.868	.623
19	Receiving Professional Help	222	1.869	.364
20	Type of Help	29	1.034	.325
21	Currently Taking Medication	219	1.900	.330
22	Sensorimotor Aids Required	223	1.794	.496
23	Type of Sensorimotor Aid	48	1.063	.381
24	Notable Illness	215	1.842	.414
25	Who is Ill	41	1.098	.490
26	Disturbance	244	1.225	.590
27	Sex	248	1.270	.445
28	Grand Total Babcock	247	18.247	8.347

Var #	Name	# of Cases	Mean	Std. Dev.
29	Koppitz Direct Copy	244	2.500	1.751
30	PPVT Raw Score	235	92.907	14.221
31	PPVT IQ	236	90.725	12.453
32	Babcock T. General	246	3.935	2.766
33	Babcock T. Verbatim	246	4.435	6.436
34	Babcock T. Summation	246	7.963	3.904
35	Babcock T2 General	246	5.041	3.712
36	Babcock T2 Verbatim	246	5.496	4.386
37	Babcock T2 Summation	246	10.614	4.917
38	Distortion A1	246	.114	.560
39	Distortion A2	246	.020	.191
40	Distortion Summation A	246	.110	.564
41	Distortion B1	246	.033	.237
42	Distortion B2	246	.045	.396
43	Distortion Summation B	246	.061	.424
44	Digit Span Forward	246	6.362	1.841
45	Digit Span Backward	246	3.955	1.365
46	Digit Span Total	246	10.313	2.975
47	Digit Span Scaled Score	246	9.711	3.370
48	Digit Span F-B	246	2.407	1.270
49	Learning Disabled	247	2.243	.636
50	Block Design Raw	233	33.785	10.435
51	Block Design Scaled	231	10.013	3.690
52	WRAT Reading Level	223	1.865	.355
53	WRAT Reading Raw	213	46.869	14.392
54	WRAT Reading Grade	228	7.668	7.517
55	WRAT Spelling Level	249	.289	.699
56	WRAT Spelling Raw	249	2.783	7.582
57	WRAT Spelling Grade	249	1.263	7.326
58	WRAT Comp Correct	249	3.169	9.099
59	WRAT Comp Level	249	6.270	3.940

Var #	Name	# of Cases	Mean	Std. Dev.
60	Bender 5 Sec	249	.691	1.731
61	Bender 90 Sec	249	.647	1.585
62	Bender Recog	248	.597	1.505
63	Bender Seq	249	.422	1.182
64	G-M Vocab	210	3.676	2.895
65	G-M Comprehension	206	2.408	2.352
66	Dictation Number	203	2.291	2.533
67	Dictation # of Punct and Cap Errors	205	2.020	2.507
68	Dictation Handwriting Style	214	1.154	.763
69	Dictation Handwriting Quality	214	1.084	.824
70	Expected Reading Level	249	11.504	6.316
71	Bender Direct Copy -PS	220	42.509	29.855
72	Bender Direct Copy -PS-Z	221	69.774	39.336
73	Digit Span Intrusions - F	249	.028	.188
74	Digit Span Omissions - F	249	.100	.394
75	No Recall Forward	249	.092	.453
76	Digit Span Reversals - F	249	.161	.566
77	Digit Span Additions - F	249	.044	.258
78	Digit Span Total Error - F	249	.386	1.057
79	Digit Span Intrusions - B	249	.064	.535
80	Digit Span Omissions - B	249	.100	.384
81	Digit Span - No Recall - B	249	.084	.355
82	Digit Span - Reversals - B	249	.116	.447
83	Digit Span - Additions - B	249	.004	.063
84	Digit Span - Errors - B	249	.337	.915
85	Digit Span - Total Errors F-B	249	.723	1.879

Transformations of Initial Variables

86	Expected minus actual Reading Grade Level
87	Bender Gestalt Percentile
88	Reading Vocabulary Percentile
89	Reading Comprehension Percentile
90	Story Recall Percentile

Appendix D

Scores on Performance Variables

By Classification Group

Scores on Performance Variables by Classification Groups

Prior vs. Non-Prior

Var #	Label	$\bar{x}$ Prior	$\bar{x}$ Non-Prior	t	p
36	Babcock T2 Verbatim	5.20	6.60	-2.00	.048
40	Distortion Summation A	.14	.02	2.42	.016
41	Distortion B1	.04	0	2.16	.032
48	Digit Span F-B	2.54	2.02	2.73	.008
ID 90	ID Number	1193.72	1464.16	-2.39	.019

Non LD vs. LD & Ret

Var #	Label	$\bar{x}$ Non LD	$\bar{x}$ LD & Ret	t	p
03	Total Children in Family	3.65	4.48	-3.34	.001
15	General School Performance	2.14	2.38	-3.19	.002
16	Grades in English	2.13	2.38	-3.97	.003
17	WhereEver in Special or Remedial Readin	1.77	1.53	3.70	.000
23	Type of Sensorimotor Aid	1.00	1.16	-2.40	.023
26	Disturbance	1.11	1.30	-3.02	.003
27	Sex	1.36	1.22	2.22	.028
28	Grand Total Babcock	20.41	17.18	3.16	.002
29	Koppitz Direct Copy Score	2.00	2.70	-3.45	.001
30	PPVT Raw Score	98.39	90.40	4.66	.000
31	PPVT IQ	97.50	86.92	7.21	.000
33	Babcock T1 Verbatim	4.70	3.74	2.10	.037
34	Babcock T1 Summation	8.84	7.53	2.65	.009
36	Babcock T2 Verbatim	6.41	5.05	2.27	.024
37	Babcock T2 Summation	11.67	10.11	2.61	.010
38	Distortion A1	.01	.17	-2.84	.005
40	Distortion Summation A	0	.17	-3.08	.002
41	Distortion B1	0	.05	-2.16	.032
43	Distortion Summation B	0	.09	-2.26	.025
44	Digit Span Forward	7.00	6.08	4.45	.000

Non LD vs. LD & Ret

Var #	Label	$\bar{x}$ Non LD	$\bar{x}$ LD & Ret	t	p
45	Digit Span Backward	4.45	3.73	4.42	.000
46	Digit Span Total	11.44	9.80	4.86	.000
47	Digit Span Scaled Score	11.09	9.06	5.25	.000
49	Learning Disabled	3.00	1.84	40.35	.000
50	Block Design Raw	36.44	32.23	3.00	.003
51	Block Design Scaled	10.49	9.49	2.37	.019
52	WRAT Reading Level	1.91	1.82	1.99	.048
53	WRAT Reading Raw	53.85	42.42	6.23	.000
54	WRAT Reading Grade Level	9.24	5.99	9.17	.000

Males vs. Females

Var #	Label	$\bar{x}$ Males	$\bar{x}$ Females	t	p
01	Age in Months	196.38	187.84	3.63	.000
05	Present Status	1.64	1.23	6.56	.000

601 vs. 602

Var #	Label	$\bar{x}$ 601	$\bar{x}$ 602	t	p
01	Age in Months	191.27	196.54	-2.26	.009
16	Grades in English	2.16	2.41	-2.90	.004
48	Digit Span F-B	2.22	2.61	-2.48	.014
ID 90	ID Number	1150.48	1346.95	-2.16	.032
53	WRAT Reading Raw	49.11	44.79	2.18	.030
70	Expected Reading Level	10.83	11.27	-2.27	.024

LD vs. Non LD

Var #	Label	$\bar{x}$ LD	$\bar{x}$ NonLD	t	p
03	Total Children in Family	4.42	3.65	2.97	.003
15	General School Performance	2.39	2.14	3.13	.002
16	Grades in English	2.39	2.13	2.86	.005
17	Wherever in Special or Remedial Reading	1.53	1.77	-3.63	.000

LD vs. Non LD

Var #	Label	$\bar{x}$ LD	$\bar{x}$ nonLD	t	p
23	Type of Sensorimotor Aid	1.17	1.00	2.15	.043
27	Sex	1.21	1.36	-2.34	.020
28	Grand Total Babcock	17.85	20.41	-2.45	.015
29	Koppitz Direct Copy Score	2.70	2.00	3.33	.001
30	PPVT Raw Score	92.13	98.39	-3.87	.000
31	PPVT IQ	88.96	97.50	-6.33	.000
36	Babcock T2 Verbatim	5.14	6.41	-2.06	.041
37	Babcock T2 Summation	10.36	11.67	-2.14	.034
38	Distortion A1	.20	.01	2.90	.004
40	Distortion Summation A	.20	0	3.09	.002
41	Distortion B1	.06	0	2.17	.032
43	Distortion Summation B	.11	0	2.27	.025
44	Digit Span Forward	5.99	7.00	-4.59	.000
45	Digit Span Backward	3.69	4.45	-4.43	.000
46	Digit Span Total	9.68	11.44	-4.95	.000
47	Digit Span Scaled Score	8.96	11.09	-5.31	.000
50	Block Design Raw	32.93	36.44	-2.46	.015
51	Block Design Scaled	9.60	10.49	-2.06	.041
53	WRAT Reading Raw	43.14	53.85	-5.67	.000
54	WRAT Reading Grade Level	6.04	9.24	-8.86	.000

Prior vs. Non-Prior

Var #	Label	$\bar{x}$ Prior	$\bar{x}$ Non-Prior	t	p
08	Other Family Member Ever in Institution	1.66	1.81	-2.17	.033
09	Other Family Currently in Institution	1.64	1.80	-2.30	.023
22	Sensorimotor Aids Required	1.83	1.67	2.09	.040
28	Grand Total Babcock	17.59	20.08	-2.45	.016
33	Babcock T1 Verbatim	3.80	5.00	-2.26	.026
34	Babcock T1 Summation	7.69	8.95	-2.21	.030

Males vs. Females

Var #	Label	$\bar{x}$ Males	$\bar{x}$ Females	t	p
06	Prior Record	1.19	1.34	-2.38	.019
12	Highest Grade Completed	10.32	9.75	2.73	.007
14	Attitude Toward School	2.02	1.68	2.78	.006
16	Grades in English	2.39	2.03	3.84	.000
17	Wherever in Special or Remedial Reading	1.57	1.74	-2.39	.018
22	Sensorimotor Aids Required	1.83	1.69	2.12	.037
23	Type of Sensorimotor Aid	1.17	1.00	2.41	.023
25	Who is Ill	1.22	1.00	2.28	.031
48	Digit Span F-B	2.54	2.09	2.48	.015
53	WRAT Reading Raw	45.36	50.33	-2.20	.030
54	WRAT Reading Grade Level	6.92	7.83	-2.00	.049
70	Expected Reading Level	11.23	10.60	3.04	.003

Retarded vs. LD

Var #	Label	$\bar{x}$ Retarded	$\bar{x}$ LD	t	p
14	Attitude Toward School	1.60	2.01	-2.26	.030
26	Disturbance	2.28	1.12	7.10	.000
28	Grand Total Babcock	13.52	17.85	-2.11	.043
30	PPVT Raw Score	81.64	92.13	-2.59	.015
31	PPVT IQ	76.48	88.96	-3.19	.004
32	Babcock T1 General	2.52	4.05	-3.06	.004
34	Babcock T1 Summation	5.42	7.90	-2.83	.008
38	Distortion A1	0	.20	-3.13	.002
40	Distortion Summation A	0	.20	-3.09	.002
41	Distortion B1	0	.06	-2.17	.032
43	Distortion Summation B	0	.11	-2.27	.025
70	Expected Reading Level	11.70	11.12	2.43	.020
64	Gates MacGinitie Vocal	2.21	3.76	-2.41	.024
67	Dictation Number of Punct & Cap Errors	1.94	3.57	-2.46	.022

END