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ABSTRACT

This paper discusses the outcomes of a study that investigated the effects of substance dependency on the reading decoding and comprehension of 497 adolescents (ages 12-18) involved in an inpatient drug and alcohol rehabilitation program. The first part of the study involved the formal assessment of reading decoding and reading comprehension skills using a nationally accepted instrument under optimum conditions. The second part of the study involved data collection via the social screening process of the facility, including medical, legal, educational, family, vocational, religious, and nutritional information. The analysis of data regarding both reading decoding and comprehension grade levels showed a wide range of scores achieved by both genders overall in all assigned grade levels throughout the entire six and one half years of the study. However, the majority scored significantly below grade levels, and numerous clients fell several years below their assigned grade levels in both decoding and reading comprehension. The analysis of the social screening data revealed significant family, educational, and vocational instability. The paper concludes by urging the education community to examine the manner in which vocational education is provided to clients who may permanently feel the effects of drug and alcohol. (Contains 18 references.) (CR)

SUBSTANCE DEPENDENCY'S EFFECT ON READING DECODING AND COMPREHENSION:

Reading Decoding and Comprehension Levels as Indicators of Brain Dysfunctioning with Ramifications for Traditional Rehabilitation Programming

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Abstract of Dissertation

SUBSTANCE DEPENDENCY'S EFFECT ON READING DECODING AND COMPREHENSION:

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Since the 70's, substance abuse and addiction has been viewed and treated as a social disease. The National Institute on Drug Abuse's goal for the year 2000 is aimed at making science the foundation of drug prevention, treatment and policy. This goal will be supported by this dissertation.

The study, resulting data analysis and discussion in this dissertation will contribute information linking substance addiction with brain functioning by directly addressing the brain processes involved in reading decoding and reading comprehension. This information will be applied directly to the rehabilitation process by examining the reading levels of popular rehabilitation materials.

The study involved a carefully selected population of 497 clients between 12 and 18 years of age. These clients were, for some period of time during the six and one half years of the study, involved in an inpatient drug and alcohol rehabilitation program. The facility from which the population was selected is representative of the majority of

accepted institutions within this country which provide drug and alcohol rehabilitation programs to adolescents.

The study was two-fold. The first segment involved the formal assessment of reading decoding and reading comprehension skills using a nationally accepted instrument under optimum condition. The second segment involved data collection via the social screening process of the facility.

The data from the formal assessment of the reading decoding and reading comprehension portion was analyzed entertaining gender, age, education placement, grade levels and the trends over the years of the study.

The analysis of the social screening data assessed medical, legal, educational, family, vocational, religious and nutritional information.

The analysis of data regarding both reading decoding and comprehension grade levels showed a wide range of scores achieved by both genders over all assigned grade levels throughout the entire six and one half years of the study. However, the statistics presented in this paper indicate that the majority of the population scored significantly below their assigned grade levels.

The analysis of the social screening data revealed significant family, educational and vocational instability. Medical issues not directly related to drugs and alcohol were not significant. Legal involvement was a major factor in the profiles of the clients.

In contrasting the information from the study with rehabilitation materials, the grade level for reading comprehension was incompatible for the most popular texts.

This dissertation presents some of the early attempts by the scientific community to relate their findings to the rehabilitation realm.

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Introduction

Chapter 1.

Importance of Study

The '90's, "The Decade of the Brain", proclaimed by President George Bush, saw the identification of problems that were yet to be clearly linked to the neurological system, of which the brain is the primary component. As we come to the end of the '90's, substance abuse and/or addiction, initially and traditionally considered a social problem, is being defined as a disease of the brain expressed in behaviors always occurring in a social context (Kreeger, 1995). This emphasis on social context and etiology has been the focus of treatment and rehabilitation.

The National Institute on Drug Abuse's goal for the year 2000 is to have "science replace ideology" as the foundation of drug abuse prevention, treatment and policy (Kreeger, 1995).

Drug related brain changes can cause abnormalities in mental functioning that include learning and memory in the realm of cognitive abilities such as reading decoding and reading comprehension. This relationship takes the impact of substance abuse/addiction out of the narrow mainframe of "social context". The impact of substance abuse/addiction on the brain presents potential disabilities of undetermined duration.

This dissertation will contribute information relative to the linking of

substance abuse/addiction with brain functioning by assessing a sophisticated function of the brain - the reading process. The study, which serves as the basis of this dissertation,will provide data examining the reading decoding and reading comprehension levels of a defined population of clients with a primary diagnosis of substance dependency. The data will allow contrasting between the client's assigned school grade level and the assessed reading decoding and reading comprehension levels.

Since the data was collected over a period of six and one-half years, any trends in reading comprehension level and reading decoding variations can be noted. Also since the data is divided by the age, grade and gender of the clients, any uniqueness specific to any select group within the population can be noted.

This dissertation will also attempt to examine other medical, educational, familial and social factors within the clients' profiles. This examination will be done to determine the influence of other factors on the reading process, as well as attempt to identify commonality among the social profiles of the population of the study.

The adolescent stage of development, on which this study focuses, is one in which physical change is a continuous process. The refinement of the data analysis may contribute to further study of the stage of development in the adolescent brain relative to drug usage.

The study will examine the traditional reading base of rehabilitation for

the adolescent client. The data will contrast the ascertained reading levels of the clients with the scientifically determined reading levels of the materials which are commonly associated with the rehabilitation and recovery process.

Purpose of the Study

By determining the reading decoding and reading comprehension levels, as well as examining social factors of a population of 497 clients over a period of six and one-half years, trends may surface specific to age, grade, gender or over the period of time.

Assessing clients involved in a uniform rehabilitation program also may shed light on the clients' ability to utilize the written word as an effective tool to building a foundation of information in the therapy process. By selecting a population from a facility that parallels other rehabilitation institutes, as well as a population that characteristically profiles clients receiving treatment, this study may hold credibility.

This dissertation has three general goals:

- To add to the growing body of knowledge examining the cognitive functioning of drug dependent adolescents,
- To use measurable, basic, academic skills as a qualitative measure of brain functioning in a population which continues to be part of the educational

system,

- To contribute to the rehabilitation process by contrasting the academic level of tools traditionally utilized in rehabilitation with the examined populations assessed functional reading levels.

Three general goals were initially chosen since there were few specific conclusions regarding the cognitive functioning of drug dependent adolescents present in the literature when this researcher began her investigation. Therefore, while the tendencies in related research are producing strong indicators, the actual deductions are limited due to the infancy of the field of investigation.

However, with regard to the third goal, the mainstay materials of rehabilitation have been in use for many years with little consideration given to the cognitive appropriateness of the format.

Since successful rehabilitation has such a critical impact on society, research of a scientific nature must go hand-in-hand with practical application in rehabilitation facilities so clients are receiving state-of-the-art treatment. Therefore, this author feels strongly that assessing reading abilities in light of current research into brain functioning while integrating this information into the rehabilitation sphere is important.

Problem Stated

Thirteen million people in the United States currently abuse drugs with four million of those categorized as compulsive drug abusers (Stocker, 1998). Formal programmed rehabilitation for substance dependency, especially for the adolescent, has been at the forefront of society for the last ten years. With the emphasis of rehabilitation has come the investigation of the dependency/brain interaction. This has given credibility to scientific data linking drug usage to specific deficits in cognitive functioning.

One of the dominant medium for information distribution in rehabilitation programs has been the written word. Through books such as Alcoholics Anonymous, also known as the Big Book, the Basic Text for Alcoholics Anonymous and the text Narcotics Anonymous, clients draw the information, camaraderie and strength that professionals feel is at the core of rehabilitation. Clients in rehabilitation are expected to take these tools with them when they leave the institution and reference them appropriately.

In the forward of the Alcoholics Anonymous text (1998) is stated that seven percent of the members in groups of Alcoholics Anonymous surveyed are less than 30 years of age with many in their teens. The forward further states that in 1997, the membership census showed that about one-eighth of the membership was in its teen years. The jacket of the book states that persons "...may be led

towards recovery by reading its explanation of the AA program and its personal evidence that the AA program works."

The Alcoholics Anonymous World Services, Inc. records that, as of January 1994, 14,000,000 copies of the Alcoholics Anonymous text have been distributed, mainly for use in rehabilitation programs (Alcoholics Anonymous, 1976). As previously stated, these books are also the most tangible reference that the clients take with them from the rehabilitation program. This is evidenced by the acceptance of the use of these books in "AA" and "NA" meetings which are the primary sources of relapse prevention and support after the intense rehabilitation process has been completed. As stated in the Narcotics Anonymous text, "This volume is intended as a textbook for every addict seeking recovery" (Narcotics Anonymous, 1988, p.xiii). Is the addict, especially the impressionable adolescent addict, to assume if he cannot read the book than he is not able to or genuine in his quest for recovery?

This researcher chose to use the *Fry Readability Scale* (Fry, 1978) to determine the approximate reading grade levels for the Alcoholics Anonymous and Narcotics Anonymous texts.

The *Fry Readability Scale* was developed by Edward B. Fry to aid teachers and editors in providing children or adults with reading material on the proper level of difficulty. The scale utilizes a simple device which contrasts the average number of syllables per 100 words (determined by three randomly

selected paragraphs of the text) with the average number of sentences found in the three selected passages.

Using this procedure, the reading levels for the Alcoholics Anonymous and the Narcotics Anonymous texts were both determined to be on the 7th grade.

Therefore, it seems important, in the initial evaluation phase of a client's substance dependency rehabilitation program, that an assessment of functional reading is made. This evaluation should assist the clinician in assessing the ability of the client to feel comfortable with some of the assigned activities of the program.

This research project will show that the clinician in the rehabilitation setting should not use the "assigned grade level" as an indicator of the client's level of reading functioning.

Overview of the Study

This study will present the refined data for reading decoding and comprehension levels of adolescent clients as they enter a rehabilitation program The data will allow the analysis of the clients' reading decoding and comprehension levels relative to selected characteristics. It will further allow the contrast of clients' reading decoding and comprehension levels with the reading comprehension levels of the primary materials used in the program - Alcoholic

Anonymous and Narcotics Anonymous texts.

Rationale of the Study/Developing a Hypothesis

Since research into the link between neurological functioning and substance abuse is rapidly evolving, every effort should be made to provide information that will contribute to and enhance the on-going scientific investigations.

Linked to this is the consideration of the cognitive appropriateness of materials and methods currently being used in rehabilitation programs as the scientific world expands its knowledge of the functioning of the addicted adolescent.

Determining the reading levels (decoding and comprehension) of persons who have been diagnosed as being substance dependent will contribute data for both the scientific and rehabilitation realms.

The assessment of reading decoding and reading comprehension levels was chosen for several reasons. Most reading teachers, researchers and curriculum specialists believe that proficiency in decoding skills are an essential ingredient in the foundation of reading (Kaufman & Kaufman, 1998). Although decoding skills are largely developed in the early stages of reading, they continue to develop through the maturest stages of reading education. A reader must

become proficient at decoding before he or she is able to concentrate on the meaning of the text (Chall, 1983).

Reading comprehension develops more slowly than decoding skills. However, without comprehension, few readers would be motivated to move beyond a simple repertoire of words. People read to get information. Information is comprehension.

The translation of printed material into meaning is accomplished when the reader forms networks of relations between ideas - written and experiential. Comprehension means understanding. Understanding means going beyond the verbal forms of the printed material to reach the underlying ideas. The reader than must compare these ideas with his or her previous knowledge to choose what is relevant and essential (Lunzer, Waite & Dolan, 1979).

Certainly, an instrument such as the one used in this study can only provide limited information as to a person's ability to complete the complex task of reading comprehension. The short, carefully selected passages of a formal reading inventory are merely representational of other more sophisticated forms of reading.

In addition, the assessment process has limitations in judging functionality. Testing situations provide one-on-one private optimum performance environments. This is hardly the forum or context in which most reading takes place.

However, a formal quantitative measure of a skill can indicate a level of assumed neurological functioning. Formal testing is the generally accepted method by which neurologists and neuro-psychologists base many serious decisions.

Traditional rehabilitation programs rely heavily on reading material to better participate in the recovery process. Clients need adequate reading skills to facilitate rehabilitation as it occurs in most facilities currently.

In constructing a rehabilitation program which subscribes to a traditional model, written material has been a mainstay. However, recent information relative to the effects of substance abuse and dependency on the cognitive functioning of the brain raises the question of the appropriateness of reading material as a medium for the internalization of concepts.

Scope of Study

This study will implement the analytical survey method of research, analyzing quantitative data via the use of statistical and computer tools. The analytical survey method was chosen since instruments and techniques exist which allow for the firm presentation and analysis of collected data. This paper will attempt to link research over the last five years in neuroscience fields which indicates disturbances in verbal areas of the brain to the measured reading

function of adolescent clients diagnosed with substance addiction disorders.

The scope of this study covers the period of January 1991 through June 1997 - six and one-half years. The commencement of this study in January of 1991 evolved as part of the inauguration of the rehabilitation facility from which the population was taken, St. Luke's Renewal Centers. Renewal Centers is a drug and alcohol treatment facility for adolescents and young adults in Quakertown, Pennsylvania which opened its doors in January of 1991.

June 1997 was the close of the last traditional school year prior to the beginning of the analysis and presentation portions of this dissertation.

The study has several strong points. The researcher who conducted the individual reading evaluations was the same person in each of the 497 cases, thus limiting any inconsistencies resulting from multiple examiners. The measurement device for the reading decoding and reading comprehension are subsets of the same comprehensive instrument and were the same edition for each of the examinees. The environment in which the testing took place, one of the facility's classrooms, remained constant over the years.

Each client was tested within 48 hours of admission, placing the clients at approximately the same point in rehabilitation. This is important since all clients were determined to be actively using drugs within the 24-hour period prior to admission. Also, after one week in the rehabilitation process, clients often begin a prescribed medication regime to address psychological or withdrawal

complications. Evaluating clients prior to the commencement of any therapeutic medication eliminates entertaining the effect of the prescribed medication on cognitive functioning.

The medical, educational, familial, vocational and legal information was gathered using the institution's own survey, the Social History. Unfortunately, the Social History is one of the weaknesses of the study. A member of the nursing staff of the institution administers the Social History. The researcher was unable to provide the strict consistency that she had with the reading evaluations with regard to the person gathering the information. Also, since the Social History was not introduced to the institution until 1995, valuable information of clients for the years 1991 through 1994 is not available.

Another weakness of the study is in the accuracy of the drug profile of the client prior to beginning rehabilitation. By the time a client is referred for rehabilitation, he or she usually has logged a wide variety of drug experiences. The client has difficulty being precise about the amount and specific drug or drugs that he or she was using just prior to admission. Since clients obtain drugs through a variety of unscientific sources, the pharmacological composition of the drugs will vary. Even though most clients specify a "drug of choice", as was previously indicated, even the same drug obtained "on the street" does not necessary carry the same pharmacological composition.

The most immediate educational experiences for a client are also difficult

to determine. Drug-seeking behaviors usually alter a student's school attendance patterns. The clients in this study consistently reported that attendance became very irregular, if at all, once her or his primary goal became seeking and using drugs. Therefore, it was difficult to judge the level, if any, of on-going educational experiences.

Another weakness of the paper is the infancy of the knowledge relative to long term effects of drug usage on the brain. This limits the amount of collaboration of research or the conclusions which can be drawn.

An additional weakness is the assessment of reading decoding and reading comprehension skills in an artificial context. While a case will be presented in this paper for the purity and appropriateness of the evaluation process which was utilized, an argument can be made that these positive qualities may have not represented a true picture of the clients' skills.

Definition of terms and terminology:

Against Medical Advice (AMA) - A person withdraws from treatment and/or leaves a facility after the person has been given medical advice to continue treatment is termed leaving AMA.

Cannabis - The cannabis is the female flower of the hemp plant. This term is used interchangeably with marijuana (Friedman, 1993).

Central Tendency - This measurement provides a single score which is the most typical or representative score which characterizes the performance of the entire group (Anastasi & Urbina, 1997).

Cerebral Cortex or Cortex- The cerebral cortex or cortex is the largest area of the brain where most thinking occurs (Ornstein & Thompson, 1984).

Court Committed - Legal proceeding by which a judge signs a formal decree remanding a person to a facility for a particular length of time.

Decoding - The ability to identify letters and pronounce words, both phonetically and non-phonetically (Kaufman & Kaufman, 1985).

Frequency Distribution - A frequency distribution is a grouping of scores into intervals in order to tally each score into an appropriate interval. When all the scores have been entered, the tallies are counted to determine the number of cases or frequency in each interval (Anastasi & Urbina, 1997).

Grade Norms - A method of reporting scores on educational achievement tests. These norms are found by computing the mean raw score obtained by students in each grade level. For example, 3.0 refers to average performance at the beginning of the third grade with 3.5 referring to average performance at the middle of the grade (Anastasi & Urbina, 1997).

Hippocampus - The hippocampus is the most important part of the limbic system. It controls the homeostatic mechanisms of the body -eating, drinking, waking, body temperature, chemical balances, heart rate, hormones, sex and

emotions (Ornstein & Thompson, 1984).

Internal Consistency - Internal consistency is a method of test validation using the test itself. The test will be administered to the same person(s) for a second time or to another person(s) with similar characteristics (Anastasi & Urbina, 1997).

LSD - (lysergic acid diethylamide) LSD is a powerful "street drug" which has a chemical component allowing it to bind effectively to a particular chemical receptor in the brain (Friedman, 1993).

Limbic System - The limbic system is the group of structures located between the brainstem and the cortex. The two key parts of the system are the hypothalamus and the pituitary gland. This system is responsible for many of the higher cognitive activities present in humans (Ornstein & Thompson, 1984).

Mean - The mean is the most familiar method of measuring central tendency. It is derived from adding the numbers in the given set of data and dividing by the quantity of numbers which appear in the set of data (Anastasi & Urbina, 1997).

Median - The median is a measure of central tendency in which the numbers of a set of data are arranged in order, with the median being the middle number. The median bisects the distribution with half the scores falling above it and half below (Anastasi & Urbina, 1997).

Mode - The mode is a measure of central tendency which reports the most frequently appearing score (Anastasi & Urbina, 1997).

Neurotoxic - The term neurotoxis is used when a substance is determined to have the capacity of damaging the neurons of the brain (Friedman, 1993).

Opiates - Opiates are a drug class which includes opium, codeine, morphine and heroin (Friedman, 1993).

Photon - A Photon is a quantum of electromagnetic energy having the properties of both particles and waves (Neufeldt, 1988).

Reliability - Reliability is the consistency of scores obtained by the same individuals when they are retested with the same test on different occasions, or with sets of different items or under other variable testing condition (Anastasi & Urbina, 1997).

SPECT - A SPECT is an imaging of the brain which uses a single photon emission computed tomograpy, (Stocker, 1998).

Transcranial Doppler Sonography (TCD) - TCD is a procedure by which high frequency sound waves are bounced off the blood flowing in large arteries in the brain. The characteristics of the reflected sound waves can be used to estimate the constriction of arteries (Stocker, 1998).

Tomography - Tomography is a technique of X-ray photography in which a single plane is photographed, excluding the outlines of other structures in other planes (Neufeldt, 1988).

THC - (tetrahyrocannabinol) THC is the active ingredient in marijuana (Friedman,1993).

the test measures and how well the test does measure that activity (Anastasi & Urbina, 1997).

Review of Related Literature

Chapter 2.

Introduction

No compatible studies were found in exploring the available literature relative to the effects of substance abuse directly on reading skills. Sources included the National Institute of Health's National Institute on Drug Abuse (NIDA). The NIDA is the world's largest drug addiction research facility providing 85 % of the support for research of drug abuse and addiction in the world (Kreeger, 1995). Contact with several members of the Institute yielded only one tangential study which is in its infancy and expected to continue over the next 10 years.

The head of the study, Dr. Monique Ernst, expressed the potential contribution that the study presented within this dissertation could make to her project. However, she was unable to provide any research or direction which directly correlates to the effects of drug abuse/addiction on the reading levels of adolescents.

The review of literature in this dissertation will concentrate on drawing links between the architecture of the brain, specific to those areas relative to the reading process. The review of literature will also provide information which

connects substance abuse/addiction with specific brain dysfunctioning.

Defining Substance, Abuse, Addiction and Reading Disorders

"Substance", used in reference to abuse and addiction, is a general term encompassing alcohol, recreational drugs and prescription medication (Maxmen & Ward, 1986). The fourth edition of the Diagnostic and Statistical Manual of Mental Disorders, or DSM-IV of the American Psychiatric Association, separates substance use disorders into substance dependency and substance abuse (Maxmen & Ward, 1986). Dependency is defined as the repeated, non-medical use of a substance or substances that harms the user or incites the user to harm others. The dependency is accompanied by psychological or physical dependence (Maxmen & Ward, 1986).

The DSM-IV lists seven criteria for substance dependency and four criterion for substance abuse.

To be diagnosed as substance dependency, three or more of the criterion must be occurring at any time in the same twelve month period. The first criteria targets tolerance which is evidenced by the minimal or lack of medical attention that a user seeks due to physical maladjustment to a substance.

The second criteria, withdrawal, is the physical symptoms that a user reports when he is not actively using (Maxmen & Ward, 1986). These differ

greatly based on the type of substance and the individual user.

The quantity of substance that an individual uses is the third dependency criteria. Again, each user is different in the quantity that his or her body requires to elicit a reaction. A generally accepted concept of addiction, however, is that over a period of time, the body increases in the amount of the addicted substance that it needs to be satisfied (Maxmen & Ward, 1986).

The persistent desire or failed efforts to control or eliminate substance abuse is the fourth criteria (Maxmen & Ward, 1986).

The control that the substance has over the individual's activities is the fifth criteria (Maxmen & Ward, 1986). The surroundings and activities in which the user engages indicate the level of control. As a user increases in his or her use, the company he or she keeps, as well as the places he or she frequents are increasingly drug related.

The user's pre-occupation with using drugs is the sixth criteria which, in turn, is roughly measured by another criteria, neglect (Maxmen & Ward). The user will neglect him or herself, family, school, financial and vocational responsibilities.

The final listed criteria is that the user continues to use despite knowledge of the seriousness of the problem (Maxmen & Ward, 1986). Many substance dependent individuals are able to identify specific health problems directly related to the substance abuse, but continue to abuse the substance in the face of that

knowledge.

Abuse does not necessarily develop into dependency. Abuse is the misuse of a substance or substances resulting in significant impairment. The DSM-IV requires the manifestation of one or more of four criteria for a person to have the diagnosis of dependency (with the criteria for dependency entertained but not met) (Maxmen & Ward).

The four criteria include:

- Recurrent use causing neglect of major obligations;
- Use in situations which are physically hazardous;
- Substance abuse related legal problems;
- Recurrent social or interpersonal problems.

These criteria loosely resemble those criteria for abuse. The differentiation appears to be that dependency requires pre-occupation with drug behaviors with the person continuing to use despite his or her knowing that he or she has a serious substance problem. The criteria of dependency demonstrates the person's continued use in light of serious often formal social consequences.

Professionals interviewed for this study, all certified drug and alcohol abuse counselors, were in disagreement whether an individual could remain as a user without becoming dependent. Most agreed that there exist different levels of dependency with a person's financial and social abilities dictating the level to which a person manifests his or her dependency. For example, a financially

affluent, prominent individual may be able to delegate responsibility in such a way as to not let his or her drug use interfere with his or her obligations to the degree that the substance dependency is evident.

The DSM-IV is also helpful, but limiting in defining reading disorders. The DSM-IV recognizes "Learning Disorders" specific to reading. The discussion of the onset of this category of disorders includes usual onset before ages 7 or 8 (Maxem and Ward, 1986). The criteria for "Learning Disorders" does not recognize reading disorders as secondary to other problems such as substance abuse nor does it address the onset in the adolescent or adult years.

The Substance Abuse/Addiction and Brain Functioning Relationship

Information drawing a relationship between substance abuse/addiction and brain functioning in short term studies has surfaced in literature. The focus of the majority of this research is in the realm of establishing the brain-dependency link within the individual. However, even though this research many seem tangential, it has yielded important information relative to the learning process within the brain.

Ornstein and Thompson (1984) describe the structures and functioning of the brain in their book, The Amazing Brain. Neurons, the major constituents of the brain, have the responsibility of processing information and transferring it to

other neurons throughout the brain, ultimately generating behavior. Dopamine, the chemical transmitter for neurons, is released in the brain and attaches to activating target neurons. The dopamine changes the activity and chemical reaction of the neurons.

Foreign substances target these sites in various ways, depending on the chemical composition of the substance. The receptor molecule is the "lock" that can be opened only by the transmitter chemical that has the right shape, the key molecule.

However, many other chemicals may also contain the key shape on one part of the structure. This is where the chemical deception of foreign substances comes into plan. The complete molecule may be very different in chemical structure from the normal transmitter molecule, but the one part with the matching configuration will allow the attachment. The attachment formed by the receptor molecule and the foreign transmitter chemical will cause a very different reaction in the brain than the normally attached molecule (Ornstein and Thompson, 1984).

There are two major dopamine circuits in the brain. One of these circuits is a widespread, diffused system which affects the limbic system, the brain system concerned with higher mental thought processes. This dopamine system is a one-neuron pathway sending dopamine in a very extensive array to the higher areas of the brain. Dopamine simply transmits information, it does not contain the information (Ornstein and Thompson, 1984).

Ornstein and Thompson (1984) feel that the chemical transmitter molecules and the receptor molecules on nerve cells to which they attach hold some of the ultimate secrets of how the brain works. Therefore, any substance interfering with the normal function of these molecules could have significant impact on a person's performance.

Malorye Allison (1992) compiled information from interviews with six prominent physicians and PhD's in neuroscience fields. Her article stresses that memory functions are generally dispersed throughout the brain. The article acknowledges but does not specify the existence of different "types" of memory" for different functions. Therefore, any identified disturbances in brain functioning probably will manifest itself in some type of memory dysfunction. Since the academic learning process depends on a variety of manifestations of memory functions, disturbances to a memory function will seriously impact the learning process.

Allison (1992) states that scientists have pinpointed critical connections in the limbic system that may prove to be the roots of memory and the foundation of learning. Dr. Eric Kandel, MD, PhD, a professor at Columbia University's College of Physicians and Surgeons states that, "Learning is the modification of behavior by experience and memory is the retention of that experience" (Allison, 1992, p.4).

Marsel-Mesulam points out the importance of the limbic system in the

complex network of information exchange. She views it as the "bottleneck" of memories. She sites the temporal lobe as the area for storage, retrieval and retention of information (Allison, 1992).

Squire states that the hippocampus and the areas into which it projects are needed to bind together the storage sites in the cortex that configure a whole memory (Allison, 1992). These binding sites have been discussed earlier in this chapter. Squire notes that, since the limbic system is the consolidator of information, it is critical for the establishment of long-term retention of information (Allison, 1992).

Friedman (1993) discusses the anatomy of the brain relative to drug activity. Friedman states that two-thirds of the human brain mass is the cerebral cortex which allows for more complex behavioral repertoires than creatures with simpler brains. Parts of the cortex allow us to understand words (Friedman, 1993). The two large limbic structures under the cortex, called the hippocampus and the amygdala, are critical for memory. Sensory information flows from the cortex to these brain regions, according to Friedman (1993).

Dr. Friedman states that one of the reasons abused drugs can exert such control over behavior is that the drugs act directly on the more primitive brain stem and limbic structures which can override the cortex in controlling a person's behavior. Dr. Friedman (1993) claims that all drugs change the way the brain works by altering the chemical neurotransmissions.

Nestler, a scientist with an NIDA project, describes his investigation into the limbic-dopamine system. The limbic-dopamine system involves the dopamine-producing neurons in the midbrain which project to frontal brain regions. Nestler relates that the limbic system plays a significant role in basic functions such as task completion and motivation. Task completion in a motivated, goal oriented fashion is key to adequate performance in reading comprehension (Keeger, 1995). Tying this together with the previously discussed brain functioning, the goal oriented activity cannot take place without the substenance found within the memory to implement tasks. Nestler's studies provide evidence that changes in the levels of specific brain proteins are responsible for some of the behavioral changes seen in drug addiction.

Although the NIDA's major focus is to understand the biochemistry and neuroscience of addiction, the studies also have implications for understanding how memory and learning work. George Uhl, chief of the molecular neurobiology research branch and acting scientific director of intramural research of NIDA, feels that the cellular basis of drug addiction is an appropriate system in which to study the underpinnings of memory and learning (Kreeger, 1995). He feels that drugs' specific pharmacological definitions which provide control over direct input to the brain will allow scientist to study the brain's activity relative to memory and the whole learning process (Kreeger, 1995).

All abused drugs change the way the brain works by effecting chemical

neurotransmission through interfering with the normal transmission of signals. However, different categories of drugs act on the brain through very different chemical reactions. Drugs with a chemical configuration liken to heroin, mimic the action of a natural neurotransmitter. LSD blocks receptors, preventing messages from getting through. Drugs with a chemical structure like cocaine, interfere with the process of neuron release. PCP interferes with the way messages proceed from the surface receptors into the cell interior (Friedman, 1993).

Friedman (1993) further cautions that opiate receptors are widely distributed through the brain especially in the hippocampus and cerebral cortex. The hippocampus also contains many THC receptors. Friedman (1993) explains that studies have shown that chronic administration of THC to rats actually permanently and extensively damaged the hippocampus. In laboratory studies it is still unclear how seriously this damage affects permanent cognitive functioning.

London, chief of NIDA's neuroimaging and drug action section, explains that abnormalities have been noted in the cortex, especially in the posterior areas including the visual association cortex of drug abusers (Kreeger, 1995). Drug abusers have elevated activity in the orbitofrontal region. Skills such as the recognition of words, speech and language, reasoning and judgment are all part of a complex interrelation of brain structures and function with most of these activities taking place in the cortex, specifically the frontal area. Disturbances in

any one area of cognitive functioning can defuse to other areas of functioning.

London credits the cortex-limbic circuit in playing an important role in brain memory and learning mechanisms with the hippocampus as the connecting point between the sensory information from the external world and the motivational inputs from the limbic system (Kreeger, 1995).

Lauerman (1992).presents the collaboration of interviews with six professional experts in the field of neurology. The article sites clinical studies in which damage to the hippocampus is associated with impairment in the acquisition and storage of memory. These studies show impairment in the ability to use or apply learned information in a flexible manner.

The article cautions about making casual statements about injuries to the brain. The article states that in brain assault, statements should be make about correlation of total brain functioning, not local functioning. The author further states that, although exactly what happens is unclear at this time, it is accepted that injury to any one of a number of brain centers can jeopardize efficiency in the learning process (Lauerman, 1992).

Lauerman (1992) confirms that previous research has implicated the hippocampus in several functions of memory, including the creation of new memories. Eichenbaum, professor of psychology at the University of North Carolina in Chapel Hill, clarifies in the article that the hippocampus is involved in declarative memory. Declarative memory is the ability to create a schema of the

way the world works. For example, being able to move smoothly through a school day, including the routine activities during a class period, requires use of declarative memory by a student.

The activity dictated by declarative memory requires a number of simultaneous cognitive functions to be prominent at various times and at various speeds. Declarative memory is a very visual process and plays a large role in reading activity.

Eichenbaum further discusses that the hippocampus is a "warehouse" of memories, keeping the "claim checks" for the information, pulling them out when needed. Without the hippocampus or with an impaired hippocampus, information left to memory cannot be called upon at appropriate times, such as during a learning experience (Lauerman, 1992)

Eichenbaum notes that research is discovering another dominant role of the hippocampus - inference drawing. Inference drawing requires comprehending the material at hand while applying previously learned concepts to deduct indirect or more general conclusions than what the material concretely presents. One aspect of inference drawing allows us to extract "inferred" meaning from what an author has written (Lauerman, 1992).

Auerbach, assistant professor in the departments of neurology and psychiatry at the Boston University School of Medicine, notes in the article that the frontal lobe is crucial to the mediation of attention (Lauerman, 1992).

Therefore, the earlier discussion of the effects of drugs within the frontal lobe will impact a person's ability to attend.

Auerbach further states that patients with frontal lobe injuries experience difficulty recalling information that they actually have mastered (Lauerman, 1992).

Methamphetamine and the Brain

Methamphetamine is a man-made psychostimulant, commonly smoked, injected intravenously or snorted, which has a high potential for abuse and dependence. The effects of this drug are increased activity, wakefulness and decreased appetite. The abuse of Methamphetamine can lead to paranoia, hallucinations, mood alterations and violence (Leshner, 1997).

Methamphetamine has proven to be a serious neurotoxic in animals ranging from mice to monkeys. The drug damages the neurons that produce the neurotransmitters dopamine and serotonin. The dose usually taken by methamphetamine human abusers are comparable to the doses that produce nuerotoxicity in the wide gamete of animals (Leshner, 1997).

Dr. Leshner (Mathias, 1998) states that research has shown Methamphetamine to be a powerfully addictive stimulant associated with serious health conditions which include brain damage. Previous research has shown that prolonged exposure to relatively low levels of methamphetamine can damage as

much as 50% of the dopamine-producing nerve cells in the brains of animals. Researchers are investigating whether similar damage occurs in the brains of humans (Leshner, 1998).

Marijuana and Brain Functioning

Mathias (1996), *NIDA Notes* staff writer, reports that students who smoke marijuana heavily may be limiting their ability to learn. According to this 1996 study, college students who used marijuana regularly had impaired skills relative to attention, memory and learning 24 hours after they had last used the drug. The findings correlate to earlier studies which reported that adults who were chronic heavy marijuana users showed residual impairment in cognitive abilities a day after they had last smoked marijuana (Mathias, 1996).

Leshner, states in this article (Mathias, 1996), that these findings impact students who are heavy marijuana smokers by indicating that the ability to learn is affected not just while they are high, but for at least a day after smoking. This affects the on-going learning process. For the over-whelming majority of the clients in the survey, smoking marijuana has been a daily practice from the early onset of their drug use. For many, it was their first drug experience. For most of the clients in the study, it was routinely a before, during or after school activity, even after the clients were involved with more diverse drug activity. Therefore, the daily process of learning was affected for these individuals.

Pope, of McLean Hospital in Belmont, Massachusetts, the director of the study presented in Mathias' s article (1996), states that regular heavy marijuana use compromises the ability to learn and remember information primarily by impairing the ability to focus, sustain and shift attention. Pope feels that the student who is affected by marijuana is not even able to lay the foundation to attempt the access of information due to the impairment in attention functioning.

Pope and Yurgelun-Todd, who assisted in the study, tested the cognitive functioning of sixty-five heavy cannabis users, who smoked marijuana at least 27 out of the previous 30 days. A comparison group of 64 "light" users, who smoked marijuana on no more than three of the previous 30 days was tested. All of these subjects had smoked marijuana for at least two years, but less than ten years (Mathias, 1996).

The test results indicated that heavy marijuana users had more difficulty than light users in sustaining and shifting attention. They had trouble registering, organizing and using information. In the formalized testing of the heavy users, these impairments fell in mild to moderate ranges (Mathias, 1996).

The researchers point out that, while the residual cognitive impairments in the study were not severe, the significance of the impairments in day-to-day functioning cannot be minimized (Mathias, 1996).

Khalsa of NIDA's Division of Clinical and Services Research, points out that, given these findings, the confounding effects of other drug use needs to be

considered. Khalsa further indicates that this study joins a growing body of studies that indicate "protracted cognitive impairment among heavy marijuana users" (Mathias, 1996, p.3).

Cocaine and Brain Functioning

Cocaine is a plant-derived psycho-stimulant which is smoked, injected intravenously or snorted (Leshner, 1997).

Neurological complications from cocaine use are well documented, as presented in Volkow and her colleague's article (1992). This article proposes that chronic cocaine use can cause clinically silent brain dysfunction.

Volkow associates intracerebral hemorrhages, or brain bleeds, central nervous system infarcts and strokes with the use of cocaine. Also associated with cocaine use are changes in the brain glucose metabolism. "Brain glucose metabolism is a sensitive indicator of brain function"(Volkow 1992, p.184).

The study reported in this article assesses brain metabolic changes in reportedly neurologically intact cocaine abusers. The subjects were independent of withdrawal symptoms. This study documents decreased brain glucose metabolism in the frontal cortex of cocaine users one to six weeks after their last cocaine use. "The decreased frontal metabolism persisted after three to four months of a drug-free detoxification period" (Volkow, 1992, p.187). The authors conclude that the cortical glucose metabolism remained low suggesting "that

these changes represent long-term actions of cocaine in the human brain," (Volkow, 1992, p.189)

The article confirms that cocaine dependence involves the "disruption of the dopamine system"(Volkow, 1992, p.188). In the cocaine user it is proposed that part of the addicting process involves decreased brain dopamine activity. The authors state that the findings of the study point to "a mechanism for aberrations in those aspects of cocaine addicts' behaviors mediated directly or indirectly by fronto-cortical cerebral function even in apparently neurologically intact cocaine abusers" (Volkow, 1992, p.189).

According to S. Stocker (1998), researchers have noted a type of blood flow distrubance associated with cocaine use that leads to difficulties concentrating, slowing of thought processes and memory deficits. Dr. Marc Kaufman reports studies in which the result of many cocaine exposures produce persistent blood flow reductions to large areas of the brain. These reductions are less substantial than those present in a stroke and may not kill nerve cells, but may cause thinking and memory deficits,(Stocker, 1998).

T. Strickland (1996) carried out research projects using SPECT imaging of the brain. These images confirmed the blood flow deficits in the brains of cocaine uses which persisted long after the individuals stopped abusing cocaine. In his studies, the abusers abstained from using cocaine for at least six months.

Dr. Stickland's studies also included the administration of

neuropsychological tests to the cocaine abusers. These test results showed many abnormalities that seemed to be associated with the reduced activity in the areas of the brain affected by the reduced blood flow. The deficits manifested were in attention, memory, concept formation and mental flexibility. During the testing periods, it was also noted that the cocaine abusers struggled with inhibiting inappropriate behaviors and responses.

Accepting Addiction as Brain Disease

Leshner(1997), Executive Director of the National Institute on Drug Abuse (NIDA), reports that the brain of the addicted person has been established as different from the brains of non-addicted individuals. Leshner emphasizes that the acceptance of drug addiction as a brain disease may be the key to bringing substance abuse under control. Leshner views the addict as someone whose brain has been altered at the basic foundation by substance abuse. He believes that by recognizing addiction as a chronic brain disorder, emphasis will be on medical treatment, rather than social policies. Leshner (1997) concludes that treatment should be in line with other brain diseases, including stroke, tumors and Alzheimer's disease. In both strokes and Alzheimer's disease, the general acceptance is that cognitive functioning is impaired. Persons who have had a stroke or strokes or those afflicted with Alzheimer's disease often display

disorders in the areas of word decoding and reading comprehension.

Dr. Leshner (1997) stresses that drugs manifest themselves by altering the activities that are a result of brain processes much the same as the strokes or Alzheimer disease impact on these brain processes. Reading and reading comprehension are brain processes; thus, they are vulnerable to this impact.

Leshner (1997) states that some of the addictive behaviors associated with compulsive drug seeking and using can exacerbate the brain's dysfunctioning. For example, if a young addict is driven to seek and use drugs, he or she will spend time away from the classroom. This will result in the lack of exposure to new reading concepts, as well as the absences from opportunities to strengthen reading proficiency through using and re-enforcing the skills.

Leshner (1997) feels that society ignores the neurological aspects of addiction and focuses on the view of drug addicts as socially diseased people. This perception further contributes to the deterioration of an addict's reading comprehension skills. The addict has reduced motivation for activities like reading which are perceived as part of the "establishment". The addict does not receive society's encouragement to achieve the goals of a non-addicted individual.

Literature presenting the scientific research of the '90's establishes the effects of various drugs on the brain. It remains inconclusive of precisely how an individual's functioning is effected by the impact of a particular drug on the brain. It is also not clearly defined if the effect on the brain and the resulting

dysfunctioning is permanent or of a short duration.

Methods Used in Research

Chapter 3.

Introduction

This dissertation utilized the analytical survey as the approach implemented to secure data. This chapter will discuss the dimensions of this analytical survey. Included will be a description and rationale of the population selected, as well as the instrument used and the methods implemented to analyze the data.

The study involved a population of 497 adolescents who were selected from inpatient clients of a residential adolescent drug rehabilitation facility. These clients were receiving drug and alcohol rehabilitation services. The facility serves the needs of a maximum of thirty clients at any given time who fall between the ages of 12 and 21 years and meet the DSM-IV criteria for substance abuse/dependency.

Discussion of Facility

The facility was judged an appropriate representation of drug rehabilitation programs in the United States by the facility's inclusion in the National Directory of Drug Abuse and Alcoholism Treatment and Prevention

Programs (1998), published by the United States Department of Health and Human Services. To be included in the directory, the facility must meet at least one of the following criteria: (1) have a facility license or other approval for substance abuse treatment from the state or a nationally recognized facility, (2) have staff accredited to provide substance abuse treatment by the state or a nationally recognized agency or (3) bill for treatment services using a substance abuse diagnosis.

The administration of the chosen facility allowed this researcher to enforce the controls which would allow the least amount of variables within the study, as well as to access the necessary personal information regarding each client.

Selection of a Population

This researcher used the Uniform Facility Data Set (UFDS):Data for1996 and 1980-1996, a publication of the Department of Health and Human Services Substance Abuse and Mental Health Services Administration, to address the selection of a population. This book claims to be the only national census of specialty substance abuse treatment facilities. The book describes characteristics of substance abuse treatment services in the United States based on information received on the Uniform Facility Data Set Survey. All of the responding facilities are identified in the National Directory of Drug Abuse and Alcoholism Treatment

and Prevention Programs.

Those client characteristics which are surveyed and the data presented in the Uniform Facility Data Set (UFDS): Data for 1996 and 1980 - 1996 and relative to this study are: enrolled census, gender and age. This study chose to not entertain other characteristics which are accounted for in the book. These characteristics are race, sources of funding, and institutional ownership. The book does not carry figures for 1994 nor does it offer any explanation for their absence.

In describing the national rehabilitation population for the years 1991 through 1996 (with the exception of '94, as previously noted), the report differentiates two age brackets relative to this dissertation's study - the 12 through 17-age bracket and the 18 though 20-year-old population. For each year, the 12 through 17-year-old population represented a higher percentage of the rehabilitation population than the 18 - 20 year old clients. (see TABLE A).

In looking at the breakdown regarding the gender of the clients, the information is not as refined. The report only differentiates males and females with no regard to age. (See TABLE B).

Since the report elects not to refine the statistics for sex into age categories, one could surmise that the percentage differentiation is fairly consistent across all the age brackets. The report does not offer any clarification regarding the generalization of gender.

As is evidenced in an analysis of the figures presented in TABLE C, the male domination in the selected facility closely resembled that found in the national census regarding gender population percentages for each of the years. The male domination for 1991 in rehabilitation was 72.5% with the chosen study population reflecting 70% males. The trend follows for the other years of the study with males accounting for 60 to 71% of the populations in both the national representation and the facility chosen for the study. The females correspond with the range of from 27.5% to 42% in both the national representation and the facility studied. (Again, the year 1994 was eliminated due to the lack of inclusion in the national statistics).

In 1992, national male dominance was 71% of the total rehabilitation populations, the study population showed 62% males. In 1993, the national male domination was 70.3% with the study registering 67%. In 1994, there were no national statistics, as previously reported. In 1995, the national male population in rehabilitation was 70.1%, the study population registered 61%; and in 1996 nationally the average was 68.1% male domination in rehabilitation with the study showing 61% domination of males.

Criteria of the Chosen Population

Each client who was admitted to the facility during the period covered in the

study was considered for inclusion. The clients needed to meet three initial criteria in order to be a candidate for inclusion in the study:

- enrolled in an approved public school in the states of Pennsylvania or New Jersey,
- fell between the ages of 12 and 18 and
- had yet completed state graduation requirements at the time of admission.

The clients were registered in one of 78 school districts in the states of Pennsylvania or New Jersey. If a client is enrolled in a private school, it is the policy of the facility that the parents or guardians disenroll the client from the private school and enroll him in the appropriate public school. This has been determined to be the most efficient means of maintaining school census for the client.

The ages of 12 through 18 were determined to encompass the adolescent developmental years, as well as the junior high school/high school grade levels.

A small group of clients enrolled in self-contained public school special education programs were included (See TABLE G).

Other than this small contained group of special education students, clients were required to have achieved grade placement of at least the 7th grade. The age and grade breakdowns are presented in TABLES D AND E.

Unfortunately, limited school records accompany each client to the facility. However, there was no indication via client interview, discussions with the treatment team or records that any client received remedial reading services beyond the early elementary years of his or her schooling.

As previously indicated, a small group of special education students were included in the study. These were the only clients who met the criteria for Learning Disorders in the DSM-IV as discussed in Chapter 1.

The criteria used for a special education client to be included in the study were that the client must be enrolled in a self-contained, ungraded special education public school placement. In addition, the specifications of the client's educational goals within his or her public school must include the attainment of a high school diploma. (The facility chosen for this study does not admit clients with a measured I.Q. of less than 80).

Clients who were initially tested but who left the program "against medical advice" (AMA) were eliminated from the study. This decision was made to serve as an indicator of the motivation of a client. If a client left without completing the program, he or she probably did not make a sincere effort towards treatment.

All clients included in the study met the DSM-IV criteria for substance dependency, as discussed earlier in this paper. All clients had a verifiable history of a minimum of heavy marijuana use with most clients dependent on more

sophisticated substances such as cocaine and heroine. Each client's substance use had been on-going for a minimum of one year. (More than 70% had a recorded drug history of two years or greater).

Even though there were a substantial number of clients re-admitted to the program, no client was assessed twice. However, if the client had successfully completed the program at the time of the first admission, his or her data was included.

Prior to the testing for this study, each of the clients had completed an admission physical performed by the facility's nurse practitioner to rule out any general physical impairments which may interfere with the rehabilitation process. This physical examination establishes adequate medical stability including physical stamina, absence of communicable diseases, absence of pregnancy, and adequate visual and auditory acuity. With the exception of drugs in the clients' systems, all clients in the study were found to be in generally good physical health.

A summation of the population is 497 male or female clients of a residential drug rehabilitation facility who are between the ages of 12 and 18, in generally good health, registered in an approved public school for grades 7 through 12, with a DSM-IV diagnosis of substance dependency.

Examination Procedures

This examiner evaluated each of the clients within 48 hours of admission. The examiner made it a point to interact with each client informally prior to the formal evaluation to establish a measure of rapport.

The testing time for each client was approximately one hour. No time limits were set for the examination nor did the examiner record time parameters. This was purposefully done to insure that the clients' performances were not influenced by time constraints. The evaluation of each client took place during the morning hours.

The examiner would begin by discussing her role at the facility and than ask the client to orally provide his or her educational history, brief drug history and any information relative to drug usage interfering with any aspect of his or her education. This would help assure the examiner that the client was capable of and willing to understand and follow verbal directions, as well as provide oral responses. It would also give some indication of whether the client could maintain self-control to complete the required tasks.

The client's education history was often intermeshed with his or her drug history. All clients indicated some knowledge of the relationship between drugs and the brain. School attendance was the only area that any client felt was affected in relation to school or education by his or her drug use.

Rationale for the Use of the Selected Test Instrument

Each client was administered the Comprehensive Form of the Kaufman Test of Educational Achievement. The Kaufman Test of Educational Achievement, or K-TEA, "is an individually administered measure of school achievement for children and adolescents in grades 1 through 12"(Kaufman & Kaufman, p.1). The K-TEA Comprehensive Form consists of five subtests - Reading Decoding, Reading Comprehension, Mathematics Applications, Mathematics Computation, and Spelling. The test uses entry and exit rules for each subtest so students only are exposed to stimuli of appropriate difficulty. The scoring of the test is completely objective: one for correct items, zero for incorrect items.

The K-TEA was chosen for a number of reasons:

- When the test made its debut in 1985, the literature addressing the validity, reliability and administration procedures was very complementary,
- The test suited the parameters of the rehabilitation program in length and required little environmental accommodations,
- The method of response for reading decoding and reading comprehension (oral vs. pencil/paper) was cognitively more simplistic. This simplicity allowed the examiner to rule out difficulties that students may have with the transference of answers to a paper.

- The administration procedures, which require item-by-item interaction between examiner and examinee, seem to encourage maximum attention and focus by the examinee.
- The test is untimed which would eliminate concern for the speed of processing component. The test would, hopefully, measure true ability without time restraints or pressures.

In selecting an instrument when this data collection began in 1991, this examiner acquired the manuals for several popular and promising tools. The content of the K-TEA manual was very impressive. In particular, the manual presents a comprehensive data presentation and analysis of technical information relative to reliability and validity.

The authors, Alan S. and Nadeen L. Kaufman, report an internal consistency in reliability by grade, grade groups and age. These reliability scores range from .88 to .97 for the reading decoding and reading comprehension sections (Kaufman & Kaufman, 1991). Considering the perfect validity score would be 1.00, the reported range is high (Anastasi & Urbani, 1997).

The test also boasts a small standard error of measurement (SEM). The SEM is also an expression of reliability. The SEM estimates the reasonable limits of the true score for persons with any given obtained score (Anastasi & Urbani1997). . The SEM by grade and age for reading comprehension ranged from 3.0 to 5.2 (Kaufman & Kaufman,1985).

The level of correlation with other accepted instruments is also included in the data report of the manual. Traditionally in test construction, correlation between a new test and other respected instruments is cited as evidence that a new instrument measures the same general areas as other tests in the same category. The level of correlation with the Wide Range Achievement Test (WRAT) for reading comprehension was .68. The level of correlation with the Peabody Individual Achievement Test (PIAT) reading subtest was .86. When the K-TEA was correlated with the Stanford Achievement Test (SAT), the Metropolitan Achievement Test (MAT) and the Comprehensive Test of Basic Skills(CTBS), the scores were .78, .70 and .76 respectively for reading comprehension. These scores are gauged using the score 1.0 as the perfect correlation. Again, the scores of the K-TEA are in the high range for correlation.

R. Gregory judges the K-TEA as well normed, terming it as a "model of excellence" (1996, p. 320) for examinees through high school. . The content validity of the K-TEA, according to R. Gregory (1996), appears to be very strong, but he cautions that this may vary among school systems. He also feels that the test authors offer "sufficient evidence for the test's validity to make a case for general adequacy", (Gregory, 1996, p.320).

The Comprehensive Form of the test was chosen to provide reliable scores in the specific domains of reading decoding and reading comprehension. Included in the applications listed in the Kaufman Test of Educational

Achievement: Comprehensive Form Manual (1985) is "Program Planning". The authors recommend the use of the Comprehensive Form for "Program Planning" to identify approximate instructional levels and other aspects of a student's achievement important to planning within a program.

The assessment of the appropriateness of the rehabilitation reading materials falls in line with the test authors' recommendations. The authors also recommend the Comprehensive Form for "research", deeming this tool "a reliable, valid measure of school achievement suitable for research studies" (Kaufman & Kaufman, p.11).

In 1997, the K-TEA normative data was updated with a new comprehensive form manual published. However, to maintain consistency, the new norms were not utilized for any of the clients in this study.

Based on reliability, validity, appropriateness and presenting form, the K-TEA was judged the most suitable test instrument for use in the study.

Description of the Test Instrument

As previously stated, the comprehensive form of this test includes decoding and reading comprehension evaluations. The format also includes spelling, mathematical calculations and mathematical application subtests. These

subtests were not deemed relative to the investigation and , therefore, are not included in this discussion. However, in the administration procedure, the examiner administered the decoding subtest first and then the reading comprehension subtest before proceeding with the other areas.

By nature of her Master's degree and certifications, this examiner meets the "Qualifications of Examiners" established by the K-TEA authors.

Each of the subtests has starting points based on the subjects grade level and age. The subtest items are grouped in units which are easily identified on the Individual Test Record which is used to record responses, tally and covert scores.

The stimuli for the reading decoding and the reading comprehension subtests are presented on the "Easel-Kit", the administration tool required for use as outlined in the test manual's procedures. The Easel-Kit allows the examiner to turn each easel page to expose new stimuli (Kaufman & Kaufman, 1985).

The Reading Decoding Subtest of the K-TEA was used to establish the client's basic level of word recognition. This subtest consists of sixty words which are presented with five words per page in 1/4" lettering. The subtest instructions give starting points based on grade levels. This examiner began with the first stimuli, identifying singular letters, regardless of the client's assigned grade level. Since many of the clients have difficulty with new situations, as well as with following directions, this examiner felt that beginning with a simple task building up to a complex task allowed for less difficulties due to factors such as

inability to follow directions.

The directions for administration and scoring for each item appears on the page facing the examiner. This allows for greater standardization within each presentation. The words which are utilized in the instrument were selected due to their frequency of appearance in texts within several different content areas, such as science and social studies. Words with regional pronunciations were avoided. Words were required to follow standard rules for syllabication and had to be consistent in syllable division and pronunciation within two standard dictionaries (Kaufman & Kaufman, 1997).

The Reading Comprehension Subtest consists of fifty items. The examiner is instructed to begin with item 11 for grades 7 through 9 and item 16 for grades 10 through 12. After the first two years of testing clients, this examiner felt it best to begin with item 1. She found that students enjoyed the confidence that scoring correctly on the first items gave them, even though the stimuli were very primary or simple in nature.

For each of the fifty items, the client is required to respond motorically or verbally to a written statement or passage. In responding motorically, the client is asked to do what the word(s) presented on the Easel-Kit tells him or her. The first presentation is "Stand." The examiner is to point to the word and say, "Do what this says," (Kaufman & Kaufman, 1985, Reading Comprehension Test, item 1). The expectations increase in complexity through the progression of reading

development.

The easiest and most difficult items in the reading comprehension subtest on the two ends of the performance spectrum, require the student to provide a gesture or oral response to a command appearing in a written sentence. Stimuli #50 requires the student to, "Spell the name of the physical features which should most likely interest a podiatrist," (Kaufman & Kaufman, Reading Comprehension Test, item 50).

The items requiring a client to respond to questions about a paragraph were developed to assess literal and inferential comprehension. The authors cite brevity, originality, interest value to children and adolescents and timelessness of the topic as the criteria for the passages which they chose (Kaufman & Kaufman, 1997). A client reads each statement or passage silently, then reads one or two questions about the paragraph. The client then responds orally to the question. The questions assess both literal and inferential comprehension (Kaufman & Kaufman, 1985). The passage referencing question #30-31 was the paragraph at which the greatest percentage of total clients achieved the ceiling score:

1) Most people know that vitamin C is found in citrus
2) fruits such as oranges, lemons, and grapefruit, and
3) that it is often taken to prevent colds. Few
4) people, however, are aware of where vitamin K is
5) found and what it does. As a matter of fact, most
6) people probably don't even know it exists. Also known
7) as menadione, vitamin K occurs naturally in egg yolks,
8) alfalfa and other great plants, and soybean oil.
9) It is essential for the production of prothrombin,

10) a substance that aids in blood clotting. Vitamin K
11) is also important to liver function.

What does prothrombin do?

In line 9, to what does "It" refer? (Kaufman & Kaufman, 1985 Reading Comprehension Test, item 30 - 31.)

The objectives of the reading comprehension inventory were to include the assessment of five categories of reading skills (Davis & Davis, 1962):

1. Locating answers which are explicitly or paraphrased in a passage,
2. Weaving together ideas within a passage to grasp the central meaning,
3. Making inferences about the content and purpose of a passage,
4. Recognizing the tone, mood and literary devices of a passage,
5. Following the structure within a passage.

In administering the subtests, this examiner presented each item using the verbal cues given on the Easel-Kit. She exercised great caution in not deviating from the protocol of the testing administration parameters.

None of the clients exited the evaluation session before completing the tasks. Many of the clients expressed an interest in their performance. None of the clients expressed negativity towards the assessment process or outcome.

The first step in the data analysis was the formulation of questions by this researcher which she hoped would be answered through the analysis of the data.

These questions covered the appropriateness of the previously examined texts used for rehabilitation purposes relative to clients' assessed reading levels and the contrast of the clients' assigned grade levels with their assessed reading levels. This researcher than examined the data to determine if these answers to the formulated questions were consistent for age, genders, as well throughout the period of time which the study covered.

Evaluation of Other Factors

While the evaluation tool on which this study focuses is a standardized instrument, there are factors which may influence the rehabilitation process and reading development. These factors are difficult to assess by using a quantitative instrument.

The facility in which this study was conducted realized that data regarding these factors contributes to a profile of the client. The nurse and counselors of the institution constructed an inventory in 1995 which would bring some definition to these aspects of a client's life.

The instrument, referred to within the facility as the Social History, is the format of an interview that each client completes with a member of the nursing staff. Each question is answered orally and the nursing staff is instructed to go to great lengths in obtaining clear information relative to the twenty-two pages of

questions.

The first section consists of basic personal information. The second section gives a nurse's screening of basic health data and a simple medical history, including current medications and family health problems. The instrument questions the client in order to provide a nutritional assessment.

The next section queries the client's employment and educational history. The inventory continues with questions regarding the client's family situation and living conditions. The interview format continues with religious development and sexual activity. The client than responds to questions regarding legal problems and previous rehabilitation experiences.

These categories outline the objective queries of the interview instrument which encompasses nine pages of specific questions.

From this point in the interview process, the client responds to more subjective inquiries relative to a self-assessment with a focus on behaviors and perceptions.

This researcher examined commercially available standardized screening instruments for social data. However, all those which included the factors encompassed in the social history, required parental, and often teacher inquiries to be completed. Given the limited availability of parents and lack of contact with any of the clients' previous teachers, these instruments were discounted as viable for the study.

Methods of Data Analysis

The initial method of data analysis was traditional statistical calculations. This allowed the researcher to carefully watch for variables which may taint the final analysis.

The objective of the analysis was to organize and to summarize the quantitative data in order to facilitate an understanding of patterns or trends.

The finite data analysis was via Microsoft's Access Relational Database (1997 edition). This is a database management system for Microsoft Windows which correlates statistical information within the Windows program.

The computer used to process this data was Gateway Solo 2100 Laptop Computer (1997) with a Vivitron 1776 monitor and an Epson Stylus Color 497 printer.

The information was keyed into Microsoft's Access system. The entries were checked, item by item, by the test administrator, via the printouts provided by the computer processing system to insure accuracy of data entry.

Thirty-four queries were formed to determine frequency distributions. The queries were:

- For each year:

  Total population,

  Average age,

Number of special education students,

Total male population for each grade,

Total female population for each grade,

Total male population for each age,

Total female population for each age,

Ages of male clients for each grade,

Ages of female clients for each grade,

Average reading decoding level for each female age group,

Average reading decoding level for each male age group,

Average reading decoding level for each female grade level,

Average reading decoding level for each male grade level,

Average reading comprehension level for each female age group,

Average reading comprehension level for each male age group,

Number of students who were retained in school for one year,

Number of students who were retained in school for two years,

- For all years collectively:

  Total population,

  Average age,

  Number of special education students,

  Total male population for each grade,

  Total female population for each grade,

Total male population for each age,

Total female population for each age

Ages of male clients for each grade,

Ages of female clients for each grade,

Average reading decoding level for each female age group,

Average reading decoding level for each male age group,

Average reading decoding level for each female grade level,

Average reading decoding level for each male grade level,

Average reading comprehension level for each female age group,

Average reading comprehension level for each male age group,

Number of students who were retained in school for one year,

Number of students who were retained in school for two years,

The scores were also grouped to show central tendency. The central tendency measures used are the mean, mode and median.

The measurements for the reading comprehension and decoding levels are reported in grade equivalents or grade norms. These are a very popular method of score reporting. However, Anastasi and Urbina (1997) report several shortcomings with using the grade norm method. The content of instruction varies from grade to grade which makes grade norms appropriate only for common subjects taught consistently on various levels. Grade levels are also subject to misinterpretation unless the manner in which they were derived is kept

firmly in mind according to Anastasi and Urbina (1997).

In assessing the information provided on the Social History interview form, this researcher collected data which could quantitatively be reported. The researcher focused on the following objective information:

- Personal information (parents, address and birthdate),
- Medical History (significant for surgery, serious illnesses, medications and family medical problems),
- Nutritional Assessment (weight relative to height, food intake),
- Employment History,
- Educational History,
- Family Situation and Living Conditions,
- Religious Development and Orientation,
- Sexual Development,
- Legal Problems,
- Previous Rehabilitation Experiences,

In summation of the study, the reading comprehension and decoding levels were collected on 497 adolescents using the Kaufman Test of Educational Achievement (K-TEA) over a period of six and one-half years by the same examiner at the same drug rehabilitation facility. Supplementary information was obtained by examining the Social History interview form which is completed on each client within 24 hours of admission since 1995.

Chapter 4.

Strengths and Limitations of the Study

This study was limited by several obstacles. As was discussed in Chapter 2, the definition of drug abuse and addiction as it relates to brain dysfunction is in its infancy. The lack of parallel or supportive research limits the analysis which can be applied to the data.

Another limitation which was previously noted is the lack of information on each of the clients within the survey. The lack of information relative to the clients' educational history hampers the analysis and comparison process. Minimal or no school records do not allow factors such as the lack of school attendance to be analyzed as a cause of poor performance. The absence of previous standardized testing does not provided a profile of the client's academic performance prior to drug and alcohol abuse.

Coupled with the limited educational records is the lack of comprehensive medical information. Only 25% of the clients admitted to the facility have reliable medical histories indicating regular medical examinations and screenings (Walsh, 1991, 1992, 1993, 1994, 1995, 1996) (Land, 1997).

The Social History was also a limiting factor. The instrument had its internal weaknesses in construction and in the nature of the historian (the client him or herself). The Social History's introduction, after four years of data had already been collect also is an negative aspect of the study.

A social worker or legal representative escorts many clients to the facility. Also, given the strict laws governing confidentiality in substance abuse rehabilitation, clinicians often feel it best to solicit information from a client in a setting in which client can feel free to speak, in the absence of a parental figure. This limits the amount of information which can be obtained the one source - the client.

The client's self-reporting via the information recorded on the Social History in the nurse's interview process is only fairly reliable. As was previously mentioned, this interview is completed within 24 hours of the client's admission. During this time, it is often difficult for a client to recall significant information. Many of the clients are still under some influence of an abused substance, others are fearful of divulging information, while others simply do not have access to such information as family medical problems.

The standardization of the testing methods used for the reading comprehension and reading decoding levels - consistent instrument, same physical testing environment, same examiner - is a strength within the study.

As was previously alluded to, the strength of the testing method only achieves the goal of this researcher to a limited degree. One of the purposes of this paper is to contrast the client's reading abilities with the materials he or she is expected to utilize in the drug/alcohol rehabilitation process. The assessment of reading skills on a one-to-one basis which allows a personal element added to

each stimuli is not necessarily an adequate judgment of the client's ability to handle material independently. The passages used in the assessment process are of short duration dealing with impersonal subject matter. In the short passage presented in the reading comprehension test, it is only necessary for the client to read and retain a small amount of information for a short period of time. In the utilization of any text, information retention is a building process. Therefore, while the assessment of reading decoding and comprehension skills of a client is a very fundamental step in determining the probability of success within the rehabilitation program, it is far from an assurance of success.

The chapters of a text such as Alcoholics Anonymous are of a very different format. They are long, information based chapters with a very personal flavor.

The thorough admission screening process in the chosen rehabilitation facility allowed for a fairly standardized population. The clients needed to meet specific criteria which was described in Chapter 3 in order to be included in the study. However, most of these criteria are specific to admission into the facility in general.

During the time of the study, no changes were made within the facility which would alter the nature of the population, regime which the clients followed or environment. This stability is a strength in the validity of the findings.

In summation, the obstacles which limited this study are:

- The early stages in the research determining the effects of drug abuse and addiction on brain functioning,
- The limited medical and educational information on individual clients within the study population,
- The use of a structured screening instrument (the Social History) for social information only commencing in 1995,
- The lack of standardization of abused substances by the clients,
- The artificial nature and limited application of the data received through the assessment process,
- The effects of socio-economic factors on the performance and functioning of clients.

The study's strengths can be summarized as:

- The contribution this study will make to the developing body of knowledge relative to drug abuse and addiction's role in brain functioning,
- The standardization of testing methods,
- The stability of the chosen rehabilitation facility, as well as the standardization and comprehensiveness of the admission criteria of the facility.

Objective of the Data Analysis

In formulating the questions relative to the data analysis, this researcher had several objectives:

- To provide statistical descriptions of the nature of an adolescent rehabilitation population which was judged to be representative of the national rehabilitation populations during the study's six and one-half year period,
- To identify trends within the population and over the six and one-half year period which deserve notation,
- To examine reading comprehension and decoding levels of the population obtained through a recognized testing procedure,
- To relate the reading comprehension and decoding levels to other factors identified in the study,
- To correlate the reading comprehension and decoding levels to materials popular in rehabilitation programs.

Population Examination

In Chapter 2 substantial attention was given to the description of the

selected population and rationale behind the selection process. In analyzing the final data, observations relative to the chosen population emerged.

The over-all mean ages of clients in the study for each of the years ranged from 15.3 years through 16.3 years of age. The female population mean age ranged from 15.0 to 16.4, with the male mean age ranging from 15.2 to 16.5 (see TABLE D). For the six and one-half year period of the study, the mean age of the total population is 15.7 years. There were no trends in the overall mean age noted over the period studied. The fluctuation in ages of 1.3 years for the males was marked by a decline over the six and one-half years. At the beginning of the study, 1991, the male mean age was 16.5 years of age with 15.3 years of age the male mean age in 1997. The female mean ages were more variable - rising and lowering year to year.

The assigned grade levels of the study population were examined (see TABLE E). The "assigned grade level" is defined as the grade level in which the client is registered within his or her school district. The examination of this yielded the most frequent grade level of rehabilitation clients over the six and one-half years of the study, being the 10^{th} grade (27%) with 9^{th} grade only slightly behind (26%). This held true for both the male and female populations. The other assigned grade levels were significantly less frequent - 7^{th} (5%), 8^{th} (9%), 11^{th} (20%) and 12^{th} (11%).

The domination of 9^{th} and 10^{th} grade occurred from 1994 through 1997.

In the first two years of the study, the dominant grade level was 11th grade (29%). During those two years, 9th grade only represented 19% of the population.

TABLE F presents the mean ages of the clients distributed over the grades 7th through 12th for the years included in the study. It appears that ages, as they correlated to assigned grade levels, were fairly consistent for a two age range for each grade level.

For the 7th grade population, the ages were either 13 or 14 years with the first three years of the study averaging 13 years of age. The next two years averaged 14 years of age and the last year returned to an average age of 13 years. Therefore, the assigned 7th grade population only spanned two ages.

The 8th grade population was more variable, ranging from 13 through 15 years of age. There were 3 nonconsecutive years with an average of 13.5 years of age for 8th grade, one year of each 13, 14 , 14.5 and 15 years of age. The 8th grade population, therefore, spanned three ages.

For 9th grade, the average age was more stable at either 15 or 15.5 years of age. This was the narrowest age span - one year.

The average age of the 10th grade populations varied from 15.5 through 17 years of age, or a span of 3 ages. Four of the study years registered clients at 16 years of age in the 10th grade, with two years at 16.5 years of age and one year registering 17 years of age.

For 11th grade, there were 3 years of 16.5 and 17 years of age, but the

years did not run in succession. Therefore, 11th grade had a span of two years.

The 12th grade population followed a similar two year pattern - 17 years of age and 18 years of age each were the average ages for 3 non-consecutive years.

The data shows a rather narrow margin in age/grade level spans - one to three years in age within each grade level.

The median age for each grade level closely corresponded to the mean age for each level. For 7th grade it was 13 years of age; for 8th grade, 14 years of age; for 9th grade, 15 years; for 10th, 16 years; 11th 17 years and for 12th grade it was 18 years of age (See TABLE G).

As the figures indicate, there were only age spans of 1 or 2 years within each grade level and there was no significant change in any age/grade correlation over the six and one-half year period covered in the study.

This researcher attempted to compare this data with data collected on a larger, more universal population. Unfortunately, no data was available. Information received from Richard Hruska of the Data Collection Department in the Department of Education, Commonwealth of Pennsylvania, related no documentation known to his department which would provide the statistics for comparison purposes.

As previously indicated, the educational records for clients involved in the rehabilitation program are very scant, incomplete or unavailable.

In examining the population selected for this study, data has been obtained regarding:

- The mean ages over each of the six and one-half years for the entire, female and male populations;
- Assigned grade level frequency and distribution;
- Contrasts between assigned grade levels and mean ages, as wel as between assigned grade levels and median ages;
- Retention histories for 72% of the clients;
- Contrast of gender distributions with a national survey.

Reading Comprehension and Decoding Data

TABLE H reflects the mean grade levels of reading decoding for each assigned grade level collected during each year of the study. The range of mean reading decoding levels for clients assigned to 7th grade over the six and one-half years of the study was 5th grade through 8th grade levels. For clients assigned to 8th grade, it was 6th through 9th grades. Each of these assigned grade level represent a span of four grades. The span begins at a level two grades below the assigned level and ends at only a year above the assigned level.

The range for clients assigned to the 9th grade was 7th through 10th grades

and for clients assigned to 10th grade, the range was 7th through 9th grades . For clients assigned to 11th grade the range was 9th through 11th grade. These three assigned levels, 9th, 10th and 11th each demonstrated a three year span. The spans were shifted more dramatically than the 7th and 8th grade.

For clients assigned to 12th grade the reading decoding levels ranged from 8th through 11th grade levels. This was a span of four grade levels.

These ranges reflect at least a 3 year span of reading decoding levels for each assigned grade level. No particular year saw more mean decoding levels on the assigned grade level more than another year. For example, 1991, 1993 through 1995, and 1997 saw only one mean decoding score correspond to the assigned grade level. The years 1992 and 1996 saw two mean decoding scores correspond to the assigned grade level.

TABLE I reflects the mean level of reading comprehension for each grade level over the six and one-half years of the study. Clients assigned to the 7th grade had reading comprehension grade levels which ranged from 5th through 9th grade levels for the study period, a span of 5 grade levels.

For clients assigned to the 8th grade, the reading comprehension grade level range was 6th through 8th grade. For clients assigned to the 9th grade, the reading comprehension grade levels ranges were 7th grade through 9th. These were both spans of three grade levels.

For clients assigned to the 10th grade the ranges were 8th through 9th

reading comprehension levels. The range of reading comprehension levels for clients assigned to the 11th grade were 9th through 10th grade levels. These were both spans of two years.

The mean reading comprehension grade level ranges for 12th grade were 9th through 11th, again a span of three years.

Noted is the decrease in range in mean reading comprehension for clients assigned to higher grade levels. This decrease was not noted in reading decoding. For 7th grade, the mean reading comprehension levels occasionally reached two years above the assigned grade level. For the assigned grades of 10th, 11th and 12th grades, no year even achieved the mean reading comprehension level at the assigned grade level.

TABLE J presents the ranges of decoding grade levels for each year by assigned grade levels. The low end of the ranges are variably low, running the gamete from 1st through 9th grade. The high ranges cover 6th through post high school.

TABLE K presents the ranges of reading comprehension grade levels for each year by assigned grade levels. The scope for the all the assigned grade populations is large, covering 1st through 11th grade level for those assigned to 7th grade, 1st through 10th grade level for those assigned to 8th grade, 2nd through 11th for those assigned to 9th grade, 2nd through 11th for those assigned to 10th grade, 2nd through post high school for those assigned to 11th grade and 3rd

through post high school for those assigned to 12th grade.

The mean reading decoding scores reported for each individual grade level over the six and one-half years of the study are presented in TABLE L through TABLE Q. The Tables differentiate between the male and female populations.

The mean reading comprehension scores reported in grade levels for each grade level over the six and one-half years of the study are presented in TABLE R through TABLE W These tables also differentiate between the male and female populations.

The data from the study with regard to reading produced the following:

- Mean reading decoding levels for each assigned grade level, gender, and age for each of the years of the study,
- Mean reading comprehension levels for each assigned grade level, gender and age for each of the years of the study,
- Ranges of reading decoding levels for each assigned grade level, gender, and age for each of the years of the study,
- Ranges of reading comprehension levels for each assigned grade level, gender, and age for each of the years of the study.

Reliability of the Study

Reliability is traditionally determined by re-examining the entire

population or a segment of the population with the same test on different occasions or with different sets of equivalent items or under variable examining conditions (Anastasi & Urbina, 1997).

Due to the structure of the rehabilitation program within the chosen facility, the clients' time for surveying is limited. In addition, this examiner tested the clients upon admission to the rehabilitation facility which meant the clients had recently engaged in drug usage. Testing at a later time in rehabilitation may have different results due to the time span since his or her last drug usage. Therefore, no reliability procedures were able to be conducted within the population.

However, this clinician feels that the study as a whole is reliable. Control was exercised in testing procedures, facility and selection of population. State of the art computer calculation processing was used to limit human error. In analyzing the data, no gross variations in testing scores were determined so as to indicate any possible data contamination.

The examination of the data over the six and one-half years of the study showed no extreme variations which would indicate a degree of inconsistency within the testing.

Summary, Discussion and Recommendations

Chapter 5.

Summary

The study presented in this paper provides data obtained over a six and one-half year period (1991 through 1997). The data was obtained by administering the Kaufman Test of Education Abilities (K-TEA) to a population of 497 adolescents, males and females, receiving drug and alcohol rehabilitation services at a nationally recognized institution. Clients were carefully selected based on age, school registration and were only included in the study if rehabilitation treatment was completed. This last criterion served as an indicator of their motivation which would contribute to the affirming the validity of their responses on the test.

The original intention of testing the population over six and one-half years ago was not to present data in the form in which it appears in this paper. The original intent of administering the test to the clients was not research based, but was to reduce potential frustration in the rehabilitation process by altering reading materials and/or presentation to make them compatible with the client's individual reading level.

In 1991, when the data collection began with the opening of the rehabilitation center, only hypotheses and general information was reaching the rehabilitation sector regarding the brain/addiction relationship.

As expected, this researcher found only a sparse amount of literature directly related to this study. As is evidenced by the research that is identified in this paper, the concrete information relative to the brain functioning/drug addiction relationship has only been emerging over the last 5 to 10 years.

The literature that is available has established a strong basis for drug use affecting brain structure and functioning, especially in functioning relative to the processes critical to reading development. Some of the brain functions which are noted in research as being affected by drug use are attention, concentration, focus and memory. The studies are refining much of the specifics and duration of the effects on the particular parts of the brain structures by specified drug compounds.

Much discussion in the literature presented, which was centered around specific drugs' impact on the brain, dealt with the question of the length of time of impairment or if the impairment was permanent. Many of the subjects in this study indicated that they used drugs before, during and/or after school. Thus, drug use was directly occurring at peak learning periods. Therefore, even if the impact was short lived, the impairment was present during periods of active learning processing.

The population in the study was examined to determine the parallel of age and gender to nationally registered populations during the same time periods. The stronger the parallels, the more valuable the information may be to contributing to generalizations by other researchers

The data also allowed for determination of patterns within the population which might have occurred over the six and one-half year period. These include differentials between the male and female populations, as well as between the various ages in the study. The data also provided information relative to the clients' "assigned grade levels". The assigned grade level is the grade which the school district, where the client is registered to attend school when not in rehabilitation, feels that the client could meet with success.

The testing instrument was scrutinized as to the appropriateness for the population, reliability and validity. Every effort was made to standardize the entire formal testing process of each client. The instrument was re-evaluated by the authors in 1997 and 1998 with the authors making only very few changes in the norming to the scoring procedure and no changes to the design, purpose or test items of the instrument. Therefore, this researcher felt very confident in her choice of the K-TEA.

Data was analyzed using state-of-the-art computer programs and computer equipment.

The limitations of the study included the lack of supportive studies. This limits the conclusions and generalizations which can be made and also made it difficult for the researcher to plot a direction for the study. The insufficient medical and educational records of the clients also made it difficulty to establish academic levels prior to the client's drug history or to build a strong case for the

influence of other factors on the reading process. The lack of consistency of the abused substances, since the substances which the clients use are obtained through uncredible sources, as well as the mixture of drugs which most clients in rehabilitation have ingested, make it difficult to ascribe deficits to particular types of drug abuse.

The artificial nature of the reading decoding and comprehension assessment does not necessarily represent the ability of the client to apply basic skills to a learning situation. The effects of such factors, as socio-economics, on the client's academic functioning also is difficult to firmly establish since many clients have disassociated or have poor relationships with their families making information and details sketchy.

One of the strengths of the study is, hopefully, the contribution it will make to the body of knowledge accumulating on substance abuse and the brain. Additional strengths are the standardization of the testing methods and the stability within the facility from which the population was drawn.

Discussion

> "To provide statistical descriptions of the nature of an adolescent rehabilitation population which was judged to be representative of the national rehabilitation populations during the study's six

and one-half year period..."

"To identify trends within the population and over the six and one-half year period which deserve notation..."

These are the first two objectives of the data analysis, stated in chapter 4 of this paper. In examining the statistics presented in TABLE A., the percentages of total national rehabilitation populations in the 12 to 20 year old age bracket lends little information to the credibility of this study. However, it does validate the existence of rehabilitation services for that age group during the period of the study. The singular digits may minimize the problem since at no time during the 1991 to 1995 period did the 12 to 20 year old clients represent more than 11.2% of the clients in rehabilitation.

The Uniform Facility Data Set(UFDS): Data for 1996 and 1980 -1996 which provided the information for TABLE A, reported all statistics relative to populations in percentages with a numerical basis The data in TABLES B, and C contrast the mix of gender within the national adolescent rehabilitation population and the facility in the study. In each year, the male population dominated the female population within both the studied facility and nationally. The percentage representation was very close. In 1991, 1992, 1993, and 1995 there were approximately 40% more males than females in both populations. As was

previously noted, in 1994 there were no national statistics available. In 1996 the gender split was closer in both the national and the study facility to a meager 20% male domination in the study facility with a more substantial 36% male domination nationally. While the proportion of males to females was within a 10% range when comparing the national population with that in the selected facility, the domination of the male population over the female population followed the same increase/decrease pattern in both the national and selected facility population. Therefore, this researcher felt confident that the population in the study reflected the gender mixes in rehabilitation facilities nationally at the time of the study.

Presuming that the average person enters the 1st grade at or near the age of six years old, the following ages coincide with the assigned grade levels which were utilized in the study:

- 7th grade, 12 to 13 years of age
- 8th grade, 13 to 14 years of age
- 9th grade, 14 to 15 years of age
- 10th grade, 15 to 16 years of age
- 11th grade, 16 to 17 years of age
- 12th grade, 17 to 18 years of age

The mean assigned grade level for 13 year old clients in the study was 7th

grade for males and females with the exception of the last two years of the study for females. In those years, 1996 and 1997, the assigned mean grade levels for females was the 8th grade (See TABLE X).

For the 14 year old population, the assigned grade levels were more variable. For the 14 year old male population, the assigned grade level was 8th grade for four years - 1991, 1993, 1995 and 1996. In 1992, the assigned mean grade level for the 14 year old male population was 9th grade and assigned grade level 7th for the year 1994 (See TABLE X).

For the 14 year old female population, the mean assigned grade level was 8th grade in the years 1992, 1993, 1994, and 1995. In 1991 and 1996, the assigned mean grade level for 14 year old girls was 9th grade. The 7th grade was the mean for the 14 year old female population for only 1997 (See TABLE X).

The 15 year old population's mean assigned grade level was 8th or 9th grade. The male population's mean assigned grade level was 8th grade for the years 1993 and 1996 with the remaining five years at 9th grade level. The female population's assigned mean grade level was 8th grade for only one year, 1994, with the other five years at the 9th grade level (See TABLE X).

The 16 year old population's mean assigned grade level was 9th or 10th grades. The 16 year old male population was 9th grade for three consecutive years, 1994 through 1996. The other four years were the 10th grade level. The 16 year old female population's mean grade level was 10th grade for only two

years - 1991 and 1992 with the remaining years at 9th grade level (See TABLE X).

The 17year old population's mean assigned grade level was predominately the 11th grade with the following mean assigned 10th grade level exceptions - males in the years 1993 and 1994 and females in the year 1993(See TABLE X).

The 18 year old population's assigned grade levels were 10th, 11th and 12th for the males. In 1992 the 18 year old males mean assigned grade level was 12th grade. In 1993 and 1996 it was 10th with the remaining four years averaging the 11th grade level. For the female population, the mean assigned level was 12th in 1992 and 11th in 1993 (See TABLE X).

In examining the correlation with previously mentioned norms regarding ages and grade levels, the 13 year old clients were appropriately assigned to the 7th or 8th grades. The 14 year old clients were only slightly ascued attributed to the two years reflecting the 7th grade as the mean assigned grade level. The 15 year olds were removed from the norm more significantly in that no year reflected the norm of 10th grade level and 1993, 1994 and 1996 were at the 8th grade mean as the assigned grade level. The 16th year old population was also off course with over half of the assigned grade levels being the 9th grade (See TABLE X), reflecting one to two years behind the norm of 10th or 11th grade for 16 year olds.

The 17 year old population's mean assigned grade level was 11th grade which met the standard of the norm for all but three groups. The deviation from

the 11th grade standard occurred with the male 17 year old clients in 1993 and 1994 along with the female 17 year old clients in 1993 averaged the 10th assigned grade levels (See TABLE X). The 18 year old population was assigned to the normed 11th and 12th grade for each year except for the males in 1993 and 1996 whose mean assigned grade level was 10th grade (See TABLE X).

Examining the population by grade level (TABLE E),found the most clients with the assigned 10th grade level than those in any other assigned level in the study. While the greatest number of clients presented in 10th grade for the entire period, for only two years, 1994 and 1997, was the greatest population assigned to 10th grade for any specific years. The 9th grade had the largest representation for three years - 1993, 1995 and 1996. Clients assigned to the 11th grade had the largest representation in the years 1991 and 1992, sharing the honors with 9th grade for 1993.

However, the students assigned to 10th grade were the only double digit census for each of the years of the study. In scanning the six and one-half years, no trend in fluctuation between the grades was noted.

In examining the population by age (TABLES Y and Z), the largest census fell between the ages of 15 and 17 years with the median age being 15.5 years. Age 15 was the dominant age in 1994 (30.2%),1996(28.1%) and 1997(30%). Age 16 dominated 1993 (31%), 1995 (33.3%) and shared the honor in 1996 (28.1%) and 1997(30%). Age 17 dominated 1991(32.6%) and 1992(32.6%). Each of the

ages 15, 16, 17 registered well over 100 clients in the study. Age 15 represented 121 clients, age 16 represented 139 clients and age 17 had 139 clients. These three ages represent 78% of the total population over the six and one-half years with each representing between 13% to 33.3% of the population at a given time.

In examining the domination of a particular age for a certain year, it is interesting to note how the percentage hovered around the 28% to 33%. Therefore, each year almost one-third of the population fell at a specific age.

The median age of the population ranged from 15.2 to 16.4 years over the years of the study. The male and female populations showed no significant difference in mean ages. The male population's mean age was 16 for the first four years of the study (1991 - 1994) with 15 years being the mean age for males during the other years. In the female population, 16 years was the mean age in 1992 and 1994 with 15 years of age the mean for the other five years. No trend was noted over the years of the study in the mean ages other than the shift of one year in the male population.

While 12 year olds were a rarity in the population, none were admitted prior to 1994. There was also a very sharp decline in the 17 to 18 year old bracket over the years of the study. Excluding the 12 year old population, the 18 year old was the smallest population for five years with representation of less than 5%.

The small representation of 18 year olds appears due to a number of factors. The age of 18 is often one of transition. Many persons in this age bracket

are beginning new endeavors which may allow them to conceal or control their abuse of substances. The major cause appears to lie in the nature of fiscal responsibility. The dominant parties responsible for the charges for rehabilitation for clients under 18 years old - parents' private health insurance and government funding - cease to have this responsibility for most persons after they reach 18 years of age. Since a portion of the population is "court committed", the courts are reluctant to remand a client to rehabilitation as he or she approaches his or her 18th birthday and adult status.

Seventeen clients in the study were designated as primarily special education students by the school district in which they reside when not in rehabilitation (TABLE AA). The largest group, seven students, were part of the 1996 population. Only one year had no special education representation, 1993. Of the 17 students, 5 of them were in assigned grade levels and included in the study within that population. The other 12 students were ungraded in their respective districts. For data collection, these clients were included in their assigned grade levels, if given, and in their respective age categories.

In combining age with assigned grade level, there was general stability over the six and one-half years (TABLE F). The most noted variation occurred in the 10th grade, the largest grade level population represented. The age range for 10th grade was 15.5 to 17 years of age. (The mean age of 17 years occurred once for 10th grade - in 1993).

In evaluating the over-all mean ages of the population during the entire study (TABLE G), the increments follow a natural pattern, an increase of one chronological year for each grade level, starting with 13 years of age for 7th grade through 18 years of age for grade 12. This pattern did not hold true for any individual year within the study which saw much more variation in the progression of mean ages in contrast to assigned grade levels.

This analysis of age/assigned grade level follows the natural progress of a student entering first grade at six years of age who would be 15 years of age entering the 10th grade. Apparently, retention of clients who are placed in rehabilitation for drug and alcohol abuse is not prevalent in this population to any degree which would affect the statistics.

Retention information was obtained from a reliable source for 72% of the clients. One year retention was in the history of 60% of the clients for whom reliable educational information was obtainable. Of the 60% who were retained, 30% of them were retained for two years. No clients were retained for more than two years.

Of the 60% retained, 55% were retained in the first grade. When two year retention occurred, in each case one or both of the years were from 7th through 11th grade.

In summation, the characteristics of the population with regard to gender,

age and grade level showed little deviation over the six and one-half years. There were no significant trends noted over the time period with regard to age, age/assigned grade correlation, or mean ages for grade levels. The mean client appears to be a 15.5 year old male in the 10th grade. While the data presented regarding the age, assigned grade level statistics shows no gross variations, the variations are prevalent in every contrast. At the least, this demonstrates the instability within the populations.

The gross lack of significant retentions and special education placements given the DSM-IV diagnosis that these clients carry, should also not go without notice.

> "To examine reading comprehension and decoding levels of the population obtained through a recognized testing procedure..."

This was the third outlined objective of data analysis which was stated in chapter 4 of this paper.

Reading decoding requires several integrated cognitive skills. To effectively decode words, a client must use both phonetic and structural analysis.

In the phonetic analysis process a client must recognize single consonants, consonant clusters, digraphs, short vowels, long vowels and diphthongs.

Structural analysis involves recognizing compound elements, prefixes, suffixes along with open and closed syllables (Kaufman & Kaufman, 1997).

In the study, there are some characteristics which are notable. For the population assigned to 7th grade, there was a positive increase in the range of decoding scores over the years (See TABLE J). The first year saw a range of scores from 1st - 8th grade levels. This is a range of approximately six grade levels below and one grade level above the assigned grade level of the 7th grade client. The second year of the study saw the range shift to 3rd to 6th grade levels. This improved the low end of the range, but lowered the high end of the range by over a grade level. The third year, 1993, saw the high and low end of the range improve to 4th through 7th grades. The 1994 results were significantly decreased (over 2 grade levels) for the low end of the range with the high end remaining stable at 7th grade level. In 1995, the results again made a positive shift to the range of 3rd through 9th grade level. Significant positive shifts occurred in the last two years with 1996 results of 6th through 8th grade level range and 1997 results being the 8th through 10th grade level range.

This predominately positive shift proved a significant change in the width of the range from the year 1991 of an almost seven year span to a range of approximately two years in the last two years of the study. For all but two years of the study, the assigned 7th grade population had scores which exceeded the 7th grade level.

The mean decoding scores for males and females assigned to the 7th grade exceeded the assigned grade level for one year 1997, achieving a mean level of 8th grade (see TABLE L).

The mean decoding scores for males assigned to the 7th grade was on grade level for two years - 1991 and 1996 (See TABLE L). However, the other years saw mean decoding scores for these males behind by one to two grade levels.

The mean decoding scores for females assigned to 7th grade was 1 to 3 years behind the 7th grade level for all the years except 1997 (See TABLE L).

In decoding scores, those clients assigned to the 8th grade showed a similar, but not as dramatic pattern (See TABLE J). The ranges fluctuated year to year and were wider than those for clients assigned to the 7th grade. The ranges of the scores were from a few months in 1991 to a gap of six years for 1992 and 1996 and a range of 9 years for assigned 8th graders in 1994. On a positive note, there were scores which exceeded the 8th grade assigned level for all years except the first, 1991. The other years saw the high end of the range being between 9th and 11th grade levels.

The mean decoding scores for males assigned to the 8th grade dropped over the six and one-half year period (See TABLE M). Males assigned to 8th grade scored in 1991 slightly below grade level, jumped to grade level in 1992, only to steadily decrease over the next four years to the low 6th grade decoding

level in 1996.

Females assigned to the 8th grade were more variable - 6th grade the first year, 5th grade the next, 8th grade for the two next years and finishing in 1995 and 1997 on the 7th grade mean decoding level (See TABLE M).

Students with the assigned 9th grade level, were very scattered in the scores they achieved (See TABLE J). While each year had scores which surpassed the 9th grade level with some as high as 12th grade decoding level, very suppressed scores registered throughout the study. The years 1994 and 1996 saw decoding scores as low as 2nd grade; 1992, 3rd grade; and 1991, 4th grade. The width of the ranges of decoding scores for clients assigned to the 9th grade was more significant than other assigned grade levels. Each years saw a gap of at least three years (1997) with 1992,1994,and 1996 having nine years in the gap of decoding scores(See TABLE J).

The mean scores for males assigned to the 9th grade were at the mid to high 7th grade level with two years (1991 and 1994) registering at the 8th grade level (See TABLE N). There were no years in which the mean score for males achieved the 9th grade decoding level.

The female students who were assigned to 9th grade faired better in mean scores, although 5 years registered below the 9th grade (See TABLE N). The female population assigned to 9th grade had one year, 1991, which registered on the 6th grade level with four years (1992, 1995,1996 and 1997) having means

scores on the 8th grade level. Two years, 1993 and 1994, registered at or above grade level mean decoding scores for the female population assigned to the 9th grade.

In looking at the decoding scores for clients assigned to 10th grade, the same scattered ranges occur as did in the 9th grade level (see TABLE J). The low end of the ranges for each of the years is as low as 2nd grade with the high end of the range on the 12th grade level for each year but 1996 which only had scores reaching the 11th grade level. The range in scores for each year was significant: 6th through 12th for 1991; 3rd through 12th for 1992 and 1994; 5th through 12th for 1993; 2nd through 12th for 1995; 3rd through 11th for 1996 and the smallest range in 1997- 7th through 11th grades.

Mean decoding scores for males (See TABLE O) were all one year below grade level - 1991 was 9th grade level; 1992 was 8th grade; no clients for 1993; 1994 and 1995 were 9th grade level; 1996 was 7th grade level and 1997 was 8th grade level. . Mean decoding scores for females (See TABLE O) showed two years achieving grade level (1994 and 1995); two years slightly below grade level (1993 and 1997 at 9th grade level) and 3 years significantly below grade level (1991 at 6th grade level, 1992 at 7th grade level and 1996 at 8th grade level).

Clients assigned to the 10th grade in the study population also showed the most dramatic gaps between the 10th grade and the assessed decoding grade level when contrasting the six and one-half years of the study. For each year there was

a gap of one to three years for the mean score below the 10th grade level. This was in contrast to the other grade levels within the study which showed the mean at or above the level in question for at least one of the years. It is important to reiterate that the 10th grade comprises the largest population within the study.

The range for decoding scores for students assigned to the 11th grade (See TABLE J) spanned the 6th to 12th grade decoding levels with one year in exception. In 1994, students assigned to the 11th grade ranged in decoding levels from 3rd through 12th. The year 1996 showed the smallest range - 9th grade level through 11th grade level.

The decoding mean scores for students assigned to 11th grade (See TABLE P) spanned only three grade levels - 9th, 10th and 11th. For three years (1991, 1994 and 1996) the average decoding score was 9th grade. The decoding mean scores for 1995 and 1997 were on the 10th grade level and in 1992 and 1993 the mean scores were 11th grade level.

In the male population, the mean grade level for decoding (See TABLE P) was 11th grade level for only one year, 1992. In 1991, 1996 and 1997, the mean decoding level for males was 9th grade. In 1994, the lowest mean decoding level was achieved for males - the 8th grade level.

For the female population assigned to the 11th grade (See TABLE P), four years (1991, 1992, 1993 and 1997) registered mean decoding scores of 11th grade. The years 1994, 1995 and 1996 each registered a mean decoding score of 9th

grade for the female population.

For clients assigned to the 12th grade, the decoding scores ranged from the 3rd grade level through the post high school level of decoding. All the years but one, 1991, saw mean decoding scores in the post high school range. Each year saw the mean decoding scores at least one year behind grade level. The years 1992, 1993 and 1996 had the highest mean decoding scores of 11th grade level and 1991 saw the lowest at 8th grade.

The male population achieved a mean decoding score of 11th grade for four years (See TABLE Q) - 1991, 1993, 1996, and 1997. The female population did not achieve the 11th grade mean decoding score for any year.

The results for the female population were significant. For 3 years, 1992, 1993, and 1996, the females achieved their highest decoding level for females assigned to the 11th grade - 10th grade. For 2 of the years, 1991 and 1994, the females achieved the mean decoding level of 9th grade. And for 1995, the females assigned to 12th grade only achieved a mean decoding score of the 8th grade level.

In looking at decoding levels, it appears that 1994 was the year that saw the largest ranges for all assigned grade levels. For that year, 7th grade had a five year gap and the other grade levels had nine year gaps.

The female population showed most often scoring on grade level as the mean decoding level. However, the female population also had the widest range of scores.

The clients assigned to grades 9th and 10th showed the largest ranges of scores over-all. The 9th grade population averaged ranges that spanned six grade levels with the 10th grade population averaging a span of eight grade levels. The 7th, 8th , 11th and 12th grades each averaged a span of four years over the six and one-half years of the study.

The variability of the scores, coupled with the departure from the assigned grade level for assessed decoding skills, should trouble educators and counselors. While clients are receiving rehabilitation to eliminate drugs and alcohol from their lives, it must be emphasized that the basic core of functioning - being able to decipher words - is not a highly functional skill in the rehabilitation population as represented in this study.

Simple reading decoding skills are far more necessary on a day-to-day basis than most other skills, including reading comprehension. The ability to "read" simple directional works is still very necessary even though our society has gone to great length to become a pictorial society.

Reading comprehension buildings on reading decoding but does not exclusively depend on decoding. A client may be able to comprehend a passage without being able to decode every word within the passage by utilizing context meaning. However, it is still important to note that reading comprehension requires a greater integration of skills than decoding.

As the reading process develops, a student becomes more proficient with

decoding and moves to greater association of words and meanings. The student than develops a progressive knowledge of the grammatical structure of written language while organizing the text in units.

This culminates in the reader translating the printed text into meaning by forming networks of relationships between ideas within a passage while drawing on previously acquired knowledge and skills. The reader than is able to take the interpreted text and construct inferences from what he or she has read. The quality and nature of these inferences depends on the amount and nature of the knowledge that the reader brings to the reading situation (Kaufman & Kaufman, 1997).

At the highest level of reading comprehension the reader is able to refine his or her comprehension of text by the examination of multiple viewpoints presented by a writer while attending to the propositions most important to his or her purpose in reading (Chall, 1983).

Literal comprehension requires the recognition or recall of ideas or information that are clearly stated in the text. Inferential comprehension has the reader generating new concepts from those stated in the text. Relating several concepts presented in the text and combining presented ideas with previously acquired knowledge draws inferences. This also requires the reader to evaluate the viewpoint of the writer, formulating a personal interpretation of the information presented. (Kaufman & Kaufman, 1997).

Lunzer, Waite, and Dolan (1979) state that comprehension means understanding on two levels. At the lower level, the reader is satisfied that the passage makes sense. To achieve this, the reader must know the meaning of most of the words and hang them together grammatically and conceptually.

The second level allows the reader to learn from reading by penetrating beyond the verbal forms of the text to the underlying ideas. From here the reader compares these ideas to what her or she already knows.

In examining the reading comprehension scores achieved by the clients in the study, the ranges are as dramatic as in decoding, except in most cases lower. For example, decoding saw only one low range of first grade, while reading comprehension scores registered on the first grade level for three assigned grade levels.

In contrasting the means and ranges of reading decoding with the means and ranges of reading comprehension, there is a significant difference. The differential in performance in decoding skills is not as great as it is in reading comprehension skills. From our previous discussion, given that reading comprehension is a more integrated, sophisticated process, this is understandable. There are a greater number of individual cognitive skills in the process of reading comprehension than there are in the process of reading decoding. Therefore, there is a higher chance of potential dysfunctioning or weakness.

For students assigned to 7th grade, (See TABLE R) reading comprehension

ranges over the period of the study were 1st through 11th grade levels which was the range for the year 1991. The ranges for 7th grade were much smaller than those for decoding within each year. For 1992, the range was four grade levels - 3rd through 7th. For 1993, the range was less than one year, all within the 5th grade level. For 1994, the range was over five years - 1st through 6th grade levels. For 1995, the gap was 5th through 8th, with 1996's scores 5th through 7th and 1997's as 7th through 8th grade levels. The only years in which no client achieved the 7th grade level was 1993 and 1994.

The mean levels in comprehension for students assigned to 7th grade was 5th grade in the years 1993, 1994, and 1996. The mean grade levels for 1992 and 1995 were 6th grade with 7th grade being the mean comprehension grade level in 1997 (See TABLE R).

The male population assigned to 7th grade scored higher than their female counterparts in reading comprehension over-all during the six and one-half years of the study (See TABLE R). The mean scores were 10th grade for 1991, 6th grade for 1992 and 1993, 5th grade for both 1994 and 1996 and 4th grade for 1995.

The females assigned to 7th grade had reading comprehension mean scores on the 1st grade level in 1991, the 4th grade levels for 1994 and 1995, the 5th grade levels for 1993 and 1997 and the 6th grade level for 1996 and the 7th grade level for 1992 (See TABLE R).

The clients assigned to 8th grade had reading comprehension scores which

ranged from 1st through 11th grade levels (See TABLE S). Over the six and one-half years the gaps were from 3 years in 1995 and 1997 , to 4 years in 1991 and 1993, to 5 years in 1996 and 7 years in 1994.

The mean reading comprehension levels for students assigned to the 8th grade spanned 6th through 8th grades with 1991, 1994, 1995 on the 6th grade level, 1997 on the 7th grade level and 1992 and 1996 on the 8th grade level(See TABLE I).

The mean reading comprehension scores for the male population assigned to 8th grade was 6th grade for 3 years of the study, 1994, 1995 and 1996. In 1991 and 1993 the mean score for the male population assigned to 8th grade was 7th grade level and for 1992 it was on the 8th grade level.

The female population assigned to 8th grade registered a reading comprehension level of 3rd grade for 1991, with 5th grade the achieved level for three years - 1994, 1995 and 1997. (See TABLE S).

The clients assigned to 9th grade over the six and one-half years of the study, scored from the 2nd grade through the 12th grade (See TABLE K). For 4 years, there was a 7 year range in scores - 1991, 1992, 1995 and 1996. In 1993 and 1994 the ranges were 8 and 9 grade levels respectively. The smallest range was 1997 with 3 grade levels. The mean reading comprehension scores (See TABLE I) were between one year below the assigned grade level of 9th grade to one year above 9th grade. In 1991, 1992,1994, and 1995 the mean scores were 8th grade.

In 1996 and 1997 the mean comprehension scores were the 7th grade level and in 1993 the mean comprehension score for 9th grade was on grade level.

Males assigned to 9th grade scored on the 5th grade level in reading comprehension for 1995 (See TABLE T), on the 6th grade level for 1996 and 1997, the 8th grade level for 1991 and on the 9th grade level in 1993.

The female population assigned to 9th grade had scores in reading comprehension that were significantly higher than their male counterparts. They had one year, 1996, on the 6th grade level, four years on the 7th grade level (1991, 1994, 1995, 1997) and two years on the 9th grade level (1992 and 1993).

The comprehension scores for the clients assigned to 10th grade (See TABLE K) followed a similar pattern for the ranges of scores from year to year of the study. The gaps in range of scores were eight grade levels for 1991 (4th through 12th grades), nine grade levels for the years 1992 and 1994 (2nd through 11th grades) , four grade levels (7th through 11th grades) for 1993, seven grade levels for 1995 (4th through 11th grades) and five grade levels for 1996 and 1997 (5th grade through 10th and 6th grade through 11th grade, respectively). The mean reading comprehension scores for students assigned to the 10th grade ranged from 7th grade in 1996, to 9th grade for the years 1992,1993,1994,1995. The mean scores for 1991 and 1997 were the 8th grade level. No year had the mean reading comprehension grade on the 10th grade level.

In examining the male population assigned to 10th grade, in 1991, the

mean reading comprehension score reached the 10th grade level (See TABLE U). However, the following years showed drops in the mean reading comprehension levels to 9th grade for 1992, 8th grade for 1994, 7th grade for 1995 and 1997, and 6th grade for 1996.

The female population did not achieve the 10th grade mean comprehension level for any year with only achieving the 9th grade for one year 1994, 8th grade for 1992 and 1995 and the 7th grade in 1996 and 1997 (See TABLE U).

The range of reading comprehension scores for clients who were assigned to the 11th grade fell on the high end in the post high school level for three consecutive years, 1993, 1994 and 1995(See TABLE K). For the other years, the high ends were 10th grade for two years (1995 and 1996) and 11th grade for 1991 and 1997. The mean reading comprehension scores for each of the years ranged from 4th grade in 1995 to 9th grade in 1994, 1996 and 1997 to 10th grade in 1991, 1992 and 1993 (See TABLE I).

The male population assigned to 11th grade did not achieve the 11th grade mean score in reading comprehension for any year (See TABLE V). The mean scores for males were 7th grade level for two years (1994 and 1997), 8th grade for two years (1992 and 1996) and 9th grade for two years (1993 and 1995).

The female population assigned to 11th grade achieved the appropriate 11th grade mean reading comprehension score for four years - 1991, 1992, 1993, and 1997. They achieved the 9th grade level for 1994 and 1995 with the lowest mean

reading comprehension score, 8th grade level, occurring in 1996 (See TABLE V).

The population assigned to the 12th grade registered post high school level as the high end of its range of reading comprehension scores for all the years of the study except one, 1997, which saw a ceiling of the 10th grade (See TABLE W).. The low end of the ranges were very variable - 2nd, 3rd, 6th, 7th, and 9th grades. The reading comprehension levels saw only one year with a 9th grade level as the mean score for clients assigned to 12th grade - 1997. The most prevalent mean reading comprehension score for 12th grade students was the 10th grade level, occurring in 1991 and 1994 through 1996. The 11th grade level was the mean score for the years 1992 and 1993 (See TABLE I).

Both the male and female populations had variable mean reading comprehension scores for students assigned to the 12th grade(See TABLE W). The range for males was from 7th grade in 1995 through the 11th grade in 1991 and 1993. In 1992, the mean score for males assigned to 12th grade was 9th grade, In 1994, it was 8th grade with the remaining years at the 10th grade level.

The female population's mean scores in reading comprehension registered one year on each of the 7th , 8th and 10th grade levels, 1995, 1994 and 1993, respectively. The remaining two years were at the 11th grade level (1997 had no females in the study assigned to the 12th grade).

The wide representation of scores in reading comprehension levels indicates the level of deficiency which existed in the sample population. The

scores covered all grade levels.

Over-all, in reading comprehension 72% of the clients were reading below their assigned grade level with 56%, more than half of the population reading more than one year behind their assigned grade level.

"To relate the reading comprehension and decoding levels to other factors in the study..."

As was previously stated, socio-economic and medical factors can impact academic functioning. Each of the clients admitted to the facility in the study during the years 1995 through 1997 completed the Social History. As was previously described, the history was obtained via an interview process between the client and a member of the nursing staff.

To determine the ability of the clients to provide basic information, this researcher examined the personal information section presented as follows:

(This researcher has reproduced the sections of the Social History as they appear exactly in the survey form. The Social History is reprinted with permission from Renewal Center's Executive Director):

BASIC INFORMATION

NAME

PAENT/GUARDIAN'S NAME

ADDRESS

CITY COUNTY STATE ZIP

TELEPHONE

DATE OF BIRTH

CLIENT REFERRED BY

REASON FOR SEEKING TREATMENT AT RENEWAL CENTERS

All of the clients correctly provided their parents' names and their own birthdates. Only 64% of the clients were able to give a complete address (number, street, city, state and zip code). The knowledge of all clients knowing their parents' names and their own birthdates was not surprising, since this information is not variable. Also, since many of the clients are involved with the legal and/or social service systems, which will be attested to later in this report, the birthdate is a repetitive legal and social service necessity.

Only 64% of the clients being able to report their addresses appears due to the frequency of a client's relocation. The manner in which this was noted on the form reflected confusion felt by the interviewer. There were many special notations of clarification and errors. The notations indicated that many of the clients struggled with the response, making changes, due to the frequency in which their place of residence or with whom they resided changed.

Few clients were able to give direct information regarding who had referred them to the rehabilitation center. Most frequently the response was a

member of the legal system (probation officer, the judge) or the client claimed to not know.

Clients were very simplistic in their reasons for seeking treatment. Stating that they had a drug and/or alcohol problem was the overwhelming response. The only other recorded response was that the client was seeking treatment as an alternative to being placed in a detention or correctional facility.

The objective of the next section was to collect as much medical information directly from the client as possible, as well as to screen the client for any immediate attention he or she might require. The medical section questions:

MEDICAL HISTORY AND NURSES AND SCREENING

HT. WT. HAIR COLOR EYE COLOR

VS [vital signs]: TEMP [temperature] P [pulse] BP [blood pressure]

DRUG ALLERGIES

HEARING 500 1000 2000 3000 4000 6000 VISION

RIGHT RIGHT

LEFT LEFT

TEST LEVEL 20db HL / = + PASS 0 + FAIL BOTH

ANY COMMENTS ON HEARING ANY COMMENTS ON VISION

IMMUNIZATIONS RECORD ON CHART YES NO

COMMENTS

LAST dt tb

PAST MEDICAL HISTORY

SURGICAL HISTORY

RECENT ILLNESSES/INJURIES/OPERATIONS

CURRENT MEDICATIONS

NAME OF MEDICATION DOSE AND FREQUENCY

LAST DOSE TAKEN HOW LONG ON MEDICATION

PROBLEMS IN CLOSE RELATIVES

Diabetes	Epilepsy
Heart Disease	Mental Disorders
Kidney Disease	Alcohol Abuse
Stomach Ulcers	Cancer
Overweight	Reading Disability
Allergy	Learning Problem
Behavior Problem	Drug Abuse

STATE OF SKIN (DESCRIBE ANY AREAS WITH BRUISES, LESIONS, RASH , ENDEMA DISCOLORATION, TATTOOS, ETC.)

Obviously, much of this section required objective testing or evaluation by the nurse, utilizing traditional instruments.

For the height, weight and vital signs, there were no special notations reflecting concerns.

For all of the clients in the study, there were no signs of hearing problems.

Drug allergies reported by the clients were limited to penicillin for about 5% with no other drug allergies noted.

Vision screening was conducted with corrective devices in place - glasses on or contact lenses in for clients who had them. Vision problems were noted for approximately 14% of the clients, most of whom admitted to having glasses but did not have them on their person or acknowledged not having brought them to the facility.

No client knew the date of his or her last tetanus shot or tuberculosis test.

There was no evidence of concern for skin conditions. 60% of the clients had at least one tattoo.

The medical information provided by the clients was fairly unremarkable. There were 15% of the clients who reported at least one hospitalization for self-inflicted harm (suicide attempt). There were a few hospitalizations noted for injuries during acts of violence (i.e. fights with peers). 60% of the clients were able to report some type of medication which was currently prescribed for them. 30% of the female clients reported that the nature of the prescribed medication

was birth control pills. The most commonly identified medication was Ritalin. Of the 60% of the clients who reported currently having a prescribed medication, over three-fourths of them reported recently discontinuing the medication. Over 90% of the clients who were able to name a current medication were unable to give a dosage (other than 1 pill), frequency, or how long he or she was on the medication. All clients reported a "last dosage" to the best of their knowledge..

The reporting of family health problems was very scant. The most frequent admission by clients was of parental and grandparent alcohol abuse. (Over one-half of the clients reported at least one parent or grandparent who is abusing or has abused alcohol).

The Social History proceeds to assess the client's nutritional status:

NUTRITIONAL ASSESSMENT:

DIETARY HISTORY: HT._____ WT._____

RECENT WT. GAIN/LOSS_____

QUALITY OF APPETITE: GOOD_____FAIR_____ POOR_____

OF MEALS PER DAY_____

FOOD INTOLERANCE/ALLERGIES:_____

EATING PROBLEMS:_____

BREAKFAST: CEREAL__ BREAD___ FRUIT/JUICE___

MILK__ EGGS___

LUNCH: MEAT/CHEESE___ SANDWICH___ FAST FOODS___

DINNER: FAST FOODS___ GOT MEAL WITH MEAT___

VEGETABLES___ MILK_____ FRUIT___ SWEETS___

OTHER_____

ANY DIETARY SPECIAL NEEDS/ SPECIAL DIET:_____

DIETARY CONSULT YES_____ NO____ DATE_____

SLEEP PATTERNS:

HOURS /DAY_____ PATTERN_____

COMPLAINTS_____

On the nutritional assessment, a very small amount of the clients were termed as overweight, none were referenced by the nurse assessor as obese. A small number of clients reported a recent weight loss with no client reporting a weight gain.

The other information provided by clients for the nutritional assessment was very vague. Approximately 15% of the clients reported various food allergies (milk, fish, etc.) or food restrictions due to religious observances.

Less than 10% of the clients reported any dietary or sleeping difficulties (excluding askew sleeping patterns). Sleep patterns were reportedly abnormal for periods in which the clients were engaged in heavy drug usage. Many reported staying up all night and sleeping all day during these periods. Several clients

reported that the prescription medication that they were receiving was a sleep aid.

Approximately 20% related eating difficulties relative to their drug use. These difficulties included bingeing and purging, skipping meals and loosing weight in direct relation to using drugs. All of the clients who reported bingeing and purging behaviors were females. These females denied that this was currently a problem.

In approximately 20% of the cases a dietary consult was requested. (The consult would be done by a dietician from the affiliate hospital.)

The information reported by the clients in the nutritional section indicates a definite affect that drug/alcohol abuse on eating and sleep patterns. The question for future investigation is whether this impact is a result of direct biological effect, such as an impact to the gastro-intestinal system, or to the brain which control eating/sleeping processes or is the effect due to the social context in which the client functioned while engaged in drug behaviors?

Clients were than queried about their employment histories:

WORK HISTORY

EMPLOYMENT/VOCATIONAL HISTORY (INCLUDING EFFECT OF D&A USE):_____

JOB TRAINING/APPRENTICESHIP:_____

WORK HABITS:_____

WORK HABITS:_____

INCOME:_____ SAVINGS:_____ DEBTS:_____

MEANS OF SUPPORT:_____

OTHER:_____

In relation to the work history section, 34% of the clients gave some work experience. However, only 12% listed credible employment. The nature of this work was fast food restaurants or physical labor such as construction. The rest of the 43% reported working for parents, stepparents, and personal or family friends. This jobs were menial in nature.

A few clients held jobs which reflected apprentice or internship type work. Approximately 60% of those who reported any employment stated that there were employment problems or separation from employment due to drug usage.

In 55% of the training/educational sections, clients reported attending vocational/technical programs through their respective school districts. Almost two-third of those reporting involvement in vocational technical training, had been excused from the program or maintained serious absenteeism patterns. The areas which were pursued through vocational training were: carpentry 6%; cooking 4%; small engine repair 6%; automotive repair 22%; electrical 20%, auto body 16% and cosmetology 26%. The information recorded on the form indicated that, in most cases, the client was unsure as to his or her status in the

program, with most feeling that they were no longer eligible to participate in the vocational training.

To complement the employment section, the Social History explored the client's educational history:

EDUCATIONAL HISTORY

SCHOOLS ATTENDED:_____

GRADES COMPLETED.AVERAGE GRADES_____

GRADES SKIPPED OR LEFT BACK:_____

ATTENDANCE/ABSENTEEISM:_____

DISCIPLINE PROBLEMS IN SCHOOL:_____

DRUG USE IN SCHOOL/FREQUENCY:_____

CONFLICTS WITH TEACHERS OR OTHER STUDENTS_____

OTHER SIGNIFICANT INFORMATION:_____

Over 75% of the clients had been enrolled in more than one school district during their school histories, although many of the clients were unable to provide specific details with regard to these various districts (names and location of districts, time periods of attendance, etc.). Over 25% of the clients provided information regarding their current school placement for which the interviewer indicated that the client was unsure as to the accuracy of the information.

Approximately 30% of the clients were able to give only part of the name of their individual schools. Approximately 25% were unable to provide the name

of their school districts. Many of these clients were unsure as to their current status within the school district at the time of their admissions to treatment. Many clients had not bothered to attend school even on the first day of the current school year in order to find their current school placements. Although this response occurred sporadically throughout the course of each year, the students who had not even bothered to attend the first day of school appeared most during the last three months of the calendar year. Many of these clients would report uncertainty with regard to passing their last grade level.

Since the question was vague regarding performance ("average grades"), the responses were equally vague. Most gave letters, "C"/"D" or "B/C". Some clients responded that grades were "good" until some occurrence - entering high school, moving, parents divorced, drug usage which appeared to be the pivotal point in grade changes. Only 15% of the clients claimed to be doing well currently in school with regard to grades.

Interesting information surfaced regarding "grades skipped". It surprised this researcher to find that some clients had been moved ahead in grade levels. From the documentation, it appears that a few clients repeated a grade level, for example, 7th grade, and then were "skipped" to, in our example, the 9th grade, the following year. The clients nor their records gave any further explanation.

Every client reported some level of difficulty in school. Truancy (absenteeism, tardiness, "cutting classes") was cited by 88% of the clients as a

major difficulty with school. Another major difficulty was conflicts with teachers or fellow students, reported by 75% of the clients.

Most of the clients reported no difficulty in school during the elementary grades (first through sixth grades). 30% of the clients reported school difficulties prior to their drug involvement. All clients reported that their educational difficulties started or were worsened by their use of drugs. All clients reported attendance problems due to their drug usage. Clients reported using drugs prior to or after school, leaving school to use drugs, using drugs in school or staying out late at night and being unable to get up for school.

Under "other information", 11% of the clients stated that they were "ADD" or "AD/HD". Traditionally, these abbreviations refer to "attention-deficit disorder" or "attention deficit hyperactivity disorder." These are behavioral syndromes which are characterized by fidgeting, distractibility, impulsivity, attentional deficits, poor social skills, and lacking the consideration of consequences (Gregory, 1992).

Of the clients in the population, 5% also reported being classified as Learning Disabled. Learning disabled typically refers to a sever discrepancy between a student's general ability and his or her school achievement that cannot be explained by sensory/motor handicaps, mental retardation, emotional problems or cultural factors (Gregory, 1992).

This researcher cross checked each of these reported classifications (ADD

or AD/HD and Learning Disability) with the other documentation in the clients' charts. In only 52% of the charts of clients claiming these disabilities was there substantiation for this classification.

Many of the clients (more than the 25%) were unsure as to where they would be attending school when they left treatment due to custody and/or placement issues. Most clients expressed serious concern for their school placement.

It is important to note that there were clients between the ages of 17 and 19 who had signed the paper work in their school districts which released them from further school attendance ("dropped out"). Each of these cases were verified by the institution. These clients were not included in the study, even though they met the age criteria.

The information in the vocational/educational section is very troubling. The reading testing conducted in this study indicates that many of these clients have very poor reading decoding and reading comprehension scores in which to function in every day life. The statistics regarding vocational and educational experiences reflect that in society many of the clients have not developed interpersonal relationship skills which will allow them to develop a trade or marketable employment skills. The information provided in this section also reflects the poor working relationship and working knowledge that these clients have developed towards society as a whole.

As the Social History continued its flow of gathering information with regard to various components of the client's life, the area of living conditions, as well as family situation, was examined.

LIVING CONDITIONS:

PRESENTLY LIVING WITH: _____

DESCRIBE NEIGHBORHOOD:_____

PRIOR RESIDENCES:_____

OTHER:_____

FAMILY SITUATION

MARITAL STATUS:

FAMILY AND/OR HOUSEHOLD MEMBERS:

NAME	RELATIONSHIP	AGE	LIVING SITUATION	SCHOOL/ OCCUPATION

CLIENT'S RELATIONSHIP TO FAMILY MEMBERS:

DESCRIBE CHANGES IN FAMILY STURCTURE INCLUDING DIVORCES, SEPARATIONS, OR ABSENCES OF ANY FMAILY MEMBERS:

IS CLIENT OR ANY OTHER FAMILY MEMBERS ADOPTED: REACTION TO THIS:

ANY DEATHS OR SERIOUS ILLNESSES IN FAMILY? REACTION TO THIS:

FAMILY'S PERCEPTION OF CLIENT'S PROBLEM:

EFFECTS OF CLIENT'S D&A USE ON FAMILY SITUATION:

D&A USAGE/PROBLEMS AMONG OTHER FAMIIY OR HOUSEHOLD MEMBERS:

BEHAVIORS PROBLEMS BETWEEN CLIENT AND FAMILY:

Only 25% of the clients were in a residence with his or her two natural parents. Of the study population, 45% of them stated that they were living in a single parent or parent/stepparent home prior to their placement in treatment. This category, single parent/stepparent arrangement, was grouped in this manner since so many of the living arrangements were described in a very awkward manner.

As was noted in examination of responses to the initial section of the Social History, only 64% of the clients were able to report their addresses. The frequent relocations that clients experienced seem to be reflected in the information of this section. Clients reported changes in parental custody,

assignments to special residential placements or their families moving due to hardship circumstances.

Most of the clients were vague in their descriptions of their neighborhood. Most perceive their neighborhoods as heavily involved in drug related issues - crimes committed related to drug selling and usage.

Clients (35% of those in the study) came to this facility from other in-patient, residential or detention placements.

The clients reported in 65% of the interviews that their natural parents were divorced. It was difficult to calculate re-marriages, since clients presented a variety of scenarios regarding parental marital situations. Many parents were on second divorces, separated, living with persons (not married to) other than the natural parent of the client.

No client personally had been married.

Although the form did not question procreation, per se, some interviewers indicated that the client had an off-spring. This researcher did not quantify data in this area since there was no direct query and the information was only voluntarily recorded.

With regard to household members, the constellation of this situation was as varied as the parental marital situations. There were a multitude of combinations of blood relatives, stepfamilies, and friends of all immediate family members who figured into the pattern. In 68% of the reports there were members

living in the home beyond parent(s) and child(ren).

Every client reported at least a temporary absence of an immediate family member through death, separation, divorce, family separation, or legal placement (detention, rehabilitation or incarceration).

Every client also reported at least one death of a close friend or relative. For 31% of the clients the death was of a parent, grandparent or sibling.

Clients had a great deal of difficulty responding to the next two questions. Answers lacked any insight into the family's perception or the effect that the client's drug and alcohol involvement had on the family. The question served to point out the lack of awareness of the client to the global nature and ramifications of his or her problem.

The clients reported in 80% of their histories drug and/or alcohol problems among other immediate family members - parents, siblings and/or grandparents.

All clients reported some level of behavioral problems between him or her and a parent and/or a sibling.

The information in this section indicates the poor or weak support systems in which many of the clients have been raised. The instability in the nucleus of the family contributes to poor performance and functioning in many aspects of life.

The Social History branches out from the family to a personal aspect of the community in exploring the client's development in the area of religion.

RELIGIOUS DEVELOPMENT

RELIGIOUS BACKGROUND/EFFECT ON PRESENT LIFESTYLE:

80% of the clients reported having a formal religious affiliation at some point in their lives. Of the 80%, 40% had attended a religiously affiliated school within their educational experience.

Clients reported little effect of religion on their present lifestyles. Only 24% alluded to periodic attendance.

The Social History next explored the client's interpersonal and sexual relationships.

RELATIONSHIP AND SEXUAL DEVELOPMENT:

ANY SIGNIFICANT RELATIONSHIPS OUTSIDE OF FAMILY AND THE EFFECT OF DRUG/ALCOHOL USE:

WAS CLIENT INVOLVED IN ANY PHYSICAL, SEXUAL OR EMOTIONAL ABUSE?

ANY INCEST IN THE FAMILY:

IS CLIENT SEXUALLY ACTIVE (PAST OR PRESENT) AND HOW HAS

DRUGS AND ALCOHOL EFFECTED THIS? EXPLAIN:

DESCRIBE PEER GROUP AND THEIR DRUG/ALCOHOL USE, INCLUDE CONFLICTS:

Clients interpreted "a significant relationship outside of family" to be in the category of male/female (boyfriend/girlfriend). All female clients indicated currently or recently being involved in a relationship. Only 35% of the males reported a current or recent male/female relationship.

33% of the clients reported some type of sexual abuse in their lifetimes. 38% reported physical abuse by a parent, sibling or boyfriend.

No client indicated any emotional abuse, although this researcher would question whether the clients understood the nature of emotional abuse and/or whether the interviewer could adequately explain emotional abuse to illicit a correct response.

No client reported incest. This researcher is reporting this information based on exact responses to specific questions. Many of the 33% of the clients who reported sexual abuse were female clients claiming sexual abuse by a family member. These clients did not respond accordingly to the question regarding incest, nor was it recorded in that manner by the interviewer.

All clients reported being sexually active within the last two years. 75%

reported using birth control at least on most occasions. The only responses to how drug/alcohol use effected his or her sexual activity were indications of increased pleasure when using drugs or alcohol.

All clients' reports indicated peer groups with drug and alcohol involvement similar to the clients. No significant information was recorded regarding conflicts.

The Social History next questioned the client about legal involvement.

LEGAL BEHAVIOR PROBLEMS

CLIENT LEGAL INVOLVMENT - PENDING AND PAST (NOTE DRUG RELATED):

PROBATION/PAROLE HISTORY AND STATUS:

INFLUENCE OF LEGAL SITUATION ON TREATMENT:

BEHAVIORAL PROBLEMS (e.g. LYING, STEALING, CHEATING, FIGHTING, DEALING DRUGS):

80% of the clients indicated personal legal involvement. The legal involvement covered extensive periods for many of the clients. While many of the clients indicated that their placement in treatment was a result of court action,

the term "court placement" or "court commitment" takes on various forms depending on the context. Therefore, this researcher chose to not tally specific statistics in this area.

The question of probation/parole also elicited a variety of responses. Clients indicated being on probation, but there was no record of a probation officer. Some indicated having a probation officer, but claimed to not be on probation. Again, this researcher chose not to include statistics in this area.

The most frequent response to the influence of a legal situation on treatment was the necessity to be involved in treatment to avoid any further punitive action by the court system, or simply being given no other alternative by the legal system but to enter treatment.

All clients reported some type of behavior problem. Most related it to desires to participate in drug/alcohol consumption i.e. stealing, lying. All clients reported behavior problems relative to their relationships with a specific parents. Some of the male clients volunteered having had physical confrontations with a parent (striking or pushing a parent), although this question was not specifically asked.

It is important to establish previous interventions in a client's addiction history. To obtain this information, the Social History explores the client's previous treatment history, if any.

Tying the legal involvement of these clients to the other previously

discussed sections, family and educational histories, the clients' situations represent multi-dimensional presentations. It appears that all the appropriate systems are aware of the complexity of the problems facing these adolescents, but that the interventions are minimal or ineffective.

OTHER TREATMENT EXPERIENCES

PAST OR CURRENT PSYCHOLOGICAL/COUNSELING SERVICES:

CURRENT OR PAST TREATMENT EXPERIENCES (INCLUDING INVOLVEMENT WITH SCHOOL COUSELOR, PROBATION OFFICER)

40% of the clients indicated having past or current counseling services, mostly through drug and alcohol resources.

Placements in other treatment facilities was indicated by 52% of the clients.

The Social History questions the client regarding his or her current mental and emotional state.

MENTAL/EMOTIONAL STATUS

IS CLIENT TROUBLED WITH FEELINGS OF ANXIETY, FEAR, OR DEPRESSION? EXPLAIN:

SUICIDAL THOUGHTS OR ATTEMPTS:

OTHER COMPULSIVE OR ADDICTIVE BEHAVIORS (e.g. GAMBLISH, EATING DISORDERS, ETC.)

54% of the clients reported feelings relative to anxiety, depression or fear. Most of these were associated with concrete issues such as future placements, family situations or consequences for their actions. Many assessments did not include elaboration on any of these concerns.

47% of the clients admitted to thoughts of or attempts at suicide.

Within the female population, 18% related information relative to previous eating disorder behaviors, mainly "bingeing and purging". All denied any current problems in this area. No males claimed any compulsive or addictive behaviors outside of their drug/alcohol addiction.

Capitalizing on activities other than those compatible with drug and alcohol consumption is an important component in the rehabilitation process. The Social History attempts to obtain information in this area.

ACTIVITIES AND HOBBIES

LIST AND DESCRIBE INVOLVEMENT

All clients listed activities or hobbies. These ran a very large gamete. However, only 8% of the clients acknowledged current participation in a structured activity on a regular basis.

How a client views him or herself is an important starting point for many of the aspects of therapy. The Social History attempts to shed some light on the client's perception of him or herself.

SELF ASSESSMENTS

CLIENT'S SELF DEFINED STRENGHTS AND WEAKNESSES:

The assessments contained little information from the clients regarding strengths. Most clients referenced strengths that the clients viewed as no longer existing. Some stated that they were good students prior to high school, or that they had an athletic strength before their drug/alcohol involvement.

All clients indicated that they perceived their drug/alcohol involvement as their biggest weakness.

In examining the remaining 13 pages of questions, this examiner felt that the questions held little relativity to impacting this study. The responses to these questions were very subjective and varied. Therefore, the remainder of the Social History is not included in this presentation.

Dr. Lesher,(Stocker, 1998, p.1) at the April 1998 NIDA National

Conference of Drug Addiction Treatment proclaimed, "What science has taught us is that drug addiction is a result of an interaction between an individual's biological vulnerability plus his or her experiences plus environmental factors plus, of course drugs. The final result is a changed brain.".

This researcher feels that the Social Histories of the clients delineate some of the biological vulnerability, the experiences and environmental factors which have contributed to these clients' participation in drug usage.

The most significant factors disclosed on the Social Histories appears to be family instability, poor educational and vocational experiences, and ineffective religious involvement. The medical and nutritional factors seem to contribute but to a lesser degree.

In looking at the factors revealed in the Social Histories, the question becomes the proverbial, "chicken or the egg" dilemma. The number of clients who shared familial drug/alcohol problems, as well as other dysfunctional aspects of their live which would have been present even without the client's drug and alcohol involvement, raises the question of whether the drug/alcohol addiction was due to or the cause of the other factors.

"To correlate the reading comprehension and decoding levels
to materials popular in rehabilitation programs..."

As was discussed in chapter 1, the dominant medium for information dissemination in rehabilitation programs is the written work. The books which are widely favored are Alcoholics Anonymous or Big Book and Narcotics Anonymous. As a component of this study, these books were determined to be on the 7th grade reading comprehension level.

If we apply the data discussed in this chapter, the reading comprehension level of these books would not be appropriate for many of the clients in the facility selected for this study.

First, this paper will address decoding skills related to utilizing these two books on the 7th grade level, which would simply mean that the client would be to READ the words, divorced from the skill of comprehending what the text mean. The data of this study reflects "mean" decoding levels below 7th grade level for 34% of the age groups of clients.

Since reading comprehension is an even more sophisticated skill, the natural conclusion is that even more clients would be excluded from the comprehension process of the material. The data of this study shows that the mean comprehension levels for 38% of the age groups of clients in the study fell below the 7th grade.

Therefore, by nature of "raw" or foundation skills, 38% of the clients in this study would not be able to utilize the dominate source of information acquisition in treatment, nor would they be able to participate fully in the relapse

prevention component available through Alcoholics Anonymous or Narcotics Anonymous.

Conclusions and Recommendations

This researcher feels that this study raised more questions than it answered. However, in bringing quantitative data to some of the vague information available, hopefully, the questions raised are of a more definitive nature than prior to this study.

By correlation of characteristics, the facility from which the population was drawn appears to be representative of populations within treatment facilities during the time period of the study.

The population appears to represent a cross-section of gender, age, and assigned grade levels. No particular age or grade level was excluded from the population.

The testing instrument has survived over 10 years utilization in the field with current literature continuing to acclaim its validation. Therefore, the test scores accumulated from the administration of the subtests of the testing instrument can be considered a valid representation of a client's performance.

The stability of the facility, testing procedures, and population during the six and one half years that this study was conducted contribute to the confidence of this researcher to draw conclusions and make recommendations.

As was the reoccurring message in this paper, the conclusions that can be drawn are limited due to the early stages of the correlation that this paper is establishing on a very small scale. However, the evidence which has been surfacing is very non-controversial.

The functioning of the person diagnosed with substance abuse and/or addiction is negatively affected due to alteration in brain chemistry. Specifically how, for what duration and to what extent still need to be solidified.

In collectively examining the test scores, the Social Histories and educational information of the population several recommendations, definitive questions and conclusions surfaced.

Although this study did not collect data relative to retention, this researcher cannot ignore the trend that surfaced in the paper. As was noted in the discussion, in examining the population relative to assigned grade levels, there were deviations from the traditional age/assigned grade pattern. However, these occurred more significantly in the older populations, 16 years and above, as opposed to the 13 through 15 year old population. It would appear that retention took place more frequently during the high school years due to failed subject areas or absenteeism. Therefore, it appears that retention was due to the client's involvement in substance abuse since the clients stated in their Social Histories that absenteeism and school difficulties began or were acerbated by their drug and alcohol involvement. This would be in contrast to retention in the lower grades

when more intense direct reading instruction occurs. The question than becomes, were the clients reading levels on or above grade level as determined by routine standardized testing prior to entering high school? If the answer to this question is "no", than what are the circumstances in which the clients enter high school with significantly deficient reading decoding and comprehension skills?

In examining the special education classification of the clients in the population, less than 5% were identified with sufficient needs to be termed special education and eligible to receive special services to any significant degree. 90% of these special services were designated to address behavior problems within the natural school setting. Not included in these statistics were clients who had been in a total special placement which appeared more socio-educational than purely educational in basis. The remaining 10% of the services delivered were resource supplemental augmentation to a student's curriculum, not self-contained classrooms.

This study should contribute to a case for closer examination of the manner in which the educational system identifies, judges or tracks students "at risk" who are involved or who are potential candidates for involvement in substance abuse activities.

In examining the data from the decoding scores, it is disturbing how many clients scored below the levels of basic decoding skills. Clients assigned to each grade level from 7th grade to 12th grade had scores as low as 3rd grade with

students assigned to 7th grade scoring as low as 1st grade and students assigned to 9th and 10th grades scoring as low as 2nd grade for decoding skills. It is very troubling how infrequently the mean decoding score was at or above the given grade level over the six and one-half year period. Only in six cases out of a possible 42 chartings were the mean decoding scores representational of the clients' assigned grade levels.

In decoding scores, the study reflected very little difference between males and females in either range of levels or mean grade level. The females were on or above grade level for 9 chartings over the six and one-half years. The majority of the nine times in which a females' mean decoding scores were at or above the assigned grade level was most frequent on the 11th grade level (See TABLE V). The male population achieved a mean score at or above grade level on three occasions. Each of these were on the 7th or 8th grade level (See TABLES R and S). No particular year showed an unusual pattern in contrast to the other years.

In reading comprehension, the ranges were also very dramatic. However, in 93% of the grade levels collectively over the six and one-half years of the study, the ceilings of the ranges were at or above grade level. The mean reading comprehension levels only were on the assigned grade level in 17% of the charted occurrences (See TABLE L). The mean reading comprehension levels for assigned grade levels only occurred on the 7th, 8th and 9th grade levels for the general population (males and females collectively). In the assigned 10th, 11th and

12th grades there were no mean scores on grade level for the general population. However, in the female population assigned to the 11th grade, there were four occurrences of mean scores at the 11th grade level out of the seven mean scores representing the six and one-half years of the study. There were no significant patterns in the mean reading comprehension scores over the years as they progressed from 1991 through 1997, nor were there any remarkable differences between the male or female populations.

This paper includes considerable emphasis on the ranges of decoding and reading comprehension scores. In tying together the components of this study, the ranges scored become very applicable to the objectives of this study. In examining the decoding ranges, only nine groups in the 7th to 12th grade populations over the six and one-half years of the study were able to achieve a base and ceiling decoding score at 7th grade or above. These nine groups represent the following breakdown of clients who were capable of decoding on or above the 7th grade level:

- 12 of the 28 assigned 7th graders in the study
- 22 of the 50 assigned 8th graders in the study
- 75 of the 130 assigned 9th graders in the study
- 71 of the 134assigned 10th graders in the study
- 69 of the 98 assigned 11th graders in the study
- 47 of the 57 assigned 12th graders in the study

This represents a total of 296 clients of the 497 or 60% of the clients in the study were able to decode words on or above the 7th grade level. Therefore, 201 of the 497 clients or 40% of the clients in the study are not able to decode words on or above the 7th grade level.

The same analysis can be made with regard to the reading comprehension scores. Of the forty-two charted ranges of students assigned to the 7th through 12th grades over the six and one-half years of the study, only eleven groups were able to achieve bases and ceiling at or above the seven grade level. These groups represent:

- 8 of the 28 assigned 7th graders in the study
- 13 of the 50 assigned 8th graders in the study
- 50 of the 130 assigned 9th graders in the study
- 54 of the 134assigned 10th graders in the study
- 59 of the 98 assigned 11th graders in the study
- 45 of the 57 assigned 12th graders in the study

These numbers indicate that 229 of the 497 clients in the study or 46% were able to comprehend material at or above the 7th grade level. Therefore, 268 of the 497 clients or 54% in the study were unable to achieve a reading comprehension level of 7th grade or above.

The Social History generally proved an effect tool in gathering the information regarding factors affecting the development of reading skills.

However, it needs to be emphasized with regards to this study, that the Social History only came into play in 1995 - excluding information for the clients within the study from 1991 through 1994. Thus there are no Social Histories for the following number of clients:

Males - 211 of the 327 in the study or 65% did not have Social Histories

Females - 87 of the 165 in the study or 53% did not have Social Histories

16 of the 28 7th grade clients or 57% did not have Social Histories

28 of the 43 8th grade clients or 65% did not have Social Histories

64 of the 130 9th grade clients or 49% did not have Social Histories

78 of the 134 10th grade clients or 58% did not have Social Histories

71 of the 98 11th grade clients or 72% did not have Social Histories

36 of the 57 12th grade clients or 63% did not have Social Histories

In the interest of research, this researcher felt compelled to present statistics representing the absence of the 1991 through 1994 Social Histories. However, in examining the data for the years 1995 through 1998, the heavy percentages weighing within certain factors should not be dismissed.

In examining the data reported using the Social History instrument, there are some statistics and information to note. Much information eluded clients due to the instability of the basis of that information. The 36% of the clients who could not give an accurate address may be lacking in the rote information. With 45% living in a single parent or parent/stepparent arrangement, the probability that the

client has had more than one address in his or her life is high.

The 75% rate of clients who have been enrolled in more than one school district in their education careers also supports the transient nature of some of the clients' living conditions.

The scant nature of the medical information does not surprise this researcher. Beyond those questions requiring direct nursing assessment, this researcher is unsure whether, given the age and situation of these clients, they would have the base of knowledge to respond positively when appropriate. Most of the questions ask if the client has any knowledge of, for example, heart disease in his or her family. The client is accurate in responding that he has no knowledge, if that is indeed the case. However, this does not give a high level of assurance that there is no heart disease.

The nutritional assessment re-enforced the presumption of poor eating and sleeping patterns among clients with substance abuse histories. The researcher was surprised that so few clients were referred to the dietician for a nutritional consultation. It would appear that given the weak nurturing patterns within the social histories, as well as the effects that drugs have had on the client's ability to maintain a healthy lifestyle, maximum input from a variety of sources would be beneficial.

The employment section combined with some of the information from the education section, demonstrates how limited the exposure to opportunities for the

future are for these clients. The statistics in the employment section, demonstrate that most of these clients have had little guidance in developing "hands-on" marketable skills. The 30% work experience also indicates, especially for the older clients in the program, that only a minimal effort has been made by a number of sources to provide alternatives to the activities which lead to substance abuse behaviors.

This section did not question the clients' success in the workplace in depth to explore, for those clients who had experience, the success or failure of that experience. The recommendation to be made from this information is that increasing the intensity of interventions in the direction of employment experiences for "at risk" or substance abuse clients should be examined. For clients to abstain from drugs and alcohol, they need alternative activities and incentives with rewards to substitute for the addiction behaviors.

Much of the educational history data revealed in the Social History has already been analyzed through the study itself. As was previously mentioned, the clients' educational histories parallel their residential information with regard to the transient nature of some of their existences. Additionally, the educational history does raise questions about the lack of rote learning of information regarding, for example, the name of the client's individual school. Is this due to the transient component as mentioned earlier, the effects of drugs on the memory, or the lack of emphasis, support and re-enforcement of the educational piece in

these clients' lives?

The information provided through the "living conditions" and "family situation" sections of the Social History, points up the instability present in the foundation of the client's basic support system. The transient nature of the persons within the clients' lives, evidenced by every client reporting the temporary absence of a significant family member, and was very disturbing.

Given the intense emotional issues presented in the Social Histories – parental separations, absence of significant family members, relocations, physical abuse – little evidence is presented that appropriate support or interventions were implemented to assist the client in addressing or understanding these phenomena.

It is interesting that 80% of the clients reported some type of formal religious affiliation at some point in their lives. This indicates that, at some point and at some level, interest was show in the client's moral foundation and structure. Unfortunately, this data indicates a drop to only 24% participation in a short lifespan.

The different responses of the male/female populations with regard to significant relationships may indicate a difference in emotional perspective toward relationships. The sexual activity of the clients indicates the need for education and availability of protection for substance abusers practicing unsafe sex.

The information regarding peer groups is in line with popular held

sociological beliefs regarding the heavy peer support among substance abusers and addicts.

The high legal involvement in querying clients in a residential treatment facility is not surprising. Since seeking treatment is traditionally difficulty for substance abusers and addicts, the involvement of the legal system in the referral process is understandable. However, the inconsistency in the presentation of this information by the clients is another example of the clients' poor comprehension of a situation. The legal ramifications of consequences and placements may affect an adolescent for life. However, with clients unsure as to the disposition of their legal status, they are not able to set goals which would lead them on a legally righteous path.

The behavior problems as reported by clients in the Social History are consistent with addictive behavior patterns.

The recitatives of clients in rehabilitation programs (52%) should be a concern of those structuring the rehabilitation process. The motivation and acceptance of the rehabilitation initiative on the part of a client returning to treatment would appear questionable.

Like the education and employment voids expressed by the clients in the Social Histories, the current involvement of only 8% in productive activities on a regular basis, indicates the lack of resources and support available to these clients in the struggle to avoid drug and alcohol consumption. Like the information

relative to religious development, it is indicative that these clients did, at one time, have at least exposure to healthy options to the addictions of drugs and alcohol.

By the time the Social History reaches the client's self-assessment sections, a fairly bleak picture is painted for many of the clients. Therefore, it is not surprising that the clients find little inner resources as strengths. The narrowness of their thought processes is evident in the lack of insight of their weaknesses beyond their substance abuse or addiction and their lack of identifying strengths.

As a composite, the Social History highlighted some significant factors in the histories of the clients in substance abuse treatment. The statistics indicate major family structure instability. While the clients were involved within the education and legal systems, these systems did not appear to offer appropriate interventions which would alter the patterns of negative behaviors. Those clients who were also involved in structured religious organizations did not receive support or encouragement which would encourage a continuous relationship in the environment.

The Social Histories did not lend evidence to the role of remarkable medical patterns in the clients. The clients did not report any traumatic medical occurrences.

While this researcher has spent considerable time addressing the information obtained in the Social Histories administered to the clients in the study, she feels compelled to point out the short comings of the History itself. This researcher felt

frustration for the vague responses and the incomplete information that the clients were providing due to the ambiguity and vague nature of the questions they were being asked. Also, since there is inconsistency in the identification of the interviewer, the history form needs to be accompanied by more thorough instructions for the interviewer. Therefore, the researcher would strongly recommend that the facility re-examine and re-vamp this instrument.

The Social Histories also provided information which reflects on the development of reading skills and, possibly the substance abuse relationship. The clients reported little or no difficulty in elementary school (first through sixth grades). As part of the elementary school experience, they would have been subject to periodic monitoring of their skills. For example, students in Pennsylvania and New Jersey public school systems are subject to period screenings of basic academic skills. During elementary school years, they should have participated in these periodic standardized testings such as the California Achievement Tests or the Stanford Achievement Tests.

If the clients did participate in these tests and the discrepancies appeared in the reading areas with the patterns demonstrated in this report, are we to assume they were ignored? Since the majority of clients are involved in legal and social service agencies, these agencies should have examined the foundation skills, such as reading, of these clients and incorporated the building of such skills into the rehabilitation plan.

If the clients maintained reasonable skills throughout elementary school as evidenced by the recording of standardized testing, either district or state wide, then there is a strong argument for the involvement of substance abuse in the deterioration of reading skills.

Another question raised by this study is, at what point did the clients in the study begin to show significant deterioration in academic skills or did this occur after the clients fragmented association with the school system began? Since relocation is an issue in the continuity of clients such as those in the study, should there be a more central monitoring system for students' achievement in this country?

Applying the data of this study to the materials used in the rehabilitation process, indications are that further investigation is warranted as to the exclusivity of the materials used by Alcoholics Anonymous and Narcotics Anonymous in the recovery and relapse prevention processes with regard to reading comprehension. The person attempting to recover, may conclude that he or she is not a promising candidate for rehabilitation since he or she is not even able to utilize the basic materials.

The supportive materials that a clients takes with him or her after the completion of the intense rehabilitation process should be re-evaluated. Currently, these materials are the previously discussed Alcoholics Anonymous and Narcotics Anonymous texts. This evaluation process should be an especially

careful procedure. The materials selected, if this is the direction taken, should be careful not to further stigmatize the client or make him or her feel inadequate.

A very traditional component of rehabilitation is the incorporation of AA Meetings and "sponsorship" which involves the teaming of a client in rehabilitation with a person in recovery who would be a positive influence after the client leaves treatment. Therefore, if this "connection" is made, the sponsor may apostilitize the Alcoholics Anonymous and Narcotics Anonymous texts without realizing the inability of the client to effectively utilize them.

Stocker (1998) notes that NIDA funded researchers have found that the brain damage caused by blood deficits discovered in individuals who abuse certain types of drugs such as cocaine interferes with drug rehabilitation. These deficits present in a subtle manner as manifestations which can be misinterpreted as motivational problems. The clients with blood deficits may be slow in processing information and, thus in responding. He or she may be highly distractible or lethargic. All of these conditions are easily misinterpreted by those involved in the rehabilitation process. And again, all of these conditions will negatively impact on the reading process. The NIDA is studying how to modify treatment to accommodate patients with this type of brain damage.

This researcher found a few resources currently being used in treatment which conquer some of the obstacles presented in this report.

The Step Workbook for Adolescent Chemical Dependency Recover: A

guide to the First Five Steps (Jaffe, 1990), in use in many facilities today including the one in the study, presents as a more amendable workbook for impaired youth. The workbook is published by the American Academy of Child and Adolescent Psychiatry which may be why it is compatible with clients with possible brain dysfunctioning.

The format of the workbook is simplistic with generous spacing to ease visual spatial demands. The type of the text varies in style and size giving the client an easier time tracking.

The questions take necessary liberties with language in the interest of clarity for the adolescent. For example, the author asks if the person has ever thought of "killing yourself" (Jaffe, 1990, p. 7), as opposed to many texts which use "hurting" or "suicide".

The author, in the section, "How to Use The Step Workbook"(Jaffe, 1990, p.1), gives the instructions in a very simple, step-by-step manner. He stresses some directions appropriately, such as, "spelling doesn't count", and that "no one will grade the answers."

The "Introduction" explains the purpose of the workbook:

> "This workbook has been developed to aid and correctly structure a teenager's working the first five steps of Alcoholics Anonymous and Narcotics Anonymous...Because chemically dependent teenagers frequently have school and learning problems, these experiences have

been written at an easier reading and understanding level," (Jaffe, 1990, Introduction Page, unnumbered).

This researcher assessed the reading level of the workbook using the same Fry Readability Scale used previously in this study. The reading comprehension level registered at 4th grade.

This workbook is a promising step in moving to functional adaptations for the adolescent struggling in treatment. However, the workbook is used and thought of, at least in the facility in which the study was conducted, within the appropriate context of a workbook. It is not utilized or appears in a manner which would encourage staff or clients to build a resources for use beyond the facility. It presents in a "paperback" cover which, in and of itself, is short lived.

The Relapse Prevention Workbook For Recovering Alcoholics and Drug Dependent Persons by Dennis C. Daley (1986) is another effective instrument currently being used within treatment programs.

The readability measured by the Fry Readability Scale of this workbook is slightly higher than the Step Workbook for Adolescent Chemical Dependency Recover: A guide to the First Five Steps (Jaffe, 1990) The Relapse Prevention Workbook For Recovering Alcoholics and Drug Dependent Persons(1986) has a reading comprehension level of 5th grade.

This researcher applauds Dennis Daley, the author of this workbook. In the introduction, Mr. Daley states, "Recovery from alcoholism or drug addiction

is an ongoing process requiring both abstinence from mood altering substances and changing your thinking patterns, attitudes, behaviors and/or your lifestyle," Daley, 1986, 1). This researcher has no way of knowing if Mr. Daley intended to elude to the necessity to address cognitive aspects of the rehabilitation process when he emphasized changing thinking patterns.

The format of this workbook is gradual, allowing the client to read, contemplate, relate, and respond in a building fashion.

Unfortunately, relative to adolescents, the workbook uses case studies as examples which have adults involved in adult situations. However, a creative counselor could utilize this book in two ways. For those clients who have adult family members involved in substance abuse, the case examples can help the client increase his or her insight into the family member's addiction. Often, therapeutically, this is an indirect method to assist the client in gaining insight into his or her addiction problem. The other method is for the counselor to substitute case studies involving adolescents.

The exercises in the workbook are direct and simple. The concepts deal with real issues relative to substance abuse - especially those significant in adolescents. These issues include anger and risk taking.

No figures were available as to the use of either of the identified workbooks in treatment. However, neither workbook was identified in usage by Alcoholics Anonymous or Narcotics Anonymous for persons within their

programs.

According to Strickland (1996), professionals involved in drug rehabilitation programs should be aware that cognitive deficits in drug abusers may hamper the ability of these clients to benefit from treatment.

Stickland (1996) recommends giving clients, especially those with a history of cocaine abuse, neuropsychological screenings to identify cognitive deficits. Once these deficits are identified, treatment protocol can be altered to accommodate the client.

This type of screening, however, is expensive and time consuming. According to the previously referenced the Uniform Facility Data Set (UFDS): data for 1996 and 1980 - 1996, the duration of the overwhelming majority of rehabilitation programs in the United States is 4 to 6 weeks or 30 to 50 days. With current neurological testing procedures, it is unrealistic to think that neurological testing can be completed, information disseminated and an appropriate treatment program completed within this time frame.

This researcher fully supports and highly recommends the neurological testing as a basis of the construction of a successful treatment program for each client. Therefore, her recommendation is to restructure the process of rehabilitation to emphasize effective procedures and de-emphasize the time constraints imposed due to financial considerations.

Stickland (1996) makes suggestions which would be compatible with

deficits disclosed in neurological testing, He suggests methods such as presenting information in small segments with the client repeating each segment until he or she masters the concept as a method to deal with attention and memory deficits.

It must be emphasized that Dr. Stickland's (1996) study determined deficits in attention, memory, concept formation and mental flexibility. While these skills are all necessary in achieving a level of competency in reading, a client may not succeed in rehabilitation due to the manifestation of these deficits with or without a reading component.

This therapist has attended many group treatment sessions where clients read aloud with the group attending to the message. Attention deficits can impede this process. A client with concept formation and/or mental flexibility problems may not be able to apply what he or she reads to his or her circumstances. The reading presented in a testing situation is very impersonal and does not require application to any degree.

It is necessary to address the training and qualifications of counselors in substance abuse treatment centers. It is imperative that the governing (licensing) organizations be part of the re-development of the rehabilitation process. The standards of training must include emphasis on education which allows the counselor to utilize medical and neuro-psychological information in a working framework to benefit the clients.

The misinterpretation of some of the deficits presented in this paper, such

as poor attention or impulsivity can be grossly mishandled in the treatment setting and lead to an ascerbation of the problematic behavior of the client.

NIDA scientists are also investigating the possibility of treating the restricted blood flow indicated in the aforementioned SPECT scans (reference Chapter 2) with medications which will, in turn, have a positive effect on the client's deficit areas (Stocker, 1998).

Herning (1997) suggests using a technology called transcanial Doppler sonograhy, or TCD, to monitor the blood flow effects of medication. He feels that this method would provide a quick, easy way to inexpensively monitor the medication's effect on blood flow on a weekly basis, which cannot be done with a SPECT.

However, the medical interventions with regard to tracking and medicating blood flow deficits cannot affect the person's functioning unless a rehabilitation is implemented to allow the person to capitalize on the medical intervention which gives the person new capabilities. Without proper guidance, the healthier thinking recovering addict, may use the new capabilities to further his or her drug involvement in more creative ways.

Research is showing that drug addiction therapy requires a combination of approaches and methods to be effective. Dr. Leshner states, "When all is said and done, the ultimate cure for drug addiction will probably involve a combination of biological and behavioral treatments and social services" (Stocker, 1998, P.1).

This biological and behavioral therapy approach stems from studies which show that addiction is both a biological and behavioral disorder. At the 1998 National Institute on Drug Abuse's National Conference on Drug Addiction Treatment, this was clearly demonstrated through presentations dealing with therapeutic and medical treatments. These included cognitive behavioral therapy and methadone treatment working in combination (Stocker, 1998).

Dr. Bruce Rounsaville of Yale University feels that combining medications with behavioral treatments is effective in keeping clients in treatment and developing healthy lifestyles (Stocker, 1998).

The educational and social services systems cannot ignore the part they play in supporting the client being available for drug activity. In examining the statistics reporting the frequency and nature of school difficulties and absenteeism, one needs to examine the accountability we are establishing in our society on a variety of levels.

Dr Robert Drake of Dartmouth Medical School proposes that substance abuse treatment is best accomplished by a multidisciplinary approach involving a case management team of a psychiatrist, mental health case manager, a substance abuse specialist and vocational/educational specialist who can address the client's needs in an integrated fashion. Dr Drake feels that this approach yields a higher functional status for the client (Stocker, 1998).

This researcher presented three general goals in Chapter One of this paper.

The first general goal was to add to the growing body of knowledge examining the cognitive functioning of drug dependent adolescents. Upon formal approval, this paper will be submitted to Dr. Monique Ernest of the Adolescent Psychiatric Division of the National Institute of Health. Hopefully, Dr. Ernest will find the study worthy of incorporation into other schemas.

The second general goal was to use measurable, basic, academic skills as a quanitative measure of brain functioning in a population which continues to be part of the educational system but has been identified as substance addicts. Reading is an on-going process with the educational system as the primary director of that process. The clients in this study are registered students of that on-going process. Why are they coming into the rehabilitation world without notation of , in many cases, severe deficits in the reading process?

The third general goal is to contribute to the rehabilitation process by contrasting the academic level of tools traditionally utilized in rehabilitation with the examined populations assessed functional reading levels. Through this researcher's limited associations in the substance abuse rehabilitation field (one network institution), some professionals will be made aware of the gross discrepancy between the traditional tools of sobriety and many of the persons the tools are meant to reach.

This researcher is confident that she achieved most of her objectives in conducting this study.

The body of research continues to grow and strengthen regarding the connection between the brain and drug and alcohol consumption. Much of the refinement of this information is leading to deductions which link the brain changes in the addicted brain to similar changes present in other neurological impairments. The linkage will help scientists to expedite the conclusions which can be made with regard to permanency of the damage, rate and potential for recovery, as well as the best treatment for individual clients.

This paper did provide statistical descriptions of the nature of an adolescent rehabilitation population which was representative of the national population during the 6 and one half years of the study. In chapter 2, the data of the chosen institution followed the structure of rehabilitation facilities as presented in the Uniform Facility Data Set (UFDS): data for 1996 and 1980 - 1996.

As far as identifying trends within the population, there were few predictable patterns. No patterns formed within male or female populations, nor within or between grade levels. However, the pattern over the six and one half years of the study was interesting in that the numbers remained rather stable. The grade levels proved rather proportional in the each of the grade level's representations from year to year. Unfortunately, this researcher had aspirations that the statistics would show decreases in population numbers and increases in the skills that these individuals brought to the rehabilitation environment.

This paper presented considerable information regarding the reading decoding and reading comprehension levels of the clients. The clients represented a wide range of skills in both areas. The tragedy is the low nature of the base scores and the conservative level of the ceiling scores. Unfortunately, the study population had numerous clients falling several years below their assigned grade levels in both decoding and reading comprehension.

An indicator that can be drawn from the data presented in this study is that clinicians in the rehabilitation setting should be extremely cautious in using the client's assigned grade level as a determinator of the client's functional reading level.

In structuring the study, the researcher is confident that the testing instrument and conditions were the best possible when carried over a period as long as the study was conducted. Therefore, this researcher feels that the data relative to reading decoding and reading comprehension is reliable and valid.

In relating the reading decoding and reading comprehension levels to other factors, this was, in this researchers mind, the weakest area of this paper.

Since it was this researcher's intention to only examine reading decoding and reading comprehension scores for clients who met entrance criteria to the institution's education program, little attention was taken initially to weigh other factors.

When the Social History was introduced at the facility chosen for the

study, this researcher realized the significance of other factors in examining the client's skill levels. Unfortunately, the use of a standardized, uniformed assessment tool to qualify and quantify some of the areas loosely covered by the Social History was not implemented at the commencement of the study.

However, even with the informality of and limited time period that the Social History was utilized, some factors could not be ignored. Family instability and the lack of aggressive support and monitoring by the education and legal systems seemed significant in a large portion of the population.

Perhaps the direction that should be taken from this study is not to search for what is lacking in the histories and skills of this population, but what is there. Emphasis is placed on the "absence" rather than the "presence". This is probably the reason why it was virtually impossible for the clients to respond to the identification of strengths within themselves as part of the Social Histories.

According to Dr. Maxine Stitzer of Johns Hopkins University in Baltimore rewarding clients for staying abstinent is an effective behavioral approach. She suggests vouchers be given which can be exchanged for healthful goods which are valuable to the client (Stocker, 1998). This approach could be constructed and implemented by the educational, social and legal systems while a client is receiving inpatient therapy to assist in the continuation of the therapy process.

Medical factors seemed to have little global impact on the profile of the clients. There were no remarkable aspect of the clients' medical information

which would lead to any generalizations to encourage further investigation.

The limited nature of the interventions offered by the social services, educational and legal communities to clients appears evident in the tragic profiles of many of the clients.

Hopefully, studies such as this will impact on the rehabilitation process. The workbook cited in this study, as well as Dr. Strickland's suggestions for improved rehabilitation, both medically and programmatically, are evidence of the awareness developing in the professional sphere.

It is the desire of this therapist to make a small contribution to the medical, educational and social service fields. Hopefully, the value of this paper for the medical community will be to add to the information gathering process regarding the relationship between brain functioning in the areas of reading and drug and alcohol addiction.

The study may help members of the education community examine its role in the lack of basic reading skills of the majority of these clients. The education community should also examine the manner in which vocational education is available to clients who may permanently feel the effects of drug and alcohol.

The social service community, who synthesizes much of the services provided to the client needs to re-evaluate the goals for clients, accepting that rehabilitation and re-learning is a long, complex process.

Education of society, in general, is necessary to understand the roots of the

addiction disease. The parameters of the factors identified in the Social History have become very wide in general social acceptability.

The aspects of the emotional and support foundations for which most members of society are responsible need to be brought to the attention of society. The responsibility of each person must lie beyond their paycheck. The norms and orientation of society towards developing youth needs to be re-evaluated. The reevaluation should be from the perspective of establishing services which are not only directly aimed at eliminating abused substances, but develop activities and skills which meet those needs of the youth who seek drugs and alcohol to fill the needs in a constructive manner.

TABLES

TABLE A

PERCENTAGE OF TOTAL NATIONAL REHABILITATION POPULATIONS REPRESENTED BY AGE GROUP

	1991	1992	1993	1994	1995	1996
12-17 Yrs	5.9	5.0	5.8	*	6.6	*
18-20 Yrs	5.2	4.7	4.8	4.8	4.6	*

* No report published

TABLE B

PERCENTAGE OF CLIENTS RECEIVING REHABILITATION NATIONALLY GROUPED BY SEX

	1991	1992	1993	1994	1995	1996
MALE	72.5	71.1	70.3	*	70.1	68.1
FEMALE	27.5	28.9	29.7	*	29.9	31.9

* No report published

TABLE C

DISTRIBUTION BY SEX OF POPULATION SELECTED FOR THE STUDY

	1991	1992	1993	1994	1995	1996	1997
MALE	33	56	37	64	64	37	18
FEMALE	14	33	18	3	41	27	12

TABLE D

ALL MEDIAN CLIENT AGES FOR EACH YEAR OF THE STUDY

	1991	1992	1993	1994	1995	1996	1997
OVERALL	15.8	16.1	15.9	16.3	15.4	15.3	15.4
MALE	16.5	16.2	16.4	16.2	15.2	15.2	15.3
FEMALE	15.0	16.0	15.5	16.4	15.6	15.5	15.5

TABLE E

PRESENTATION OF STUDY POPULATION BY ASSIGNED GRADE

GRADE	7	8	9	10	11	12
1991	3		9	13	15	5
1992	4	4	18	22	26	15
1993	3	8	14	11	14	5
1994	6	14	23	32	16	11
1995	5	7	36	30	15	11
1996	4	6	24	14	8	7
1997	3	2	6	12	4	3
TOTAL	28	43	130	134	98	57

TABLE F

MEAN AGE OF CLIENTS IN THE STUDY'S POPULATION ACCORDING TO THE ASSIGNED GRADE LEVEL

GRADE	7	8	9	10	11	12
1991	13	13.5	15	16	16.5	18
1992	13	13	15	16	17	17
1993	13	14	15.5	17	17	17
1994	13	15	15	16	17	17
1995	14	14.5	15.5	15.5	16.5	18
1996	14	13.5	15.5	16.5	17	17
1997	13	13.5	15	16	16.5	18

TABLE G

OVERALL MEAN AGE OF THE POPULATION FOR EACH ASSIGNED GRADE LEVEL

GRADE	7	8	9	10	11	12
	13	14	15	16	17	18

TABLE H

MEAN TESTING RESULTS IN DECODING FOR EACH GRADE LEVEL

GRADE	7	8	9	10	11	12
1991	7.6	7.0	7.5	8.0	9.0	8.0
1992	6.4	9.0	8.0	8.0	11.0	11.3
1993	5.3	7.8	9.1	8.4	11.1	11.6
1994	5.4	7.6	9.0	7.3	9.1	9.0
1995	6.6	6.6	9.2	8.6	10.3	10.2
1996	6.0	8.2	10.0	8.4	9.2	11.6
1997	8.1	6.6	8.4	9.4	10.4	10.4

TABLE I

MEAN TESTING RESULTS IN READING COMPREHENSION FOR EACH GRADE LEVEL

GRADE	7	8	9	10	11	12
1991	9.2	6.6	8.0	8.2	10.6	10.0
1992	6.3	8.0	8.5	9.0	10.0	11.3
1993	5.5	8.2	9.3	9.6	10.8	11.2
1994	5.1	6.2	8.4	9.4	9.2	10.5
1995	6.4	6.8	8.4	9.0	4.6	10.6
1996	5.7	8.4	7.2	7.5	9.0	10.6
1997	7.5	7.5	7.6	8.8	9.7	9.6

TABLE J

RANGE OF DECODING GRADE LEVELS FOR EACH YEAR BY ASSIGNED GRADE LEVEL

	1991	1992	1993	1994	1995	1996	1997
7	1.6-8.2	3.4-6.8	4.6-7.4	2.4-7.3	3.5-9.1	6.0-8.2	8.1-10.0
8	6.8-7.2	3.4-9.6	7.2-10.6	2.3-11.2	6.1-11.1	4.1-10.4	5.6-9.7
9	4.8-10.2	3.2-12.0	6.5-12.7	2.2-11.0	5.2-12.7	2.4-11.4	6.1-9.6
10	6.1-12.7	3.6-12.7	5.1-12.8	3.2-12.8	2.6-12.5	3.6-11.3	7.0-11.2
11	6.2-12.4	6.2-12.6	7.6-12.8	3.4-12.7	6.1-12.8	9.1-11.6	8.2-12.8
12	9.0-12.6	7.8-PHS	9.3-PHS	3.6-PHS	4.1-PHS	10.0-PHS	8.6-PHS

phs=post high school

TABLE K

RANGE OF READING COMPREHENSION GRADE LEVELS FOR EACH YEAR BY ASSIGNED GRADE LEVEL

	1991	1992	1993	1994	1995	1996	1997
7	1.4-11.5	3.9-7.7	5.1-5.3	1.1-6.4	5.1-8.6	5.6-7.1	7.8-8.7
8	3.9-8.0	5.2-11.2	6.4-10.2	1.6-8.6	7.1-10.2	3.5-8.2	5.1-8.0
9	3.9-10.7	5.0-12.1	3.2-11.8	2.2-11.2	4.5-11.5	3.1-10.3	5.2-8.8
10	4.2-12.0	2.9-11.8	7.2-11.2	2.3-11.6	4.8-11.6	5.3-10.4	6.7-11.8
11	8.3-11.8	5.4-PHS	8.6-PHS	2.3-PHS	6.4-10.8	7.6-10.6	7.4-11.2
12	11.2-PHS	6.0-PHS	10.4-PHS	4.1-PHS	3.2-PHS	9.4-PHS	7.2-10.2

TABLE L

MEAN DECODING SCORES (GRADE LEVELS) FOR 7TH GRADE FOR EACH YEAR

	1991	1992	1993	1994	1995	1996	1997
MALE	7.8	6.6	5.8	5.5	5.3	7.6	8.0
FEMALE	1.6	6.6	5.3	4.6	5.6	6.6	8.6

TABLE M

MEAN DECODING SCORES (GRADE LEVELS) FOR 8TH GRADE FOR EACH YEAR

	1991	1992	1993	1994	1995	1996	1997
MALE	7.2	8.1	7.5	6.2	6.1	6.2	
FEMALE	6.8	5.4	8.4	8.8	7.3		7.5

TABLE N

MEAN DECODING SCORES (GRADE LEVELS) FOR 9TH GRADE FOR EACH YEAR

	1991	1992	1993	1994	1995	1996	1997
MALE	8.6	7.8	7.5	8.5	7.6	7.6	7.5
FEMALE	6.8	8.1	10.0	9.2	8.4	8.0	8.5

TABLE O

MEAN DECODING SCORES (GRADE LEVELS) FOR 10TH GRADE FOR EACH YEAR

	1991	1992	1993	1994	1995	1996	1997
MALE	9.3	8.3		9.3	9.1	7.5	8.8
FEMALE	6.3	7.8	9.8	10.2	10.0	8.4	9.7

TABLE P

MEAN DECODING SCORES (GRADE LEVELS) FOR 11TH GRADE FOR EACH YEAR

	1991	1992	1993	1994	1995	1996	1997
MALE	9.0	11.0	10.2	8.8	10.0	9.6	9.5
FEMALE	11.7	11.1	11.3	9.7	9.1	9.6	11.4

TABLE Q

MEAN DECODING SCORES (GRADE LEVELS) FOR 12TH GRADE FOR EACH YEAR

	1991	1992	1993	1994	1995	1996	1997
MALE	11.0	10.6	11.6	9.6	9.6	11.3	11.0
FEMALE	9.2	10.8	10.8	9.7	8.3	10.4	11.4

TABLE R

MEAN COMPREHENSION SCORES (GRADE LEVELS) FOR 7TH GRADE FOR EACH YEAR

	1991	1992	1993	1994	1995	1996	1997
MALE	10.0	6.2	6.0	5.2	4.2	5.5	7.0
FEMALE	1.4	7.7	5.1	4.6	4.6	6.1	5.4

TABLE S

MEAN COMPREHENSION SCORES (GRADE LEVELS) FOR 8TH GRADE FOR EACH YEAR

	1991	1992	1993	1994	1995	1996	1997
MALE	7.2	6.6	6.0	5.2	6.1	5.5	
FEMALE	3.9	7.2	8.0	5.3	5.0		5.4

TABLE T

MEAN COMPREHENSION SCORES (GRADE LEVELS) FOR 9TH GRADE FOR EACH YEAR

	1991	1992	1993	1994	1995	1996	1997
MALE	8.2	7.5	9.0	7.6	5.6	6.5	6.6
FEMALE	7.3	9.3	9.4	7.5	7.5	6.7	7.5

TABLE U

MEAN COMPREHENSION SCORES (GRADE LEVELS) FOR 10TH GRADE FOR EACH YEAR

	1991	1992	1993	1994	1995	1996	1997
MALE	10.0	9.2	9.5	8.3	7.2	6.4	7.8
FEMALE	5.8	8.0		9.4	8.3	7.3	7.5

TABLE V

MEAN COMPREHENSION SCORES (GRADE LEVELS) FOR 11TH GRADE FOR EACH YEAR

	1991	1992	1993	1994	1995	1996	1997
MALE	10.0	8.8	9.3	7.7	9.2	8.6	7.8
FEMALE	11.7	11.1	11.3	9.7	9.1	8.8	11.2

TABLE W

MEAN COMPREHENSION SCORES (GRADE LEVELS) FOR 12TH GRADE FOR EACH YEAR

	1991	1992	1993	1994	1995	1996	1997
MALE	11.2	9.0	11.0	8.5	7.8	10.0	10.2
FEMALE	11.3	11.0	10.6	8.8	7.6	9.7	

TABLE X

MEAN ASSIGNED GRADE LEVELS BY CHRONOLOGICAL AGE AND GENDER

AGE	1991	1992	1993	1994	1995	1996	1997
13 MALE	7	7	7	7	7	7	7
13 FEMALE	7	7	7	7	7	8	8
14 MALE	8	9	8	7	8	8	
14 FEMALE	9	8	8	8	8	9	7
15 MALE	9	9	8	9	9	8	9
15 FEMALE	9	9	9	8	9	9	9
16 MALE	10	10	10	9	9	9	10
16 FEMALE	10	10	9	9	9	9	9
17 MALE	11	11	10	10	11	11	11
17 FEMALE	11	11	10	11	11	11	11
18 MALE	11	12	10	11	11	10	
18 FEMALE		12	11				

TABLE Y

PRESENTATION OF STUDY POPULATION BY AGE

	12	13	14	15	16	17	18
1991	0	4	3	9	13	15	2
1992	0	six	11	12	22	29	9
1993	0	4	six	11	17	16	1
1994	2	8	8	32	25	30	1
1995	0	4	13	30	35	18	5
1996	1	4	8	18	18	13	2
1997	1	2	2	9	9	5	2

TABLE Z

PERCENTAGE OF STUDY POPULATION BY AGE

	12	13	14	15	16	17	18
1991	0	8.7	6.5	19.5	28.6	32.6	4.3
1992	0	6.7	12.3	13.5	24.7	32.6	10.1
1993	0	7.2	10.9	20.0	31.0	29.0	1.8
1994	1.9	7.5	7.5	30.2	23.6	29.8	0.9
1995	0	3.8	12.3	28.5	33.3	17.4	4.7
1996	1.6	6.2	12.5	28.1	28.1	20.3	3.1
1997	3.3	6.6	6.6	30.0	30.0	16.6	6.6

TABLE AA

NUMBER OF CLIENTS IN STUDY REGISTERED IN SPECIAL EDUCATION CLASSES

1991	1992	1993	1994	1995	1996	1997
2*	1	0	3**	2	7***	2

- * These two students were in assigned grades
- ** Two of these students were in assigned grades
- *** One of these students was in an assigned grade

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