NODE-LINK MAPPING AND RATIONAL RECOVERY: ENHANCING THE RECOVERY PROCESS

DISSERTATION

Presented to the Graduate Council of the University of North Texas in Partial Fulfillment of the Requirements

For the Degree of

DOCTOR OF EDUCATION

By

Eric A. Schmidt, M.S.
Denton, Texas
August, 1997
Alcoholics Anonymous (AA) continues to be the most accepted approach for the treatment of addictions in the United States. However, due to recent evidence questioning the effectiveness of AA, the need for alternative approaches to the treatment of addictions has become clear. The following research addresses the efficacy of one such alternative, Rational Recovery (RR). Node-Link Mapping (NLM), a graphic communication technique which uses links and nodes as building blocks to facilitate and enhance communication of information as well as awareness in a counseling environment, was implemented to enhance the recovery process. Three groups of ten (10), chemically dependent, adjudicated subjects were exposed to three different treatment approaches at an outpatient counseling center. The Experimental group received RR with NLM, the Comparison group was exposed only to RR, and the Control group continued in treatment according to the protocol of the counseling agency. All subjects were given the Substance Abuse Subtle Screening Inventory-2 (SASSI-2) as a measurement of symptoms associated with chemical dependency. The subjects were also administered the Rotter Internal-External Locus of Control Scale (Rotter I-E Scale) to determine locus of control prior to treatment and any change after treatment. Findings showed that the Comparison RR group showed significant change from pre to post-test administration on the SASSI-2 global scores and three of the six subscales. The Experimental NLM group showed significant change on only one subscale, and the Control group showed significant change on only one subscale. The results indicate that the RR modality alone as implemented in the comparison group is an effective treatment for enhancing recovery for chemically dependent subjects.
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CHAPTER 1
INTRODUCTION

Chemical dependency has increasingly become a prominent concern among mental health professionals within the United States. Since its founding in 1935, Alcoholics Anonymous (AA) continues to be the primary means for the treatment of chemical dependency in the United States. AA has become an integral part of not only private and non-profit treatment regimens, but has been the primary source of referrals for the judicial system as well, with attendance mandated as a condition of probation and parole in many cases. According to Alcoholics Anonymous (1989), the greatest spurt of growth in terms of AA membership was in 1972 with a 15.6% increase, and a consistent annual growth of 6% to 7% from 1983 to 1989, culminating in an estimated 1 million members in the U.S. at this time. In addition, the development of the traditional twelve step approach by AA has extended beyond chemical dependency, including Narcotics Anonymous (NA) and Cocaine Anonymous (CA), to groups focusing on eating disorders (Overeaters Anonymous) and compulsive gambling (Gamblers Anonymous), and recently, Caffeine Addicts Anonymous (CAA), as well as others.

According to Alcoholics Anonymous (1976), the twelve step approach views chemical dependency as a disease, involving and affecting physical, mental and spiritual components. However, taking precedent is the spiritual component, namely, a central belief in a "Higher Power". From an AA perspective, this belief is necessary for one to recover from chemical dependency and remain in sobriety. Recently, concern has been raised addressing a possible constitutional violation in terms of the separation of church and state in relation to judicial mandates for criminal substance abusers to twelve-step programs. For example, a patient at the Denver Veterans Administration hospital was informed that he must attend AA meetings as a condition of remaining in the treatment
program. This individual sued the hospital and won a settlement in a Federal Court, which resulted in policy changes within the hospital (Hughes, 1984). In addition, a lawsuit has been filed in California against the State of California and Orange County for requiring individuals convicted of driving under the influence of alcohol to attend AA meetings (O'Connor, 1994). This case was awarded to the state with an appeal in process.

Despite limited research, AA has proven effective for thousands of chemically dependent individuals (Lehman, 1990; Chappel, 1993). However, there are thousands of others who have not benefited from AA (Peele, 1990; Ellis & Schoenfeld, 1990; Westermeyer, 1989). In 5 surveys conducted by Alcoholics Anonymous (1989) from 1968 to 1989, it was found that approximately 50% of new members attending AA dropout within the first 3 months, with a steady decline in attendance over the first year. One possible explanation for this decline in attendance may be the difficulty experienced by the twelve-step treatment modality in "breaking through the denial". Denial is a central concept in AA, and "breaking through" that denial is a necessary step for the successful initiation of the twelve-step recovery process. According to AA (1976), denial is viewed as a primary aspect of the disease of addiction, and is characterized by defensiveness, with the addicted individual being unaware of the existence a problem with an addictive substance. From a twelve-step perspective, denial involves beliefs and attitudes held by the addicted individual which center around the false perception of one's ability to control one's addictive behavior. However, alternatives for the treatment of addictions have been developed and received attention in the research literature.

A very recently developed alternative being utilized for the treatment of addictions is neurofeedback (EEG brainwave biofeedback). The Veterans Administration, as well as the judicial probation system, has begun referring chemically addicted individuals for neurofeedback treatment, citing its long-term effects on depression, craving and substance use (Saxby & Peniston, 1995; Bodenhamer-Davis & deBeus, 1995). However,
consistent with the surveys conducted by AA, dropout rates from outpatient neurofeedback treatment programs have been approximately 50% (Bodenhamer-Davis & deBeus, 1995). In a personal communication with Bodenhamer-Davis (December 21, 1995), this dropout rate has been attributed to subjects' lack of awareness of the addiction process (denial) and their resistance to making a commitment to the recovery process.

Thus, research addressing treatments from traditional AA to innovative neurofeedback suggest a need for the development of alternatives which may prove effective in promoting awareness, including lessening the attitudes and beliefs associated with denial, in order to enhance the recovery process. It is apparent that in light of questions concerning the appropriateness of AA as the sole referral source for the judicial system and its limited effectiveness in treating chemical dependency, as well as the apparent resistance exhibited by subjects to treatments such as neurofeedback, that an alternative which addresses promoting awareness of the beliefs and attitudes associated with denial and defensiveness, particularly at the initiation of the recovery process, is needed.

One such alternative is Rational Recovery (RR), which was developed in 1986 by Jack Trimpey. Because of the availability and expediency of RR, as well as its possible promotion of awareness, it was chosen as the treatment of choice for this research. Although RR has been reported to be effective in promoting recovery from chemical addiction, the research assessing its effectiveness is composed primarily of subject self-reports within 3-6 months following treatment. Consequently, scientific research addressing the effectiveness of RR is greatly needed.

Rational Recovery (RR) is a non-Higher Power (NHP), self-empowering approach to the treatment and prevention of chemical dependency. RR utilizes an individual's cognitive ability to actively refuse certain destructive behaviors while choosing more healthy ones. According to Trimpey (1992), "AA and RR are opposites in many respects; in fact, RR is
the *counterpoint* to AA" (p. 29). RR does not subscribe to the necessity of a Higher Power and, in fact, proposes that the religious components of AA only serve to alienate and confuse many drug and/or alcohol dependent people seeking assistance with their addictions. This illustrates the major purpose of RR according to Trimpey (1992): to offer an alternative to drug/alcohol addicted persons in their search for recovery.

Throughout material addressing the components of RR, as well as in this text, terms such as alcohol, drugs and/or chemical substances are frequently used. However, from an RR perspective, all terms are considered to have equal meaning and classification, of which there are no separating qualities. In a personal communication with Jack Trimpey (January 31, 1995), he briefly discussed his views concerning terms used in the literature which refer to addictive substances (e.g., chemicals, substances, etc.), as well as the terms used to describe the resulting addictions to those substances (e.g., alcoholic). In that communication, Trimpey stated, "the worst addiction, from an RR perspective, is the one you have." Therefore, from an RR point of view, all terms referring to potentially addictive substances can be used interchangeably. An *addicted* individual, according to RR, is viewed as using an addictive substance, "against his/her better judgment." From an RR perspective, the individual's ability to actively choose not to use an addictive substance differentiates that individual from others who drink alcohol or use drugs because they choose to do so. These are important distinctions to consider as the reader continues through the literature review.

From an RR perspective, achieving sobriety involves a process of education and recognition (awareness). Within a self-help group environment, the addicted individual must be educated about the Structural Model of Addiction, which, simply stated, views addiction from an "old brain"/"new brain" perspective. The "old brain," or "Beast" in RR terms, speaks to the "new brain" using the "Addictive Voice," as referred to by Trimpey (1994), and represents needs and desires toward survival and pleasure. According to
Trimpey (1994), it is the Beast which is responsible for addictive behaviors. The process of recognizing the Addictive Voice, or Beast, occurs through the use of the Addictive Voice Recognition Technique (AVRT).

AVRT is a process of recognizing, identifying and refusing the substance using desires of the Beast. In essence, AVRT serves to "break through the denial" associated with chemical addiction, and, consequently, might reduce resistance of those individuals to entering other treatment alternatives, such as neurofeedback, which may promote longer-term psychophysiological recovery from addiction. Gaining awareness of the Beast involves becoming aware of one's attitudes and beliefs which are foundational to the concept of denial and in promoting recovery from addiction. Becoming aware of the Beast can occur as a result of self-evaluation, individual sessions with a RR "advisor" or within a group setting. Once the Beast is recognized, it is identified as the "enemy" by the addicted individual and actively refused, which affords the addicted individual a rational choice for a lifetime of abstinence. "AVRT does not focus on your personal problems, your imperfections, your personality, or your past. Like a laser beam, it focuses only on your addiction. It must be as goal-directed and focused as the Beast is" (Trimpey, 1992, p. 31).

The process of recognizing, identifying and refusing the Beast begins by educating the addicted individual about the structural model as well as about the AVRT, and then using the AVRT to foster an awareness of the addictive voice. "Node-Link Mapping" is a technique designed to promote education and awareness. Developed by researchers at Texas Christian University (TCU), node-link mapping, or simply mapping, is based largely on cognitive modularity. "Cognitive modularity refers to independent, mental processing systems for handling different types of information (e.g., separate systems dedicated to the processing of experiential vs. conceptual information)" (Dansereau, Dees and Simpson, 1994, p. 513). Mapping is a graphic communication technique which uses links and nodes
as building blocks to facilitate and enhance communication of information as well as awareness in a counseling environment (Dansereau, Joe, & Simpson, 1993; Dansereau, Joe, & Simpson, 1995; Dansereau, Dees, Chatham, Boatler, & Simpson, 1993; Joe, Dansereau, & Simpson, in press). In mapping, the nodes contain concepts, actions, feelings and objects. The links represent the relationships between the nodes, and serve to illustrate and describe interaction among the nodes. Specific illustrations will be presented later in this chapter.

Fostering awareness of attitudes and beliefs relates to locus of control. One's attitudes and beliefs determine the directionality of one's locus of control, whether internal or external. In related research addressing the internal/external locus of control among chemically addicted individuals, including those addicted to cigarettes and alcohol, it was found that, contrary to previous expectations, addicted individuals tend to score in the internal dimension, with a continued shift toward the internal direction for the majority of subjects after treatment (Bunch & Schneider, 1991; Abbott, 1982; Gozali & Sloan, 1971). As a result of this, Gozali & Sloan (1971) theorized that "the alcoholic's belief in his control over outcome of events may be partly responsible for his drinking behavior. In other words, the feedback from the consequences of his drinking does not modify his behavior because of his belief in his ability to control his behavior" (p. 161). This unrealistic or exaggerated perception of internal locus of control directly coincides with the existence of the Beast in the episodic system, resulting in defensiveness or a false sense of self-control. According to Trimpey (1994), a chemically addicted individual in denial, with a false sense of control and a lack of awareness, is considered to be "all Beast". Gozali & Sloan (1971) conclude by stating that treatment programs for chemical addiction should consider modifying control orientation as part of the program treatment goals.

Many similar issues are addressed in both node-link mapping and RR. For instance,
the benefits of node-link mapping in promoting awareness may prove beneficial in assisting a chemically addicted individual in a RR group with the process of recognizing the existence of one's Beast through the identification of unpleasant feelings, thoughts, and images, which are characteristic of episodic information, and may serve to lessen defensiveness (denial). Found within the episodic information system as well are the attitudes associated with locus of control. Educationally, mapping may enhance the instructional aspects inherent in a RR setting by assisting the individual in accessing the semantic system, promoting an understanding of the characteristics and methodology of the Beast (awareness). Furthermore, images used by the Beast and the voice of the Beast can be materialized through a map in promoting one's ability to track the Beast and transpose one's addictive grammar. By allowing episodic information (Beast) to be assimilated into a zone of bifunctional knowledge with semantic information (neocortex), the individual can become aware of chemically addictive attitudes and beliefs, and make new decisions regarding those behaviors.

Purpose of the Study

The purpose of this study is to determine the effectiveness of combining node-link mapping with a Rational Recovery (RR) treatment modality for promoting awareness and reducing defensiveness (denial) within the recovery process for chemically addicted individuals as measured by the SASSI-2. For purposes of this study, the segment of the recovery process addressed involves a shift in awareness, attitudes and beliefs of chemically addicted individuals toward greater self-awareness, less defensiveness, and a more balanced locus of control. These shifts will be demonstrated by lowered scores on the SASSI-2 and more moderate scores on the Rotter I-E scale. Due to the facilitative capabilities of mapping in promoting education and the identification of attitudes, beliefs and awareness, coupled with the RR emphasis on the communication of information and the facilitation of awareness (recognizing the Beast), it would seem that mapping could
enhance the recovery process in a RR group.

Review of the Literature

Node-Link Mapping

Cognitive modularity refers to independent, mental processing systems for handling different types of information (e.g., separate systems dedicated to the processing of experiential vs. conceptual information) (Dansereau et al., 1994). Several theorists have argued for the modularity of the human information processing system—that is, the mind being composed of different subsystems (e.g., Baddeley, 1992; Saariluoma, 1992; Navon, 1989). Tulving (1993) elaborated on the concept of a memory system, suggesting that different systems deal with different kinds of information, operate according to different principles, and are represented in the brain by different neural structures and mechanisms. Tulving (1993) proposed "five major human memory systems for which evidence is now available. These include semantic, episodic, procedural, perceptual representation and short-term memory" (p.67). For purposes of this study, the semantic and episodic systems will be reviewed, as they relate directly to node-link mapping. In a related study on remembering versus knowing newly learned information, subjects were shown study cards containing fictitious words in an undetermined order and asked to remember them (Gardiner & Java, 1994). The subjects were then shown the identical words again, but dispersed throughout by new words, and instructed to respond to each word based on whether they actually "remembered" the word, or if they simply "knew" it was one of the words they were initially asked to recall. The study showed that subjects were better able to identify learned words by simply "knowing" than through actual memorization. "Remember" judgments were said to reflect the operation of the semantic system, whereas "know" judgments reflected the operation of the episodic system.

In addition, Squire (1992) suggested that the brain is organized into two different information storage (memory) and processing systems: declarative and nondeclarative.
Information in the declarative system can be recalled consciously, upon command, and can be communicated by the individual to external sources, whereas information in the nondeclarative system is triggered by external, environmental cues and cannot be completely explained by the individual. Nondeclarative information is completely inferred from overt, automatic behaviors. In accordance with Tulving, Squire (1992) further subdivided declarative information into episodic (concrete, personal experiences or events) and semantic (abstract, conceptual) information.

Tulving (1993) supports the modular existence of episodic and semantic memory, and lists three main ways in which they differ: "a) episodic memory is a unique extension of semantic memory, rather than a separate, parallel system, (b) episodic and semantic memory differ with respect to the kind of conscious awareness that accompanies their operations, and (c) the distinction is related to the broader problem of classification of learning and memory" (p. 67). The episodic memory system is most closely related to the nondeclarative system. "Both are acquired from concrete personal experiences; both can be easily triggered by environmental cues, and both are primarily sequential in nature" (Dansereau et al., 1994). On the other hand, the semantic memory system is considered structured, categorized and relatively affect free.

Of particular importance, episodic and semantic memory differ in respect to the nature of conscious awareness that accompanies the retrieval of information. The act of consciously recollecting a personally experienced event is "characterized by a distinctive, unique awareness of reexperiencing here and now something that happened before, at another time and in another place" (Tulving, 1993, p. 68). This is indicative of retrieving information from the episodic memory system through environmental cues. At a more conscious level, semantic memory involves information acquired from the environment via lectures, discussions and as a result of thought, for example. Whereas access to the episodic memory system involves environmental cues, as stated above, access to the
semantic memory system is achieved through symbolic cues, personal and/or environmental. From observations of a densely amnesic individual who only exhibited short-term memory functions, Tulving (1993) observed that this individual was able to learn new information and remain briefly aware of that information (i.e., the semantic system was intact). However, this amnesic individual could recall nothing from his long-term memory of experiences (episodic system). Tulving concluded that this individual's ability to recall recent information, coupled with his inability to reconstruct experiences from his more distant past, constitute evidence for the existence of semantic and episodic systems. This modularity appears to have important implications for counseling.

According to Dansereau et al. (1994), "A primary focus of cognitive modularity is on implications of modularity for the expression and representation of critical information during client-counselor interactions. The efficient interchange of information between the semantic and episodic systems is crucial for effective counseling", and various counseling approaches can be categorized within the cognitive modularity framework (p. 515). For example, cognitive therapies (e.g. Cognitive-Behavioral Therapy and Rational-Emotive-Behavioral Therapy (REBT)) focus on accessing and integrating aspects of the episodic and semantic systems which cause discomfort for an individual at any given time. The primary goal of REBT, for instance, is to uncover, dispute and revise inappropriate semantic principles (irrational beliefs) that are negatively affecting an individual's feelings and actions (Ellis, 1991). "The implicit expectations of these cognitive therapies appears to be that changing representations in the semantic or episodic systems will lead to changes in the nondeclarative system (e.g., by leading the client to reinterpret or avoid environmental cues that trigger automatic, negative behaviors and reactions" (Dansereau et al., p. 515). Although both semantic and episodic systems are addressed in counseling, due to the unconscious nature of the episodic system, cognitive therapies primarily attempt to access semantic information. The semantic system plays a major role in
counseling because it is the primary means for communication between counselor and client (language). The vast majority of work by modularity theorists such as Tulving and Squire has been to identify separable systems, "only recently have researchers turned their attention to collaboration and interchange between subsystems" (e.g., Dansereau, Joe, & Simpson, 1993 p. 386).

According to Dansereau et al. (1994), a major limitation inherent to semantic, or declarative, counseling, as seen primarily in cognitive therapies, involves the poor relationship between personal experiences (i.e., episodic information) and conceptual principles and ideas that help structure an understanding of past behavior and guide future actions (i.e., semantic knowledge) (p. 515). In meaningful learning and processing, however, the overlapping of semantic and episodic information is expansive. According to Dansereau et al., mapping facilitates the overlapping of both systems. This overlapping results in a zone of bifunctional knowledge (ZBK) (Dansereau et al., p. 516). The ZBK contains information from both the semantic and episodic systems. In counseling, when semantic information fails to alter episodic patterns, the failure is attributed to the client's ZBK, which is too narrow. In an attempt to expand the client's ZBK, the counselor's ZBK is utilized in an attempt to formulate an interactive, or shared ZBK between the counselor and the client. "The shared ZBK is bifunctional in two senses: It merges semantic and episodic information from both the client and the counselor, and work within it can have an impact on both the client and the counselor" (Dansereau et al., p. 517). The counselor uses personal experience and expert information to assist the client in achieving a better understanding of his/her personal issues and problems, thereby expanding the client's ZBK.

This shared zone, or ZBK, is similar to Vygotsky's (1978) zone of proximal development. In Vygotsky's zone, an experienced person (counselor) facilitates the development of an individual (client) with less experience by providing hints, suggestions,
alternative interpretations and encouragement. According to Vygotsky (1978), this input is based on the less experienced individual's current understanding and acts as a bridge to allow learning and personal growth to take place. Typically, in counseling, a client accesses an initial problematic event, feeling or behavior and converts it into a verbal expression, within the client's own ZBK, in an attempt to communicate that episode to the counselor. The counselor and client then work together within a shared ZBK in selecting certain critical aspects of the episode, generalize that episode to other similar episodes and represent component interrelationships in an initial schema (Dansereau, et al., 1994). Presented within the shared ZBK, this new information and experience can facilitate opportunities for change and growth in the client.

According to Dansereau et al. (1994), there are three major working phases in the declarative, or semantic, framework: entering into, processing within, and exiting from the shared ZBK. "Entering and exiting information needs to be rich and precise to capture the details of life experiences and the subtleties of conceptual principles. In this regard, natural language appears to be an excellent vehicle for moving information into and out of the shared ZBK" (Dansereau et al., p. 518). However, the linearity of language is viewed as inadequate for portraying complex relationships, such as behavioral and/or cognitive themes, that become evident while processing within the shared ZBK. According to Dansereau et al. (1994):

During the counseling session, the counselor and the client enter the shared ZBK with verbal exchanges. As lines of thinking are identified and elaborated, an initial schema is developed around the client's narrative. Then, as verbal exchanges continue, a more complex processing ground is created within the shared ZBK. Spatial-graphic representations can be used to capture, identify and organize what has been expressed, as well as to provide a framework for examining alternatives and developing a plan (schema) that will foster change (p. 518).
Processing within a shared ZBK can also increase attentional lapses both by the client and the counselor, which may have a negative impact on counseling, or at least inhibit progress due to the difficulty involved in finding one's place in the discussion. According to Dansereau et al., spatial-graphic displays shared by both the counselor and the client can be used as reference guides to refocus the counseling process and increase attention.

To summarize, spatial-graphic displays, such as node-link mapping, can assist a client in increasing one's zone of bifunctional knowledge (ZBK) through forming a shared ZBK with the therapist. This allows the client to become aware of information (experiences) in the episodic system, utilize factual information contained in the semantic system to evaluate the newly discovered episodic information, and develop alternative actions, attitudes and beliefs based on those evaluations.

The importance of schematically representing information has been established in cognitive psychology, with a recommendation for visual (diagrammatic) representations (Larkin & Simon, 1987; Winn, Li, & Schill, 1991; Mayer & Gallini, 1990; Patterson, Dansereau, & Wiegmann, 1993). According to Larkin & Simon (1987), two-dimensional visual representations, such as Venn diagrams, flow charts, pictures and graphs are considered to be more "computationally efficient" than natural language (spoken or written) for most complex problems. "Computationally efficient means that components of the representation are easier to find, easier to recognize and more amenable to inferencing" (Larkin & Simon, 1987, p. 68). In one study, it was found that the use of diagrams, as opposed to verbal language, reduced the amount of searching through information required to solve problems (Winn et al., 1991). Although the use of natural language for communication in counseling has undergone close scrutiny, spatial-graphic representations have been largely neglected in counseling research (Dansereau, et al., 1994).

When addressed in the literature, spatial-graphic representations generally focus on
marital and family therapy. For example, genograms have been used to examine the interaction and quality of relationships among members within a family (McGoldrick & Gerson, 1985; Van Treuren, 1986). These interactions and relationships are shown on a genogram by representing family members in nodes, and the interrelationships among them as links. Family sculpting has been used to visually represent family dynamics and interactions by physically placing individuals or objects in various positions (Satir, Banmen, Gerber, & Gomori, 1991). In addition, node-link diagrams have been used to develop schemas, or patterns, which serve to support and/or maintain dysfunctional mood states (Beard, Marlow, & Ryle, 1990). However, these visual methods were developed only for use with a specific situation or topic. The recent emergence of a general-purpose visual technique, node-link mapping, appears to show promise for being applicable to various counseling environments, and has shown to be effective in the counseling field of chemical dependency in particular. Research supporting this will be presented later in this chapter.

For the past few years, a research group at Texas Christian University (TCU) has been developing and researching a verbal-spatial learning and processing technique called Node-Link Mapping (Dansereau & Cross, 1990) "Node-link mapping, or simply mapping, is applicable to a variety of counseling situations, and a series of studies now in progress on this method suggests that it has potential for facilitating processing within the shared ZBK" (Dansereau et al. 1994, p. 519). Before discussing the research conducted on the effectiveness of mapping as a counseling enhancement technique, an in depth description of mapping is in order.

As stated above, mapping is a graphic communication technique which uses links and nodes as building blocs to facilitate and enhance communication of information as well as awareness in a counseling environment. Figure 1 lists the various types of links as well as the functional categories, including the degree of interaction represented by the link
between two nodes. The links represent various relationships between two nodes, including action, description or illustration. The choice of which link to utilize depends solely on the relationship of the two nodes joined by the link. The dynamic interaction of the action links represents the effect one node has on another. For example, the top of Figure 1 shows a basic example of a map utilizing several links. The possession of a car directly allows one to be mobile. However, simply because one is mobile does not necessarily result in job opportunities, although mobility does allow for increased opportunities for employment.

There are three primary kinds of maps—process, information and reference maps (Dansereau et al., 1993). Process maps are multi-structured, flexible maps which facilitate the organization and interpretation of information during the counseling process. They can be completed by the counselor or by an experienced client. Information maps, as the name implies, impart information and help explain concepts in a simple and accurate fashion, whereas reference maps serve as outlines, assisting the counselor and client in staying focused and goal-directed.

Maps are constructed from both nodes and links. The nodes contain concepts, actions, feelings and objects, in the form of simple, verbal propositions, which may be of concern for the client, or group of clients, at any given time in the counseling process. Links convey the functional categories, with dynamics of action links included. Interrelational processes or dynamics between the nodes in the map by incorporating an arrowhead to denote directionality, and are named by abbreviations according to their function (see Figure 1). The links can be adapted to various topical areas, but for the purposes of counseling, and for this study, nine basic types of links will be used. They are: Analogy (A), Characteristic (C), Comment (Co), Example (Ex), Influences (I), Leads to (L), Next (N), Part (P) and Type (T). These nine can be divided into three functional categories: Action (influences, leads to and next), Description (characteristic, part and
type), and Illustration (analogy, comment and example) (Dansereau et al., 1993).

Furthermore, the Action links illustrate the dynamic interaction between nodes. For example, the next (N) link represents a low intensity of dynamics, whereas the leads to (L) link represents the highest degree of dynamic interaction. The links are illustrated not only in terms of their function, but also consist of an arrow which shows the direction of the relationship from one node to another. An illustration of these links can be seen in Figure 1 on the following page.

In terms of actual map production, there are two main ways in which maps are produced: top-down and bottom-up (Lambiotte et al., 1989). The top-down method requires that the map developer be familiar enough with the topic being mapped to determine a likely overall structure for the map prior to its actual development. Once the structure is determined and the basic information is placed on the map, the map developer, or cartographer, can use a "relationship-guided search (i.e., use the link types to form probes or questions for accessing relevant information) to flesh out the main structure" (Lambiotte et al., p. 339). The top-down method would be used primarily by the counselor, whereas the client, as a novice to the technique of mapping, would use the bottom-up approach. In the top-down approach, the cartographer, or counselor, selects a few key ideas (i.e., concerns expressed by the client) and conducts a relationship-guided search in order to expand the map around those key ideas, represented in the nodes. Specific nodes can be singled out according to the degree of concern, and the actual relationships between the client's concerns and external influences can be illuminated. An example of a top-down map is shown in Figure 2.

Figure 2 demonstrates an actual map developed in a counseling session by the author functioning as counselor. The general term 'drug use' represents the focus of the map, for which the advantages and disadvantages were identified. This allowed the client to actually view the disproportionate number of disadvantages as compared to the
Figure 1. Illustration of basic map. Nine links are listed with classification into three functional categories, with dynamics of action links included.
advantages of drug use. Figure 2 also demonstrates the interrelatedness of different nodes, and the possible effects one aspect of drug use has on various aspects of the client's functioning. As can be seen, both bottom-up and top-down maps can greatly enhance client awareness of self and environment, as well as expand the client's knowledge about various topics. Although two primary means for map development are discussed, the cartographer can use any number of potential combinations of characteristics and/or properties when designing a map to suit topical and individual needs.

As previously stated, multi-relational maps (node-link maps) facilitate the transfer of information from episodic memory to semantic memory. This process occurs through increasing the shared ZBK (between counselor and client) which allows for previously unrealized information (episodic knowledge) concerning attitudes, beliefs and feelings to be understood by the client which then allows for rational decision making based on relevant information (semantic knowledge). For example, a study was conducted by researchers at TCU which examined the effectiveness of three methods for improving the personal management strategies of college students (Dees, Dansereau, Peel, Boatler, & Knight, 1991). These three methods were node-link mapping (mapping), scripted peer cooperation and conceptual matrices. It was found that each method provided a basis for the organization of episodic knowledge into a semantic framework. The authors stated that "While we have not formally addressed the question of whether such organization took place, we have informal evidence that it did: participants were able to write about functional facets of their own personalities and to produce written analyses of recurring events" (Dees et al., p. 227). This awareness exhibited by the students in the study was also seen as an effective component in the development of problem-solving skills.

In a related study, two schematic organizers--node-link maps and conceptual matrices--were examined in terms of their ability to integrate semantic and episodic knowledge about alcohol within college students (Peel, Dansereau, & Dees, 1993). The
Figure 2. Illustration of actual map generated in a counseling session by author.
subjects were divided into two groups according to treatment sequence: episodic/semantic and semantic/episodic. The episodic activity required participants to complete materials using their own alcohol-related experiences, whereas the semantic activity required participants to annotate expert materials (p. 7). The findings revealed that while there was no preference established for a single scenario (semantic/episodic, episodic/semantic), "the episodic activities (i.e., the analysis of a personal alcohol-related behavior pattern) were rated higher by the participants than the semantic activities, regardless of integration scenario" (Peel et al., p. 20). The results suggest that rather than focusing chemical dependency educational programs on expert information concerning the physical effects of alcohol and the process of addiction, for example, more emphasis should be placed on the individual's own personal experiences (episodic knowledge) with alcohol.

Research concerning the educational effectiveness of mapping has also been conducted. For example, a study by McCagg & Dansereau (1991) was conducted concerning the effects of student-generated maps as a learning strategy. Prior to the study, the students were educated about mapping, as well as in the construction of maps. The students were randomly assigned to one of two groups: creating a map on either statistics or physiology. However, for testing purposes, the students were responsible for knowing the required information in both statistics and physiology. They were allowed to study a map containing information on their assigned topic, but were required to find other means of studying material on the unassigned topic. It was concluded that the students assigned to the physiology group showed significantly greater knowledge in that area as compared to the scores of those same students on statistics. In addition, the knowledge acquired by those students remained intact over a period of several days after initial examination. However, a significant finding was not evidenced in the statistics group. "Despite the lack of unequivocal support for the memorial benefits of student mapping, the results of the present study indicate that mapping can join the ranks with other student-generated
supplemental learning strategies, such as note taking" (McCragg & Dansereau, 1991, p. 323).

The effectiveness of mapping to communicate new information is also supported in a study by Knight, Simpson, & Dansereau (1994). In this study, mapping was incorporated in an effort to educate randomly assigned drug-addicted probationers about a new relapse prevention training (RPT) program. Those probationers assigned to the RPT group which used mapping as the primary instructional tool scored significantly higher on the knowledge tests administered after each lesson. It was concluded that "map supplements appear to be helpful in enhancing processing and recall of the information at the end of each lesson" (Knight et al., p. 198). In a related finding, the probationers exposed to the mapping condition had significantly fewer positive urinalysis results in the first month following the RPT than did the non-mapping group. Considering these findings, the authors stated, "mapping appears to enrich the group presentations by increasing probationer participation in discussions as well as by improving understanding and application of the information" (Knight et al., p. 198). These conclusions have considerable significance within a counseling format.

The benefits of mapping in a counseling environment have only recently been addressed (Lambiotte et al., 1989). In addition, the majority of this research has been conducted within the substance abuse field. According to Dees & Dansereau (1993), "Use of drugs and alcohol is essentially an experiential, or episodic process" (p. 646). Directly related to counseling, several studies have been conducted exploring the impact of mapping on client engagement and progress. Of these, several were conducted using data generated in three community-based methadone treatment programs in the southwest region of the U.S. (Dansereau, Joe, & Simpson, 1993; Knight, Dansereau, Joe, & Simpson, 1994). In these studies, the on-site drug abuse counselors were randomly assigned into a mapping group or a non-mapping group. The non-mapping counselors
merely conducted "talk" therapy with all clients on their caseloads, whereas the mapping counselors were afforded the opportunity to utilize mapping both in individual and group sessions as an adjunct to their own counseling methods.

In the first methadone maintenance study by Dansereau, Joe & Simpson (1993), there were several statistically significant differences within the first three months of treatment for mapping vs. non-mapping groups. One significant difference was discovered for measures of client commitment to counseling. The clients who were on the caseloads of the mapping counselors (i.e., exposed to mapping during treatment) showed greater commitment to counseling through higher attendance rates at scheduled counseling sessions. The mapping clients also perceived their counselors more positively in terms of helpfulness and ability, and the counselors' perceptions of their clients, in terms of communication effectiveness and motivation, were also greater for the mapping group.

"These findings demonstrated the general potential of mapping on treatment process and promoting therapeutic alliance between client and counselor" (Dansereau et al., p. 394). This study further supports the benefit of a shared ZBK in promoting the integration of a client's semantic and episodic knowledge.

A follow-up on the previous study was conducted which yielded more significant results (Dansereau et al., 1995). For example, the follow-up study revealed lower percentages of positive urine results associated with mapping clients as compared to the non-mapping clients. This finding serves "to validate the counselor ratings and provide evidence for the efficacy of mapping using an objective behavioral criterion" (Dansereau et al., p. 383). The initial study used subjective criterion, such as attended and unattended counseling sessions, whereas the follow-up study extends the findings to actual drug-use/relapse criteria.

A subsequent study was conducted within the same methadone-maintenance treatment facilities which compared client perceptions of the effectiveness of group vs.
individual counseling sessions in mapping and non-mapping conditions (Knight et al., 1994). Questionnaires, developed by the researchers, were given to clients exposed both to mapping and non-mapping groups to assess cognitive-behavioral functioning in terms of self-understanding, problem solving, planning, understanding of others and crisis intervention. Questionnaires were also given to the clients of both groups to assess motivational variables such as self-efficacy and hope. The results revealed that the clients exposed to mapping in both individual and group sessions had more favorable scores on these questionnaires than did their non-mapping counterparts. Ratings of personal progress were also higher for mapping clients than for standard (nonmapping) clients. The research also revealed that those clients in the non-mapping modality attributed greater value to individual counseling sessions in terms of helpfulness as compared to group counseling. However, the perceived value of group counseling was increased for those clients in the mapping group to the same level reported for individual counseling by the same clients. This has direct validity for this study in terms of the increased effectiveness of group therapy through the use of mapping.

Related to cooperative, or group, interaction, one study was conducted assessing the benefits of scripted cooperation, an information processing strategy using partners, coupled with mapping (Dees et al., 1992). The study examined the effectiveness of using maps and scripted cooperation in presenting information concerning identifiable patterns of behavior that underlie recurring alcohol abuse. The subjects, students at TCU, were randomly assigned to one of two materials format conditions (map vs. text format) and to one of two processing strategy conditions (individual processing vs. scripted interaction with a partner). The information was presented to the students with the intent of increasing awareness about the nature of drinking behavior (Dees et al.). Of the results, two are of great importance. Firstly, the mapping format used to present information about behavior patterns related to recurring alcohol use was shown to be an effective
technique in enhancing recall of that information. Secondly, the individuals using
the scripted cooperation strategy were better able to identify drinking patterns associated
with alcohol abuse. "... participants who worked with partners saw all patterns coming
into play more frequently than did those who worked alone" (Dees, et al., 1992, p. 317).
This finding supports interactive processing concerning identification of chemically
dependent behaviors as seen in a group setting.

The relative benefits of mapping in a counseling environment have been cited.
Although the research is minimal, the data seem to suggest an effective and therapeutic
component inherent to mapping which can be utilized to enhance counseling effectiveness.
The apparent ability of mapping to facilitate client awareness and operational knowledge
concerning addictive behaviors may serve to enhance the recovery process within a
Rational Recovery (RR) group as well.

Cognitive Functioning

In the past, questions have arisen within the field of addictions concerning the
cognitive abilities of chemically addicted individuals, mainly alcoholics, in terms of self-
examination, performance on cognitive tasks, decision making and problem solving
(Stringer & Goldman, 1988; Goldman & Goldman, 1988). Initially, this proved relevant
to the treatment of addictions in regards to a chemically addicted individual's ability to
recognize personal cognitions and behaviors associated with those cognitions, especially
during the first few weeks of sobriety. This concern has apparent implications for this
research in terms of a chemically addicted individual's ability to utilize and benefit from
node-link mapping, as well as actively assess and alter self-destructive behaviors.
Consequently, before delineating the essential components of RR, contemporary research
exploring this topic will be briefly addressed.

An expanding amount of research has shown that either the cognitive abilities of
chemically addicted individuals are actually not impaired at all, but merely dormant, or
certain cognitive deficits experienced by chemically addicted individuals can be quickly and effectively improved (Tiffany, 1990; Zimmerman & Zeller, 1992; Eckardt & Martin, 1986; Goldman, 1987). For example, in a study by Stringer & Goldman (1988), the cognitive performance on the Block Design subtest of the Wechsler Adult Intelligence Scale-Revised (WAIS-R) of male alcoholics over the age of 40 was assessed. Both alcoholic and nonalcoholic (control) groups were given the WAIS-R Block Design subtest in a pre and posttest fashion. The alcoholic males were exposed to direct rehearsal with a visuospatial task, as well as a simplified training strategy, rather than direct practice. "The present study, which compared these two approaches for the remediation of performance on the Wechsler Block Design test, has shown that both are equally effective for enhancing alcoholics' cognitive recovery" (Stringer & Goldman, 1988, p. 409).

Furthermore, this study allowed for the separation of time-dependent recovery, in terms of cognitive functioning, from experience-dependent recovery. In other words, offering the alcoholic subjects a strategy for enhancing cognitive functioning in a monitored environment expedited the cognitive recovery of these individuals. "Hence, forced use of cognitive skills appears to be the important factor in experience-dependent recovery" (Stringer & Goldman, 1988, p. 406).

In addition, Zimmerman & Zeller (1992) examined variables associated with spontaneous recovery among alcoholic individuals. They found that shifts in personal meaning toward alcohol addiction played an extremely important role in self-recovery. "Negative environmental consequences of alcoholic drinking have been invoked to explain spontaneous recovery, but a more compelling reason for sudden changes in behavior concerns shifts in the personal meanings surrounding alcohol use" (p. 691). They concluded that spontaneous recovery involved an individual's ability to reevaluate one's circumstance, determine more healthy behaviors, and acquire a new identity, all through sensory and imaginal processes.
In a related study, Ludwig (1985) attempted to "identify and analyze cognitive processes that covary with negative environmental events" in terms of spontaneous recovery of alcoholics (p. 53). Ludwig found that a common denominator among those who exhibited spontaneous recovery was an aversive "mental association" to alcohol. This association increased the subjects' awareness of the extent of suffering they had experienced as a result of drinking. Ludwig concluded that "negative environmental events per se had little inherent meaning; more important were the personal meanings about those events that individuals construed" (p. 57). All subjects reported a decision to stop drinking based on heightened awareness resulting from altered perceptions of their own drinking behavior. This reveals a cognitive ability of these subjects to reexamine a self-destructive behavior, arrive at alternatives to that behavior, and comprise a plan to alter the behavior.

Based on this research (Stringer & Goldman, 1988; Zimmerman & Zeller, 1992; Ludwig, 1985), as well as the previously presented research addressing the implications and effectiveness of node-link mapping, it is apparent that the cognitive abilities of chemically addicted individuals are, at least, accessible. In addition, node-link mapping can enhance the process involved in accessing one's cognitive abilities (Knight et al., 1994).

Rational Recovery

Rational Recovery Systems, Inc. (RR) is a free, self-help support organization designed primarily, but not exclusively, to benefit individuals with chemical dependency problems. Developed in 1986 by Jack Trimpey, and first published in The Small Book (1992), "It has chapters in over 700 cities throughout the United States, Canada and six other countries" (Fox, 1993, p. 108). RR is typically presented in a group environment composed of 5-15 individuals, but can be conducted individually as well. Initially, the development of RR was founded upon the therapeutic base of Rational-Emotive Behavior.
Therapy (REBT) as developed by Albert Ellis in 1955 (Trimpey, 1992). However, as a result of new developments within RR (e.g., The Structural Model of Addiction) by its founder, REBT is no longer cited as a sufficient therapeutic approach in assisting chemically addicted individuals in ceasing their addicted behavior (i.e., stop drinking) (Trimpey, 1994). Despite this fact, REBT will be addressed briefly in order to better familiarize the reader with all factors influencing and contributing to the development of RR as a treatment approach for chemical addiction.

REBT proposes an ABC paradigm for the explanation of psychological maladjustment, including addiction, and is widely known in therapeutic circles. The ABC's of REBT represent separate, identifiable occurrences which result in problematic emotional and/or behavioral consequences for an individual. Within the ABC paradigm, A is the Activating event, B represents the Belief (self-talk, irrational thought) one has about that event, and C represents the emotional or behavioral Consequences of those beliefs (Ellis, 1993). REBT postulates as its central theory of psychological maladjustment that A does not cause C, B causes C. It is the belief held about the event that results in the problematic emotional and/or behavioral consequence. "Whereas other therapists primarily focus on past events, unconscious processes, and environmental contingencies, REBT concentrates on people's current beliefs, attitudes and self-statements as contributing to or 'causing' and maintaining their emotional and behavioral disturbances" (Ellis, McInerney, DiGiuseppe, & Yeager, 1988, pp. 1-2).

In terms of chemical addiction, while non-addicted people are believed to have a greater balance of rational and irrational thoughts than substance abusers (although REBT views people as having more irrational thoughts in general), addicted individuals are viewed as possessing an abundance of irrational thoughts primarily centering around addiction, sobriety and self (Ellis et al.) These irrational thoughts centering around substance use and abuse for the addicted individual form a subset of irrational thoughts,
which compound the irrational thoughts already present in every individual. In REBT, once the beliefs are identified, they are disputed by the counselor via the scientific method and discarded only to be replaced by more realistic beliefs about the same events. Several basic features of REBT have played a critical role in the separation of RR from the REBT ranks. The purpose here is not a comparative analysis between RR and REBT. However, certain comparisons will be discussed below in an attempt to explain the separation of RR from the therapeutic base of REBT, as well as to highlight the essential aspects of RR which differentiate it from all other alternatives within the addictions field.

The primary factor resulting in the disassociation of RR with the therapeutic aspects of REBT is the development of The Structural Model of Addiction now proposed by RR (Trimpey, 1994). Lacking scientific evidence, the Structural Model of Addiction holds that the human brain "comes in 2 parts, a large neocortex ('new brain'), which is the human brain, and beneath the neocortex, at the end of your spinal cord, is the midbrain, which is basically the brain of a beast" (Trimpey, 1994, p. 79). The neocortex is that part of the brain responsible for reason, accessible memory and language, whereas the midbrain has only one purpose and desire, "to get what it wants", including alcohol and/or drugs (Trimpey, 1994, p. 80). It is important at this point to acknowledge that there is no scientific support for the concepts of RR.

Consequently, certain terminology proposed by RR can be easily misunderstood by novice readers. For instance, the term "Beast", as used by RR, signifies certain aspects of an addicted individual which serve to promote and/or prolong one's addiction. This term is not meant to imply that one should consider oneself negative or "beast-like" in any way. The term "Beast" has been incorporated into RR to enhance the process of recognition of one's addictive process. Once one's addictive tendencies have been realized, one can then begin to reevaluate and alter those tendencies. During the process of recognizing one's Beast, an addicted individual can then become aware of the part of oneself which seeks
sobriety. This is the primary function of labeling the Beast. Nevertheless, the major premises and concepts of Rational Recovery are, at this time, based on hypothetical considerations developed by its founder and, therefore require further research.

From an RR perspective, and lacking supporting research, through direct experience and as a result of the pleasurable aspects of chemicals, the addicted individual’s midbrain associated survival to the acquisition of mind-altering substances. Therefore, the midbrain considers drug use as necessary for survival. Its only function and purpose is to obtain more. Consequently, refusing to supply one’s Beast with more mind-altering chemicals serves to weaken the addictive voice of the Beast to near extermination.

In addition, since the midbrain must use the functions of the neocortex, namely language and imagery, to get what it wants, an individual has the ability, from a RR perspective, to recognize this process and actively choose to refuse the desires of the midbrain. "In order for your Beast (or midbrain) to get what it wants, it must first identify itself by telling you in pictures and words that it wants alcohol. Only 'the neocortical you' can decide to drink or not to drink" (Trimpey, 1994, p. 81). The cognitive and self-empowering aspects of RR are evidenced in the previous statement. The addictive voice of the Beast is very similar to the concept of irrational beliefs proposed in REBT. The realization of the desperate qualities of the Beast, according to Trimpey (1994), has contributed to the separation of RR from the REBT approach to the treatment of addictions. REBT, as stated above, proposes that irrational beliefs, which can be actively disputed, are the cause of addictions, as well as all dysfunctional emotions and behaviors. According to Trimpey (1994), it is impossible to dispute something that simply seeks pleasure and survival. Compromise and/or disputation is impossible when one is facing a primal, hedonistic entity such as one’s Beast. Therefore, the only course in defeating the addictive voice of the Beast is active and simple refusal.

However, when potent amounts of alcohol enter the body, the affects on the
neocortex and midbrain are completely different. "The effect on the midbrain is arousal, and the effect on the neocortex is impairment" (Trimpey, 1994, p. 84). Hence, the structural model, as theorized by Trimpey (1994), readily accounts for the apparent loss of control recognized as a primary component of addiction (Jellinek, 1960; Kinney & Leaton, 1991). Furthermore, an individual's apparent inability to rationalize when under the influence of alcohol, or other addicting chemicals, supports the position held by RR. Namely, that an intoxicated individual does not possess the ability to rationalize, as postulated by REBT, but only refuse. In addition, the inverse effect of intoxicating amounts of alcohol on the neocortex, as compared to the midbrain, has been the primary foundational support upon which the goal of RR is based. From a RR perspective, the only viable goal for each and every chemically addicted individual is complete and total abstinence. Should an addicted individual decide to engage in the use of an addictive substance, one's ability to rationalize and, therefore, actively choose is severely impaired.

The goal of RR has also contributed to its disjoining from REBT. According to Ellis (1992), a recovering addict can expect to return to controlled, successful use of the substance to which that individual was addicted after abstaining for approximately a year, should that person decide to do so. As stated above, however, RR postulates that the effects of mind-altering chemicals are such that they serve to inhibit the neocortex (rational "you"), and strengthen the midbrain, the Beast. For this reason, "successful" drinking at any time by an individual who has experienced an addiction to any substance is viewed as detrimental to the RR goal of abstinence. "In Rational Recovery, the purpose of abstaining from alcohol is not to prove that you are a better person, but to open the doors to genuine pleasure, as you define it" (Trimpey, 1992, p. 102). Having posited the structural model as the basis of addiction, as seen from a RR perspective, and how it differs from the theoretical approach of REBT, consideration will now be given to the
fundamental approach used in RR for promoting abstinence. The question which will be addressed here is, "How does one refuse one's addictive voice?" As stated earlier, the concepts of RR lack a scientific base. Consequently, the techniques purported to promote recovery within RR have been developed based on logical assumptions and propositions.

The process of recognizing one's Beast is known as the Addictive Voice Recognition Technique (AVRT). Through AVRT one becomes aware of the addictive messages from the Beast, or addictive voice, which then provides the rational self (the neocortex) an opportunity to actively choose to act on or refuse the addictive messages. "AVRT is simply the process of becoming aware of any thinking that supports the use of an addictive substance in any form, at any time for the rest of the individual's life" (Trimpey, 1992, p. 31). AVRT is actually a process which involves the incorporation of two concepts instrumental in promoting recovery within RR: constructing a Big Plan and recognizing ambivalence.

Ambivalence is defined as a function of the discrepancy between the rational self and the Beast. From an RR perspective, when an individual enters treatment for chemical addiction, one part of that person really wants to stop one's addictive behaviors, while another part wants the positive, pleasurable results which are inherently present with the use of any addictive substance. This state of ambivalence has been identified by others in the field of addictions as well. For example, Prochaska & DiClemente (1982, 1986) developed a model identifying several stages an addicted individual encounters during the process of change. In their model, there are six stages of change: 1) Precontemplation, 2) Contemplation, 3) Determination, 4) Action, 5) Maintenance, and 6) Relapse. Of importance here is the transition from stage 1 (Precontemplation) to stage 2 (Contemplation). An individual in the Precontemplation stage is not even considering change. This individual perceives no problem with any substance, and therefore would not typically be seen in treatment. From an RR perspective, this individual would be
considered to be "all Beast" (Trimpey, 1994). However, an individual in the Contemplation stage is described as one who is at least somewhat ambivalent (Prochaska & DiClemente, 1986). According to Prochaska & DiClemente (1986), "The characteristic style of the contemplator is 'yes, but.' This reflects the fact that part of the person wants to change and part does not" (p. 9). This accurately describes the state of ambivalence as proposed by RR.

By becoming aware of one's ambivalence, the individual consciously experiences the existence of the Beast for the first time. The process of assisting the chemically addicted individual in becoming aware of this state of ambivalence (the struggle between the rational self and the Beast) begins with the Big Plan. "A Big Plan is an irreversible decision to abstain from alcohol for the rest of your life" (Trimpey, 1992, p. 88). The formulation of a Big Plan begins by asking the individual, "What is your present plan for the future use of alcohol and/or drugs?" The individual discovers that he/she actually has no plan concerning the future use of any chemical substance. "In the logic of AVRT, the absence of a plan to quit for good is a plan, now, to drink" (Trimpey, 1992, p. 89). Although the individual may refrain from using occasionally, his/her Beast refuses to accept any concrete plan for the discontinuation of alcohol and/or drugs for the rest of the individual's life. To accept such a plan would mean that the Beast could not get what it wants. For the Beast, that is completely and totally unacceptable, and even frightening. It has kept the rational self from even considering such a plan at any time during the addiction. "The last thing your Beast wants you to do is to take control of your feelings and behavior, to become emotionally independent, to lay down the law with yourself about drinking, to stop always thinking about recovery, to allow yourself to naturally forget about the reasons you quit, and then to live a normal, happy life as a person who never drinks. Beasts despise AVRT" (Trimpey, 1992, p.88).

Once the chemically dependent person considers a future of sober weddings, funerals,
holidays, birthdays, picnics, parties, retirement and even some difficult times (e.g., sad
ess, boredom, unemployment), and even considers the thought of never feeling high
again or having his/her favorite drink ever again, an array of unpleasant feelings is
experienced (Trimpey, 1994). These feelings can include sadness, anxiety, depression,
anger, and panic. The individual is asked to notice any thoughts associated with that
process as well. It is often suggested that the individual write down those unpleasant
feelings and thoughts. Once this occurs, the individual is made aware of the source of
these feelings and thoughts, the Beast. According to Trimpey (1992),

"The sorry pictures you see of yourself, deprived of comfort and joy, are being shown
to you by your Beast. The thoughts you hear are the sounds of your Beast. 'That would
be terrible,' it may say. You can't do it. Never say never,' you may hear. 'Put this book
down. This is stupid,' it may urge. The individual is actually feeling his/her addiction to
alcohol or drugs, feeling your personal nemesis, your personal enemy itself, the infamous
Beast of Rational Recovery" (p. 90).

Subsequently, once the individual becomes aware of the unpleasant feelings and
thoughts, he/she is then asked to notice that voice, however small, which is agreeing with
the Big Plan. This is the voice of the rational self. By becoming aware of one's rational
voice immediately following awareness of the Beast, the rationalizations, excuses and
arguments (or "Beast tactics") used by the Beast to further the use of the addictive
substance become evident. Furthermore, the individual can now utilize rational, conscious
techniques designed to expedite the recognition of Beast tactics.

One such technique is known as "transposing the addictive grammar" (Trimpey,
1992, p. 93). From an RR perspective, the Beast speaks to the rational self using the
pronoun "I." For example, one's Beast might say, "I can't stay sober forever. I'll just stay
sober for a few months to prove that I can do it." This enables the Beast to operate
unnoticed by the individual, and makes it difficult for the rational self to separate from the
Beast. Once the individual becomes aware of the Beast and its tactics, he/she is encouraged to replace the pronoun "I" with the pronoun "it" in referring to the addictive voice. In addition, the individual is encouraged to separate the decisions of the rational self with the desires and wants of the Beast. Using the example cited above, the technique of transposing the addictive grammar would result in, "It can't stay sober forever. It only wants to stay sober for a few months. But I can stay sober forever. I want to stay sober not only for a few months, but forever."

In addition to learning to transpose one's addictive grammar, the chemically addicted individual is encouraged to "Track the Beast." Tracking the Beast begins with keeping a journal describing Beast activity. According to Trimpey (1994), there are four ways to describe Beast activity: (1) *frequency*, that is, are the Beast messages continuous, frequent, seldom, etc., (2) *intensity*, that is, is the addictive voice whispering, boisterous, vivid, etc., (3) *tone*, such as, is the Beast cynical, friendly, scolding, etc., and (4) *circumstances*, that is, is it active only at meals, when one is fatigued, when one is bored, depressed, and so on (p. 122). Not only does this process allow for greater recognition of the Beast and its tactics, but it affords the individual a means for recognizing the changing strategies of the Beast. As one initiates sobriety, the Beast will alter its now useless tactics and attempt to achieve a pleasurable state by any means necessary. From an RR perspective, relapse is the result of this process. By tracking the Beast, one is constantly aware of the Beast and its threat to one's sobriety. Threats to one's sobriety and possible relapse are, therefore, results of the Beast. The major components of RR (i.e., AVRT, the Big Plan, transposing the addictive grammar, and tracking) not only promote abstinence from the addictive substance, but also assist in the prevention of future relapses. Becoming aware of the Beast, rationally challenging it through transposing its grammar, and tracking the Beast enable the chemically addicted individual the personal freedom to refuse future addictive messages.
Having outlined the process of achieving and maintaining abstinence within an RR framework, attention will now be given to a review of the extremely brief literature addressing RR as a treatment for chemical addiction. Willis, Gastfriend, & Meyer (1993) analyzed data from a reader response questionnaire included in The Small Book which they had given to then current members of RR groups. The purpose of their study was to determine the factors contributing to chemically addicted individuals' rejection of AA and involvement in RR in treating their addictions. Of the respondents, 89% were sober at the time of questionnaire completion, 70% had made previous attempts to achieve sobriety, 89% had attended AA in the past, and 70% of those had discontinued AA involvement. Of those who discontinued AA, 51% reported doing so due to personal objections to the spiritual aspects of AA, 17% found AA to be too unscientific and/or irrational, and 16% felt they didn't "fit in" socially. In terms of what the respondents considered helpful methods for achieving sobriety, 44% reported "personal strength/willpower," whereas only 24% reported 12-step groups and/or literature.

From these findings, Willis et al. (1993) concluded that "some proportion of alcoholic individuals reject AA because of philosophical and/or other disagreements, and may be attracted to RR" (p. 3). They raise the question of whether rejection of AA represents resistance to recovery or legitimate treatment needs. If rejection of AA represents legitimate treatment needs, then effective alternatives should be sought. Not only does this study reveal that many chemically addicted individuals have rejected AA and its spiritual philosophy, but that RR is one viable alternative for those individuals to receive direction and support for their addictions.

In a study by Galanter, Egelko, & Edwards (1993), the nature of RR and its impact on chemically addicted individuals was examined. A national sample of 433 chemically addicted people attending 63 established RR groups was evaluated, using codable self-report questionnaires. The sample consisted mainly of men who had previously attended
AA. Respondents reported using a variety of drugs, although alcohol was the most common. The respondents were differentiated according to duration of attendance in terms of the impact of membership. Engaged members were those individuals who had joined the RR self-help group three or more months prior to the study, whereas recruits were defined as those who attended their first RR meeting during the prior month. The questionnaires revealed several supporting findings for RR as an alternative for the treatment of chemical addiction.

For instance, among the engaged group, 73% reported abstinence in the previous month, and had attended an average of 4.1 RR meetings during that month. More specifically, among those members who joined six or more months before, 58% reported at least six months of sobriety. Thirty-eight percent of the recruits reported being abstinent in the previous month, and reported attending an average of 3.2 meetings during that time. Interestingly, among members with a history of heavy cocaine use, the portion reporting abstinence in the previous month was not significantly different from those individuals who had never used cocaine. From this information, Galanter et al. (1993) concluded that "involvement in RR helped to sustain or engender abstinence in a notable portion of members" (p. 506). According to Galanter et al., as a result of their findings, RR can be compared to AA in terms of an alternative for the treatment of chemical addiction.

However, the results of this study showed a significant decrease in sobriety over time, suggesting a possible lessening in its effects after the first few months in treatment. The authors did not discuss their findings or offer possible explanations for this. In addition, no follow-up studies beyond six months have been reported. The limited research on RR suggests that it is a viable option to AA. However, its long-term impact on chemical addiction, including the problems of defensiveness and resistance to recovery have not been adequately investigated.
Research Question

In light of the literature presented, can node-link mapping enhance the recovery process for substance abusers over the age of 18 years in a Rational Recovery (RR) self-help group? For purposes of this study, the segment of the recovery process involves a shift in awareness, attitudes and beliefs of chemically addicted individuals toward greater self-awareness, less defensiveness, and a more balanced locus of control. These shifts would be indicated by lowered scores on the SASSI-2 and more moderate scores on the Rotter I-E scale. These shifts in awareness and attitudes would be accomplished by assisting the individual, through node-link mapping, to become aware of episodic information and to allow that information to be evaluated according to semantic knowledge. This procedure could address the problems of defensiveness and denial in the recovery process by allowing the individual to reevaluate beliefs and attitudes concerning one's present ability to control behavior. Many similar issues are addressed in both node-link mapping and RR. For instance, the benefits of node-link mapping in promoting awareness may prove beneficial in assisting a chemically addicted individual in a RR group with the process of recognizing the existence of one's Beast through the identification of unpleasant feelings, thoughts, and images, which are characteristic of episodic information. Educationally, mapping may enhance the instructional aspects inherent in a RR setting by assisting the individual in accessing the semantic system, promoting an understanding of the characteristics and methodology of the Beast. Furthermore, images used by the Beast and the voice of the Beast can be materialized through a map in promoting one's ability to track the Beast and transpose one's addictive grammar. By allowing episodic information (Beast) to be assimilated into a zone of bifunctional knowledge with semantic information (neocortex), the individual can become aware of chemically addictive behaviors, and make new decisions regarding those behaviors.
Chapter II

HYPOTHESES, METHODS, PROCEDURES, SUBJECTS, INSTRUMENTATION, AND STATISTICAL ANALYSES

The purpose of this research was to determine if node-link mapping enhanced the recovery process for chemically addicted adults within a Rational Recovery (RR) self-help environment. Due to the inherent educational aspects of RR, and the necessary condition of reducing defensiveness and increasing awareness of attitudes and beliefs into one's own addicted voice for the promotion of recovery, node-link mapping would appear to facilitate the recovery process within a RR treatment setting. The research evaluated locus of control and the degree of openness and defensiveness of all subjects prior to and following treatment. This chapter addresses the hypotheses, methods, procedures, subjects, instruments and statistical analyses implemented for this research.

Hypotheses

The first ten hypotheses stated below were tested for the purpose of examining the effectiveness of node-link mapping in enhancing the recovery process within an RR recovery format in relationship to a comparison RR group and a control group. Hypothesis eleven tested the findings from previous research that chemically addicted individuals tend to score in an internal direction on the Rotter I-E scale. Hypotheses twelve, thirteen and fourteen tested the effectiveness of node-link mapping and RR in altering attitudes and beliefs.

Hypothesis 1. Node-link mapping RR subjects will exhibit significant decreases in post-test mean global scores on the Substance Abuse Subtle Screening Inventory-2 as compared to pre-test scores.
Hypothesis 2. Node-link mapping RR subjects will exhibit significant decreases in post-test scores on the FVA, FVOD, DEF, OAT, SAT and COR subscales of the Substance Abuse Subtle Screening Inventory-2 scores as compared to pre-test scores.

Hypothesis 3. Comparison RR subjects will exhibit significant decreases in post-test Substance Abuse Subtle Screening Inventory-2 global scores as compared to pre-test scores.

Hypothesis 4. Comparison RR subjects will exhibit significant decreases in post-test scores on the FVA, FVOD, DEF, OAT, SAT and COR subscales of the Substance Abuse Subtle Screening Inventory-2 when compared to pre-test scores.

Hypothesis 5. Mean global scores on the Substance Abuse Subtle Screening Inventory-2 for node-link mapping RR subjects will be significantly lower than the mean post-test scores of comparison RR subjects.

Hypothesis 6. Node-link mapping RR subjects will score significantly lower on the FVA, FVOD, DEF, OAT, SAT and COR subscales of the Substance Abuse Subtle Screening Inventory-2 post-test than comparison RR subjects.

Hypothesis 7. Control group subjects will exhibit no significant change in post-test global scores on the Substance Abuse Subtle Screening Inventory-2 as compared to pre-test scores.

Hypothesis 8. Control group subjects will exhibit no significant change in post-test scores on the FVA, FVOD, DEF, OAT, SAT and COR subscales of the Substance Abuse Subtle Screening Inventory-2 scores when compared to pre-test scores.

Hypothesis 9. There will be a significant difference in the amount of change between pre and post-test Substance Abuse Subtle Screening Inventory-2 global scores for the three groups: a) node-link mapping RR subjects will show the greatest decrease; b) comparison RR subjects will show a lesser decrease as compared to the node-link mapping RR subjects and; c) control group subjects will show no significant decrease.
Hypothesis 10. There will be a significant difference in the amount of change between pre and post-test Substance Abuse Subtle Screening Inventory-2 FVA, FVOD, DEF, OAT, SAT and COR subscales scores: a) node-link mapping RR subjects will show the greatest decrease; b) comparison RR subjects will show a lesser decrease as compared to the node-link mapping RR subjects and; c) control group subjects will show no significant decrease.

Hypothesis 11. The pre-test mean scores on the Rotter Internal External Locus of Control Scale for all three subject groups will classify each group in the direction of internal locus of control than external.

Hypothesis 12. The post-test mean scores for the node-link mapping RR subject group and the RR comparison subject group on the Rotter Internal External Locus of Control Scale will shift away from the internal direction and toward the external direction as compared to pre-test scores.

Hypothesis 13. Node-link mapping RR subjects will exhibit a significantly greater shift in mean scores from a more internal locus of control to a more external locus of control from pre to post-test scores on The Rotter Internal-External Locus of Control Scale in comparison to the RR comparison group subjects.

Hypothesis 14. Control group subjects will exhibit no significant shift in mean post-test scores on The Rotter Internal-External Locus of Control Scale when compared to pre-test scores.

Methods

An RR format was used for both the experimental and comparison groups, each containing ten subjects. The Experimental node-link mapping (NLM) RR group was educated about node-link mapping in terms of nodes and links, as well as about the concepts and beliefs of RR. Each of the 12 group sessions addressed issues of recovery from an RR perspective, including relapse prevention. All information and ideas shared
during group time were processed using node-link maps, and illustrated on a chalkboard located in the group room. The Comparison group was only educated about RR and its concepts. Each group session addressed issues of recovery from an RR perspective, including relapse prevention. All information and ideas were processed verbally in the group. The Control group received no information. The only contact the Control group had with the researcher was as a result of pre and post-test administrations.

The control group received a treatment modality already implemented by the substance abuse agency at which the research was conducted. The Substance Abuse Subtle Screening Inventory-2 (SASSI-2) and the Rotter Internal-External Locus of Control Scale (I-E scale) were used to assess changes in the recovery process for all groups in terms of pre and post-test administration.

Procedures

Written consent was obtained from all subjects prior to the initiation of the study, and approval from the University of North Texas Human Subjects Committee was obtained prior to the onset of the study (see appendix B). Additionally, approval from the counseling agency from which all clients in the study originated was obtained. All subjects volunteered for the research, and were randomly assigned to each group. A Pre-Test/Post-Test Control Group Design was implemented. The experiment was conducted in twelve, one and one-half hour sessions per group for a total of eighteen hours per group. Each group met one time per week during the twelve week period. Once randomly assigned, and prior to the first group meeting, each member in the study completed the SASSI-2 and the I-E scale. Prior to the first of the twelve sessions, all groups met for a period of 90 minutes for administration of tests. During this time, the Experimental NLM group received a mapping demonstration for the sole purpose of educating all members about node-link mapping and its application. The Comparison and Control groups were presented with general information concerning their respective treatment regimens. Before
beginning the study, all subjects were advised of the nature of the experiment and the requirements and benefits of participation.

Once the series of twelve sessions began, both the Experimental NLM and Comparison groups received information as proposed by Rational Recovery (RR), and all discussions were guided utilizing RR and its concepts. The Control group simply continued to receive treatment from the research site according to its treatment protocol. In addition, the Experimental NLM group received information inherent in RR via node-link mapping, and processed discussions using node-link mapping. As part of the treatment, Experimental NLM subjects received one "outline" map for take-home purposes (see Appendix C for example of the outline map). The outline map contains links and nodes, but the nodes contain no information. Outline maps allow each mapping subject to process one's own addictive process outside of the 90 minute group sessions. Once the twelve group sessions were completed, all groups were again administered the SASSI-2 and the I-E scale in a post-test fashion. After both testing sessions (pre and post), all subjects were asked if they would like to review their results on the SASSI-2 and I-E Scale. No subjects elected to review the results of either instrument.

Subjects

The subjects who participated in this study were adult males, with a mean age of 37. All subjects were taken from an outpatient substance abuse treatment agency in the south-central region of the United States. The only inclusive categorization was each individual's perceived need for substance abuse counseling in lieu of chemical addiction. No exclusions were made in terms of gender, ethnicity or individual addictive substance. The ethnicity of all subjects included 53.33% African American, 30% White, 10% Hispanic and 6.66% Native American. The only exclusive category involved severity of chemical addiction, in that chemically addicted individuals requiring intensive, inpatient detoxification were excluded from the study and referred for more appropriate services.
The agency from which all subjects came provides a fifteen to eighteen months treatment protocol for adjudicated clients, which can be divided into three phases. The first phase involves intensive residential treatment with a twelve-step therapeutic foundation, lasting for nine to twelve months. During the first phase, clients receive individual and group counseling, as well as AA/NA meetings, on various topics directly and indirectly related to chemical dependency. Once completed, the client moves into the second phase consisting of outpatient treatment and AA/NA attendance which lasts for 13 weeks. During this time, each client is required to attend one outpatient group meeting, lasting for 90 minutes, as well as one AA/NA meeting per day. The third and final phase requires each client to attend one outpatient group per week for the final 13 weeks. All groups consisted of clients who were in the third phase of treatment.

Subjects were taken on a volunteer basis, and were randomly assigned to one of three groups using a table of random numbers. A sample size of ten subjects per group (N=30) was accepted, which was the minimum.

Instrumentation

Substance Abuse Subtle Screening Inventory-2

The SASSI-2 (Miller, 1985/1994) consists of 88 items combined from two separate questionnaires. The front half of the page contains an updated version of the original SASSI, which is a one-page, 62 dichotomous item (true/false), paper and pencil test consisting of seven subscales. There is a degree of homogeneity among the subscales, in that some questions are present in different subscales. There are two forms of the SASSI-2; one for use with adolescents and one for use with adults (18 and over). For purposes of this research, the adult SASSI-2 will be administered. Due to its recent revision, there has been little research addressing the reliability and/or the validity of the SASSI-2. However, the SASSI-2 demonstrates great similarity to the SASSI in its original version. The SASSI has proven effective in identifying people who abuse alcohol or other chemical substances.
regardless of sex, age or socioeconomic status (Miller, 1985). The SASSI-2 can be administered in either individual or group settings. It takes approximately ten to fifteen minutes to complete and can be hand scored in five to ten minutes. The test is intended to be readable at the fifth-grade level and can also be administered orally.

For purposes of this research, the recovery process was evaluated in terms of non-significant SASSI-2 global scores, as well as scores on the Face Valid Alcohol (FVA), Face Valid Other Drug (FVOD), Obvious Attributes Scale (OAT), Subtle Attributes Scale (SAT), Defensiveness Scale (DEF), and the Correctional Scale (COR) of the SASSI-2. Although neither the original SASSI nor the SASSI-2 has been evaluated in terms of its ability to measure the recovery process, these subscales assess areas highly associated with that process. According to Miller (1985), the primary purpose of the SASSI-2 is to serve as an objective screening tool to differentiate substance-abusers from non-abusers. The SASSI-2 consists of nine subscales which provide clinically useful information on each subject regarding level of denial, attitude toward the assessment, emotional pain, ability to acknowledge problems and risk of legal problems. The nine subscales are listed below. Under each subscale, consideration will be given to its function, number of items and significant numerical scores. The reliability and validity of both the SASSI and the SASSI-2 will be addressed following the subscale discussions.

The Obvious Attributes (OAT) Scale is designed to measure the openness of the client to admit to symptoms or problems related to substance abuse. The OAT consists of seventeen items, eleven of which are keyed true, and the remaining six false. An elevated score, twelve or above, on the OAT reflects similarities between the subject's responses and the candid responses given by criterion groups composed of chemically addicted individuals. A raw score of twelve is sufficient to contribute to the classification an individual as a chemical abuser.

The Subtle Attribute (SAT) Scale was designed to identify individuals attempting to
mask their chemical addiction. It consists of eleven items, eight of which are keyed true. According to Vacc (1985), the SAT is intended to differentiate substance abusers from non-substance abusers regardless of the respondent's degree of honesty. A SAT score of at least two standard deviations above the mean (a raw score of six or above) would contribute to a substance abuse identification.

The Defensiveness (DEF) Scale was designed to discriminate between criterion groups composed of candid abusers, and defensive abusers. The DEF is composed of fourteen items, nine of which are keyed false. An elevated number of falsely keyed responses indicates the defensive approach of this subscale. A high score on the DEF, eleven or greater for males and twelve or greater for females, yields evidence of defensiveness, and suggests that the subject is denying aspects of their substance abuse and, consequently, the SASSI-2 is not valid. A low score on the DEF indicates possible feelings of worthlessness and deficiency (Kerr, 1993).

The Supplemental Addiction Measure (SAM) Scale consists of fifteen items, nine of which are keyed true. SAM is intended to differentiate substance abusers with high DEF scores from nonabusers with elevated DEF scores. SAM is not typically interpreted for all assessment profiles. Its utility is most beneficial when an examinee scores two standard deviations above the mean on the DEF Scale, or scores one standard deviation above the mean on the DEF Scale and one or more standard deviations above the mean on either the OAT or SAT subscales. The SAM assists in the identification of defensive abusers when cross-validated with the DEF subscale. According to Miller (1985), the SAM subscale is assumed to have no meaning for those examinees without elevated DEF scores.

The Correctional (COR) Scale is a measure of relative risk of criminality. It consists of 16 items, seven keyed true. According to Frank Miller (personal communication, April 28, 1995) of the SASSI Institute, the COR scale is intended to be used in helping to make decisions regarding referral for treatment and supervision. Examinees who score above
the cutoff of eleven show response patterns similar to individuals who have relatively extensive criminal histories.

The Family (FAM) Scale is intended to be a preliminary measure of codependency. It consists of fourteen items, ten of which are keyed false. "Although the FAM scale has proven unsuccessful in differentiating abusers or codependents who are also adult children of alcoholics from other abusers or codependents, its utility in identifying individuals who have current issues with a chemically dependent individual awaits cross-validation" (Miller, 1985, chap. 4, p. 32).

According to Miller (personal communication, April 28, 1995), the Random Answering Pattern (RAP) Scale identifies examinees who have responded to the SASSI-2 in a non-meaningful manner (e.g., a person who randomly marks true and false without reading the questions). The RAP Scale consists of six items, three of which are keyed true and three false. The questions are such that all individuals giving meaningful responses would answer similarly to all of the items. A score of zero or one on the RAP Scale represents an examinee who is responding in a meaningful manner. However, a score of two suggests non-meaningful responses. According to Vacc (1994), scores of two, three or four signify a random response pattern on the part of the respondent.

The final two subscales are classified under one title: Face Valid Scales (FVS). (Miller, 1985/1994). Both the Face Valid Alcohol (FVA) Scale and the Face Valid Other Drug (FVOD) Scale are likert-type response scales. The FVA consists of twelve four-point items targeted specifically for assessing difficulties experienced due to alcohol use and/or abuse within the past three months. A score of ten or greater on the FVA is considered indicative of an alcohol abuser. The FVOD consists of fourteen four-point items targeted specifically for assessing difficulties experienced by the examinee due to chemical abuse other than alcohol within the past three months. Like the FVA, a score of ten or greater on the FVOD is indicative of substance abuse other than alcohol.
In addressing the validity of the original SASSI, Miller (1985) reported that the accuracy rate of the SASSI in discriminating substance abusers from non-substance abusers to be between 89 and 97 percent, with a miss rate of five to ten percent. In other words, the SASSI incorrectly identifies a non-abuser as an abuser, or incorrectly identifies an abuser as a non-abuser only five to ten percent of the time. According to Miller (1985), the combination of the SASSI and the Face Valid Scale (FVS) enhanced the validity of the SASSI with all populations. In combination, the SASSI and the FVS identified 90 percent of a residential population sample, 80 percent of defensive early stage abusers in a family oriented intensive outpatient program, and 90 percent of nonabusers who were also codependents. In addition, Cooper & Robinson (1987) reported that the SASSI has a concurrent validity of .62 with the MacAndrew Alcoholism Scale (MacAndrew, 1965).

Reliability has received little attention in terms of research on the original SASSI. According to Miller (1985), all indications point to the SASSI being very reliable in terms of consistent identification of substance abusers. According to Kerr (1993), the internal consistency of most of the subscales of the SASSI is quite low. "Because of the discriminant analysis method of construction, each subscale, excluding the FVA and FVOD, is made up of heterogeneous items rather than items related to a unitary construct" (Kerr, 1993, p. 6). The author found only one study of test-retest reliability performed on the SASSI, which was performed without the FVS. Kilkunas study on reliability (as cited in Kerr, 1993) tested 24 subjects on a four to six week interval and found moderate to good test-retest reliability. The reliability coefficients were reported as: OAT, .87; SAT, .91; DEF, .86; SAM, .91; FAM, .76.

In a personal communication with Wayne Renn of the SASSI Institute (December, 4, 1995), it was discovered that research addressing the criterion validity of the SASSI-2 has recently been addressed by the SASSI Institute. For the research, various treatment settings ranging from a Family Addictions Program to an Inpatient Hospital were utilized.
Collecting data from 690 subjects (N=690), the SASSI-2 correctly classified 607 (88%) as either chemically addicted or non-chemically addicted, with 8% of cases resulting in a false negative (i.e., results indicated no chemical addiction when it was present), and 4% of the subjects had positive scores which proved to be false.

The SASSI Institute also addressed test-retest reliability in an additional study. Using 40 subjects (N=40), 6 Subscales were evaluated for test-retest reliability. The results are as follows: OAT - .97; SAT - .96; DEF - .97; SAM - .97; FVA - .99 (N=33); FVOD - .99 (N=33). Based on this data, in addition to the vast similarities between the original SASSI and the SASSI-2, it would seem that for purposes of this research, the SASSI-2 has proven to identify characteristics associated with chemical addiction.

**The Rotter Internal-External Locus of Control Scale**

The Rotter Internal-External Locus of Control Scale (I-E scale) is a 29-item, forced-choice test including 6 filler items which serve the purpose of making the scale somewhat more ambiguous (Rotter, 1966). The raw score is determined by the number of external responses given by the subject. Hence, the score ranges for an external classification are from twelve to a possible 23. For an internal classification, the score ranges are from a possible zero to 11. According to Rotter (1966), the items of the I-E scale "deal exclusively with the subject's belief about the nature of the world" (p. 10). That is, the items address subjects' expectations, attitudes, cognitions and beliefs about the value they place on internal control. For instance, according to Gozali & Sloan (1971), locus of control, whether internal or external, "describes persons along the dimension of acceptance of responsibility for the outcome of their activities" (p. 159). This involves the attitudes and beliefs one holds concerning one's ability to control one's own behaviors.

Research addressing the internal/external locus of control among chemically addicted individuals, including those addicted to cigarettes and alcohol, has found that, contrary to previous expectations, these individuals tend to score in the internal dimension (Bunch &
Schneider, 1991; Abbott, 1982; Gozali & Sloan, 1971). As a result of this, Gozali & Sloan (1971) theorized that "the alcoholic's belief in his control over outcome of events may be partly responsible for his drinking behavior. In other words, the feedback from the consequences of his drinking does not modify his behavior because of his belief in his ability to control his behavior" (p. 161). This directly coincides with the existence of the Beast in the episodic system, resulting in a false sense of control. According to Trimpey (1994), a chemically addicted individual in denial, with a false sense of control and a lack of awareness, is considered to be "all Beast". Gozali & Sloan (1971) conclude by stating that treatment programs for chemical addiction should consider modifying control orientation as part of the program treatment goals. Accordingly, success for this study will be defined as significant movement from an internal locus of control toward an external locus of control.

The reliability and validity of the I-E scale will now be addressed. According to Rotter (1966), tests addressing internal consistency among varying populations and various sample sizes yielded correlations of .70 and above. "The test shows reasonable homogeneity or internal consistency, particularly when one takes into account that many of the items are sampling a broadly generalized characteristic over a number of specific or different situations" (Rotter, 1966, p. 17). In studies on the test-restest reliability of the I-E scale (Rotter, 1966), results ranged from .49 to .83, with group administrations during the first month being the highest, and individual administrations during the second month resulting in somewhat lower results. However, a study by Gozali & Sloan (1971) resulted in a high correlation (r = .81) between scores for alcoholics who were individually administered the I-E scale while in a hospital setting, and again 3 months after release from the hospital. According to Gozali & Sloan (1971), this "suggests adequate reliability and stability of the measure" (p. 160).

In a specific study addressing construct validity of the I-E scale, Adams-Webber
(1963) found a highly significant relationship (p = <.001) between a projective test of tendency for individuals to view punishment for immoral acts as being externally imposed or coming from an internal source and the I-E scale. Furthermore, in a study by Phares (1957), the I-E scale scores resulted in accurate prediction as to shifts in expectancy according to success or failure on learning performance tasks. The reliability and validity results, as well as the normative tests done by Rotter himself, yield strong support for the stability of the I-E scale.

Demographic Sheet

Finally, a brief demographic data sheet (see Appendix D) was administered for the collection of further data to be evaluated for possible future assessment. Areas addressed on the demographic sheet were age, gender, ethnicity, drug of choice, age of subject when alcohol/marijuana were first used, the length of time the subject has been addicted, previous treatment attempts, length of current treatment attempt, perceived benefit of previous treatment(s), perceived benefit of current treatment, and the anticipated benefit of the current study according to each subject. Also included on the demographic sheet were questions addressing subjects' amount of time in the current treatment facility, and the perceived benefit of that facility. The demographic sheet was completed by all subjects during the pre-test session.

Statistical Analyses

Hypotheses 1 through 4, 7, 8 and 11 through 14 were tested using a one-tailed t-test for difference between means. Hypotheses 5 and 6 were found to be inherently included within Hypotheses 9 and 10. Consequently, Hypotheses 5 and 6 were disregarded. Hypotheses 9 and 10 were tested using one-way analysis of covariance (ANCOVA), once a test of significant difference revealed difference between groups, with the pre-test score serving as the covariate. In addition, prior to the ANCOVA, a test of homogeneity was computed to determine that the distribution of the data was normal, and to ensure that the
variance of all groups was similar. These various statistical tests were computed according to the Statistical Package for the Social Sciences (SPSS), one of the most commonly used statistical software programs. A minimum significance level of $p< .05$ was set for the study prior to collecting and analyzing the data. See Table 1 for a complete list of hypotheses, purpose of each hypothesis and statistical test to be implemented for each hypothesis.

Table 1.

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<tr>
<th>HYPOTHESES:</th>
<th>PURPOSE</th>
<th>STATISTIC</th>
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<tr>
<td>Hypothesis 1. Node-link mapping RR subjects will exhibit significant decreases in post-test mean global scores on the mapping RR treatment SASSI-2 as compared to pre-test scores.</td>
<td>Efficacy of NLM RR treatment</td>
<td>t-test</td>
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<td>Hypothesis 2. Node-link mapping RR subjects will exhibit significant decreases in post-test scores on the FVA, FVOD, DEF, OAT, SAT and COR subscales of the SASSI-2 scores as compared to pre-test scores.</td>
<td>Efficacy of NLM RR treatment</td>
<td>t-test for each subscale score</td>
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<tr>
<td>Hypothesis 3. Comparison RR subjects will exhibit significant decreases in post-test SASSI-2 global scores as compared to pre-test scores.</td>
<td>Efficacy of comparison RR group</td>
<td>t-test</td>
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<tr>
<td>Hypothesis 4. Comparison RR subjects will exhibit significant decreases in post-test scores on the FVA, FVOD, DEF, OAT, SAT and COR subscales of the SASSI-2 when compared to pre-test scores.</td>
<td>Efficacy of comparison RR group</td>
<td>t-test for each subscale score</td>
</tr>
<tr>
<td>Hypothesis 5. Mean global scores on the SASSI-2 for NLM RR subjects will be significantly lower than the mean post-test scores of comparison RR subjects</td>
<td>Compare efficacy of NLM vs. comparison RR group</td>
<td>t-test</td>
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Table 1. (Con't)

Listing of hypotheses, purpose of each hypothesis and the statistical test for each.

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<td>Compare efficacy of NLM vs. comparison RR group</td>
<td>t-test for each subscale score</td>
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<tr>
<td>Hypothesis 7. Control group subjects will not exhibit no significant difference in post-test global scores on the SASSI-2 as compared to pre-test scores.</td>
<td>Control not effective</td>
<td>t-test</td>
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<td>Hypothesis 8. Control group subjects will not exhibit no significant difference in post-test scores on the FVA, FVOD, DEF, OAT, SAT, COR subscales of the SASSI-2 scores when compared to pre-test scores.</td>
<td>Control not effective</td>
<td>t-test for each subscale score</td>
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<td>Hypothesis 9. There will be a significant difference in the amount of change between pre and post-test SASSI-2 global scores for the three groups: a) node-link mapping RR subjects will show the greatest decrease; b) comparison RR subjects will show a lesser decrease as compared to the NLM RR subjects and; c) control group subjects will show no significant decrease.</td>
<td>Compare the three groups together</td>
<td>ANCOVA</td>
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<td>Hypothesis 10. There will be a significant difference in the amount of change between pre and post-test SASSI-2 FVA, FVOD, DEF, OAT SAT, COR subscales scores: a) NLM RR subjects will show the greatest decrease; b) comparison RR subjects will show a lesser decrease as compared to the node-link mapping RR subjects and; c) control group subjects will show no significant decrease.</td>
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### Hypotheses, Purpose of Each Hypothesis and the Statistical Test for Each

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<tr>
<td>Hypothesis 11</td>
<td>The pre-test mean scores on the Rotter I-E Scale for all subject groups will classify each group as internal locus of control than external.</td>
<td>Show internal locus of control tendency for subjects</td>
</tr>
<tr>
<td>Hypothesis 12</td>
<td>The post-test mean scores for the node-link mapping RR subject group and the RR comparison subject group on the Rotter I-E Scale will shift away from the internal direction and toward the external direction as compared to pre-test scores.</td>
<td>Efficacy of both NLM-RR treatment and RR comparison treatment in shifting attitudes</td>
</tr>
<tr>
<td>Hypothesis 13</td>
<td>Node-link mapping RR subjects will exhibit a significantly greater shift in mean scores from a more internal locus of control to a more external locus of control from pre to post-test scores on the Rotter I-E Scale in comparison to the RR comparison group subjects.</td>
<td>Compare efficacy of NLM-RR treatment and RR only treatment</td>
</tr>
<tr>
<td>Hypothesis 14</td>
<td>Control group subjects will exhibit no significant shift in mean post-test scores on The Rotter I-E Scale when compared to pre-test scores.</td>
<td>No change in control group scores</td>
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Definitions of Terms

**Addictive Voice Recognition Technique (AVRT)** - the primary technique in promoting recovery within an Rational Recovery framework composed of the Big Plan and recognizing ambivalence, designed to facilitate awareness of the Beast.

**Ambivalence** - a function of the discrepancy between the neocortex and the midbrain.

**Beast** - see Midbrain.

**Big Plan** - an irreversible decision made by the chemically addicted individual to totally discontinue all substance use for the rest of the individual's life. Facilitates the identification of ambivalence.

**Cognitive Functioning** - the cognitive ability of a chemically addicted individual in terms of self-examination, performance on cognitive tasks, decision making and problem solving.

**Cognitive modularity** - independent, mental processing systems for handling different types of information (e.g., separate systems dedicated to the processing of experiential vs. conceptual information).

**Declarative information** - information which can be recalled consciously, upon command, and can be communicated by the individual to external sources, analogous to semantic memory.

**Episodic Memory System** - unique extension of semantic memory involving a lesser degree of awareness by an individual. Involves information, memories and feelings acquired from concrete personal experiences which are triggered by environmental cues in a sequential nature.

**Information Maps** - impart information and help explain concepts in a simple and accurate fashion.

**Links** - a primary structure of node-link mapping, links convey the interrelational
processes or dynamics between the nodes in a map by incorporating an arrowhead to denote directionality, and are named by abbreviations according to their function (see Figure 1).

**Midbrain (Beast)** - theoretical representation of the section of the brain responsible for addictive behaviors desiring immediate gratification, composed primarily of episodic information and memory.

**Neocortex** - theoretical representation of section of the brain responsible for reason, accessible memory and language, composed primarily of semantic information and memory.

**Node-Link Mapping (Mapping)** - a graphic communication technique which uses links and nodes as building blocks to facilitate and enhance communication of information and promote personal awareness in a counseling environment (see Figure 2).

**Nodes** - a primary structure of node-link mapping, nodes contain concepts, actions, feelings and objects in the form of simple, verbal propositions, which may be of concern for the client, or group of clients, at any given time in the counseling process (see Figure 1).

**Nondeclarative information** - information triggered by external, environmental cues and cannot be completely explained by the individual. Nondeclarative information is completely inferred from overt, automatic behaviors and is analogous to episodic memory.

**Process Maps** - multi-structured, flexible maps which facilitate the organization and interpretation of information during the counseling process. They can be completed by the counselor or by an experienced client.

**Rational Recovery Systems, Inc. (RR)** - a free, self-help support organization designed primarily, but not exclusively, to benefit individuals with chemical dependency.

**Recovery Process** - a shift in awareness, attitudes and behaviors of chemically addicted
individuals as measured by the SASSI-2 and the Rotter I-E Scale.

Reference Maps - serve as outlines, assisting the counselor and client in staying focused and goal-directed.

Semantic Memory System - structured, categorized and relatively affect-free. Contains information acquired from the environment via lectures, discussions and as a result of thought. Access to the semantic memory systems is achieved through symbolic cues, personal and/or environmental.

Structural Model of Addiction - the theoretical base of RR, stating that the human brain is composed of two parts, the neocortex and the midbrain.

Tracking the Beast - an active technique to promote recovery involving journaling in order to identify, describe and alter messages from the Beast. Involves identifying the frequency, intensity, tone and circumstances of the Beast messages.

Transposing the Addictive Grammar - involves altering the messages from the Beast from the "I" pronoun to "it". (e.g., transposing "I can't stay sober forever" to "It doesn't want me to stay sober forever.")

Zone of Bifunctional Knowledge (ZBK) - contains information from both the semantic and episodic systems in an overlapping fashion considered beneficial in promoting growth and awareness.
CHAPTER III

RESULTS AND DISCUSSION

The purpose of this research was to determine if node-link mapping, within a Rational Recovery (RR) self-help environment, along with RR alone, enhanced the recovery process for chemically addicted adult males. Due to the inherent educational aspects of RR, and the necessary condition of reducing defensiveness and increasing awareness of attitudes and beliefs into one's own addicted voice for the promotion of recovery, node-link mapping would appear to facilitate the recovery process within a RR treatment setting. The research evaluated locus of control and the degree of openness and defensiveness of all subjects prior to and following treatment. This chapter addresses the results of the research, as well as a discussion of the findings.

Results

Sample Description

Participants (N = 30) ranged in age from 20 to 64 with a sample mean age of 37. The mean age of the three groups were as follows: Experimental NLM group subjects (n = 10) 35.4, Comparison group subjects (n = 10) 39.6, and Control group subjects (n = 10) 36. The majority of subjects were African American (n = 16, 53.33%), with the remaining sample comprised of Anglo/White ethnicity (n = 9, 30%), Hispanic (n = 3, 10%) and Native American (n = 2, 6.66%). Cocaine was the drug of choice (DOC) for the majority of subjects (n = 19, 63.33%). The remaining subjects listed alcohol (n = 5, 16.66%), marijuana (n = 2, 6.66%), heroin (n = 2, 6.66%) or lysergic acid diethylamide (LSD) (n = 2, 6.66%) as their individual DOC.

Hypotheses

Hypothesis 1. It was hypothesized that Experimental NLM subjects would exhibit significant decreases in post-test mean global scores on the SASSI-2 when compared to
their pre-test scores. One-tailed t-test was implemented to compare the pre to post-test mean scores (see Table 2).

Table 2

t-Test Between Post-test Mean Global SASSI-2 Scores and Pre-test Mean Global SASSI-2 Scores for Experimental NLM Group Subjects

<table>
<thead>
<tr>
<th>Source</th>
<th>N</th>
<th>Mean</th>
<th>S.D.</th>
<th>S.E.M.</th>
<th>t-Valuel-tail</th>
<th>Prob</th>
</tr>
</thead>
<tbody>
<tr>
<td>Post-test</td>
<td>10</td>
<td>50.3</td>
<td>3.529</td>
<td>1.116</td>
<td>-1.56</td>
<td>0.07</td>
</tr>
<tr>
<td>Pre-test</td>
<td>10</td>
<td>53.1</td>
<td>6.28</td>
<td>1.986</td>
<td>1.56</td>
<td>0.07</td>
</tr>
</tbody>
</table>

As seen in Table 2, there was no significant difference from pre-test to post-test on the SASSI-2 global scores for the Experimental NLM subjects (p<.05). Although the means reveal a shift in scores from pre to post-test administration, the difference was not found to be significant.

Hypothesis 2. It was hypothesized that Experimental NLM subjects would exhibit a significant decrease in post-test scores on the SASSI-2 subscales FVA, FVOD, DEF, OAT, SAT, COR as compared to pre-test scores. One-tailed t-tests were implemented to assess significant difference from pre to post-test scores (see Table 3).

Table 3

t-Tests Between Post-test Mean Scores on FVA, FVOD, DEF, OAT, SAT, COR SASSI-2 Subscales and Pre-test Mean Scores for Experimental NLM Group Subjects.

<table>
<thead>
<tr>
<th>Source</th>
<th>N</th>
<th>Mean</th>
<th>S.D.</th>
<th>S.E.M.</th>
<th>t-Value1-tail</th>
<th>Prob</th>
</tr>
</thead>
<tbody>
<tr>
<td>FVA</td>
<td></td>
<td></td>
<td></td>
<td></td>
<td></td>
<td></td>
</tr>
<tr>
<td>Post-test</td>
<td>10</td>
<td>0.9</td>
<td>2.514</td>
<td>0.795</td>
<td>-0.28</td>
<td>0.393</td>
</tr>
<tr>
<td>Pre-test</td>
<td>10</td>
<td>1.2</td>
<td>1.989</td>
<td>0.629</td>
<td>-0.28</td>
<td>0.393</td>
</tr>
<tr>
<td>FVOD</td>
<td></td>
<td></td>
<td></td>
<td></td>
<td></td>
<td></td>
</tr>
<tr>
<td>Post-test</td>
<td>10</td>
<td>0.6</td>
<td>1.897</td>
<td>0.6</td>
<td>-1.31</td>
<td>0.1115</td>
</tr>
<tr>
<td>Pre-test</td>
<td>10</td>
<td>2.2</td>
<td>4.05</td>
<td>1.281</td>
<td>-1.31</td>
<td>0.1115</td>
</tr>
</tbody>
</table>

(table continues)
### Table 4

<table>
<thead>
<tr>
<th>Source</th>
<th>N</th>
<th>Mean</th>
<th>S.D.</th>
<th>S.E.M.</th>
<th>t-Value 1-tail</th>
<th>Prob</th>
</tr>
</thead>
<tbody>
<tr>
<td>DEF</td>
<td></td>
<td></td>
<td></td>
<td></td>
<td></td>
<td></td>
</tr>
<tr>
<td>Post-test</td>
<td>10</td>
<td>4.7</td>
<td>2.214</td>
<td>0.7</td>
<td>-1.91</td>
<td>0.0445</td>
</tr>
<tr>
<td>Pre-test</td>
<td>10</td>
<td>5.9</td>
<td>1.595</td>
<td>0.504</td>
<td>-1.91</td>
<td>0.0445</td>
</tr>
<tr>
<td>OAT</td>
<td></td>
<td></td>
<td></td>
<td></td>
<td></td>
<td></td>
</tr>
<tr>
<td>Post-test</td>
<td>10</td>
<td>10.5</td>
<td>2.461</td>
<td>0.778</td>
<td>-1.37</td>
<td>0.102</td>
</tr>
<tr>
<td>Pre-test</td>
<td>10</td>
<td>11.4</td>
<td>2.797</td>
<td>0.884</td>
<td>-1.37</td>
<td>0.102</td>
</tr>
<tr>
<td>SAT</td>
<td></td>
<td></td>
<td></td>
<td></td>
<td></td>
<td></td>
</tr>
<tr>
<td>Post-test</td>
<td>10</td>
<td>7</td>
<td>1.7</td>
<td>0.537</td>
<td></td>
<td></td>
</tr>
<tr>
<td>Pre-test</td>
<td>10</td>
<td>7</td>
<td>1.563</td>
<td>0.494</td>
<td>0.0</td>
<td>0.5</td>
</tr>
<tr>
<td>COR</td>
<td></td>
<td></td>
<td></td>
<td></td>
<td></td>
<td></td>
</tr>
<tr>
<td>Post-test</td>
<td>10</td>
<td>10</td>
<td>1.826</td>
<td>0.577</td>
<td>-0.12</td>
<td>0.452</td>
</tr>
<tr>
<td>Pre-test</td>
<td>10</td>
<td>10.1</td>
<td>3.542</td>
<td>1.12</td>
<td>-0.12</td>
<td>0.452</td>
</tr>
</tbody>
</table>

All subscales except for SAT reveal a decrease in mean scores from pre to post-test. Of the six subscales, only the DEF subscale showed a significant difference when comparing pre to post-test results (p< .05), with a one-tail probability of .04. The mean scores from pre (M = 5.9) to post-test (M = 4.7) reveal a significant decrease for Experimental NLM Group subjects on the DEF subscale.

**Hypothesis 3.** It was hypothesized that Comparison group subjects would exhibit a significant decrease in post-test SASSI-2 global scores when compared to pre-test scores. A One-tailed t-test was implemented to assess any significant difference between pre and post-test scores for the comparison group subjects (see Table 4).

### Table 4

<table>
<thead>
<tr>
<th>t-Test Between Post-test Mean Global SASSI-2 Scores and Pre-test Mean Global SASSI-2 Scores for Comparison Group Subjects.</th>
</tr>
</thead>
<tbody>
<tr>
<td>Source</td>
</tr>
<tr>
<td>--------</td>
</tr>
<tr>
<td>Post-test</td>
</tr>
<tr>
<td>Pre-test</td>
</tr>
</tbody>
</table>
As evidenced in Table 4, there proved to be a significant difference between pre and post-test results for the comparison group subjects ($p < .05$), at $.018$. An examination of the means shows a significant decrease in scores from pre ($M = 47.6$) to post-test ($M = 42.3$) administration for the comparison group subjects.

**Hypothesis 4.** It was hypothesized that Comparison group subjects would exhibit significant decreases in post-test scores on the FVA, FVOD, DEF, OAT, SAT, and COR subscales of the SASSI-2 when compared to pre-test scores. A one-tailed t-test was implemented to assess any significant difference between pre and post-test scores for each subscale (see Table 5).

**Table 5**

<table>
<thead>
<tr>
<th>Source</th>
<th>N</th>
<th>Mean</th>
<th>S.D.</th>
<th>S.E.M.</th>
<th>t-Valuel1-tail</th>
<th>Prob</th>
</tr>
</thead>
<tbody>
<tr>
<td>FVA</td>
<td></td>
<td></td>
<td></td>
<td></td>
<td></td>
<td></td>
</tr>
<tr>
<td>Post-test</td>
<td>10</td>
<td>0.5</td>
<td>1.581</td>
<td>0.5</td>
<td>0.54</td>
<td>0.302</td>
</tr>
<tr>
<td>Pre-test</td>
<td>10</td>
<td>0.2</td>
<td>0.632</td>
<td>0.2</td>
<td></td>
<td></td>
</tr>
<tr>
<td>FVOD</td>
<td></td>
<td></td>
<td></td>
<td></td>
<td></td>
<td></td>
</tr>
<tr>
<td>Post-test</td>
<td>10</td>
<td>0.4</td>
<td>0.843</td>
<td>0.267</td>
<td>-0.92</td>
<td>0.19</td>
</tr>
<tr>
<td>Pre-test</td>
<td>10</td>
<td>0.9</td>
<td>2.025</td>
<td>0.64</td>
<td></td>
<td></td>
</tr>
<tr>
<td>DEF</td>
<td></td>
<td></td>
<td></td>
<td></td>
<td></td>
<td></td>
</tr>
<tr>
<td>Post-test</td>
<td>10</td>
<td>7.9</td>
<td>2.767</td>
<td>0.875</td>
<td>0.21</td>
<td>0.419</td>
</tr>
<tr>
<td>Pre-test</td>
<td>10</td>
<td>7.7</td>
<td>2.497</td>
<td>0.79</td>
<td></td>
<td></td>
</tr>
<tr>
<td>OAT</td>
<td></td>
<td></td>
<td></td>
<td></td>
<td></td>
<td></td>
</tr>
<tr>
<td>Post-test</td>
<td>10</td>
<td>5.9</td>
<td>3.573</td>
<td>1.13</td>
<td>-2.74</td>
<td>0.011</td>
</tr>
<tr>
<td>Pre-test</td>
<td>10</td>
<td>10</td>
<td>3.742</td>
<td>1.183</td>
<td></td>
<td></td>
</tr>
<tr>
<td>SAT</td>
<td></td>
<td></td>
<td></td>
<td></td>
<td></td>
<td></td>
</tr>
<tr>
<td>Post-test</td>
<td>10</td>
<td>4.6</td>
<td>1.35</td>
<td>0.427</td>
<td>-3.04</td>
<td>0.007</td>
</tr>
<tr>
<td>Pre-test</td>
<td>10</td>
<td>6.4</td>
<td>1.838</td>
<td>0.581</td>
<td></td>
<td></td>
</tr>
</tbody>
</table>

(table continues)
Table 5 reveals no significant difference between pre and post-test results for FVA, FVOD and DEF subscales of the SASSI-2 (p< .05). OAT, SAT and COR subscales of the SASSI-2 show a significant difference between pre and post-test scores (p< .05). The mean scores for these subscales show a decrease in pre to post-test scores for the Comparison group subjects.

**Hypothesis 5.** It was hypothesized that the mean global scores on the SASSI-2 for Experimental NLM subjects would be significantly lower than the mean post-test scores of the comparison group RR subjects. Due to the inherent inclusion of this hypothesis in hypothesis 9, hypothesis 5 has been disregarded.

**Hypothesis 6.** It was hypothesized that Experimental NLM subjects would score significantly lower on the FVA, FVOD, DEF, OAT, SAT, COR subscales of the SASSI-2 post-test than when compared to comparison RR subjects. Due to the inherent inclusion of this hypothesis in hypothesis 10, hypothesis 6 has been disregarded.

**Hypothesis 7.** It was hypothesized that Control group subjects would exhibit no significant difference in post-test global scores on the SASSI-2 as compared to pre-test scores. A two-tailed t-test was implemented to assess any significant difference between pre and post-test SASSI-2 global scores (see Table 6).

### Table 6

<table>
<thead>
<tr>
<th>Source</th>
<th>N</th>
<th>Mean</th>
<th>S.D.</th>
<th>S.E.M.</th>
<th>t-Value1-tail</th>
<th>Prob</th>
</tr>
</thead>
<tbody>
<tr>
<td>COR</td>
<td></td>
<td></td>
<td></td>
<td></td>
<td></td>
<td></td>
</tr>
<tr>
<td>Post-test</td>
<td>10</td>
<td>5.6</td>
<td>2.989</td>
<td>0.945</td>
<td>-3.32</td>
<td>0.004</td>
</tr>
<tr>
<td>Pre-test</td>
<td>10</td>
<td>9.3</td>
<td>3.622</td>
<td>1.146</td>
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<td></td>
</tr>
</tbody>
</table>
Table 6 shows no significant difference on SASSI-2 global scores from pre to post-test administration for Control group subjects (p< .05). Examination of the mean pre (M = 50.8) and post-test (M = 49.2) scores for the Control group subjects shows no significant change.

**Hypothesis 8.** It was hypothesized that Control group subjects would exhibit not significant difference in post-test scores on the FVA, FVOD, DEF, OAT, SAT, and COR subscales of the SASSI-2 when compared to pre-test scores. A two-tailed t-test was implemented to assess any significant difference between pre and post-test scores on each of the six subscales (see Table 7).

**Table 7**

<table>
<thead>
<tr>
<th>Source</th>
<th>N</th>
<th>Mean</th>
<th>S.D.</th>
<th>S.E.M.</th>
<th>t-Value</th>
<th>2-tail Prob</th>
<th>Prob</th>
</tr>
</thead>
<tbody>
<tr>
<td>FVA</td>
<td></td>
<td></td>
<td></td>
<td></td>
<td></td>
<td></td>
<td></td>
</tr>
<tr>
<td>Post-test</td>
<td>10</td>
<td>1.5</td>
<td>2.461</td>
<td>0.778</td>
<td></td>
<td></td>
<td></td>
</tr>
<tr>
<td>Pre-test</td>
<td>10</td>
<td>0.8</td>
<td>1.317</td>
<td>0.416</td>
<td>0.68</td>
<td>0.511</td>
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</tr>
<tr>
<td>FVOD</td>
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<td></td>
</tr>
<tr>
<td>Post-test</td>
<td>10</td>
<td>1.2</td>
<td>2.7</td>
<td>0.854</td>
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</tr>
<tr>
<td>Pre-test</td>
<td>10</td>
<td>1.5</td>
<td>2.55</td>
<td>0.806</td>
<td>-0.22</td>
<td>0.827</td>
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<tr>
<td>DEF</td>
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</tr>
<tr>
<td>Post-test</td>
<td>10</td>
<td>7</td>
<td>1.826</td>
<td>0.577</td>
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</tr>
<tr>
<td>Pre-test</td>
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<td>0.651</td>
<td>1.21</td>
<td>0.257</td>
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</tr>
<tr>
<td>Post-test</td>
<td>10</td>
<td>8.8</td>
<td>2.936</td>
<td>0.929</td>
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<tr>
<td>Pre-test</td>
<td>10</td>
<td>10.7</td>
<td>3.945</td>
<td>1.248</td>
<td>-2.69</td>
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<tr>
<td>SAT</td>
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</tr>
<tr>
<td>Post-test</td>
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<td>Pre-test</td>
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<td>5.8</td>
<td>1.476</td>
<td>0.467</td>
<td>-1.31</td>
<td>0.223</td>
<td></td>
</tr>
</tbody>
</table>

(table continues)
Table 7 reveals one significant difference between pre and post-test results for the OAT subscale of the SASSI-2 (p<.05), at .025. Mean scores on pre (M = 10.7) and post-test (M = 8.8) administration for the OAT subscale shows a decrease. The remaining subscales, FVA, FVOD, DEF, SAT and COR show no significant difference between pre and post-test scores.

Hypothesis 9. It was hypothesized that there would be a significant difference in the amount of change between pre and post-test SASSI-2 global mean scores for the three groups: a) Experimental NLM subjects would show the greatest decrease; b) Comparison subjects would show a lesser decrease as compared to the Experimental NLM subjects and; c) Control group subjects would show no significant decrease. Tests of Homogeneity of Regression Assumption for all groups was conducted (see Table 8), with pre-test as covariate, to insure that the linear regression of the covariate is similar for all groups.

Table 8

<table>
<thead>
<tr>
<th>Source</th>
<th>Sum of Squares</th>
<th>df</th>
<th>Mean Square</th>
<th>F</th>
<th>Sig of F</th>
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<tbody>
<tr>
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<td>307.76</td>
<td>16</td>
<td>19.23</td>
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</tr>
<tr>
<td>Covariate</td>
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<td>1</td>
<td>266.79</td>
<td>13.87</td>
<td>0.002</td>
</tr>
<tr>
<td>Group</td>
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<td>1</td>
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<td>0.012</td>
</tr>
<tr>
<td>Covariate by Group</td>
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<td>8.56</td>
<td>0.45</td>
<td>0.514</td>
</tr>
</tbody>
</table>

Test of Homogeneity of the Regression Assumption results show that the linear regression of the covariate (pretest) is similar for all groups (0.514).

A one-way ANCOVA, with pre-test scores as the covariate, between all groups was
conducted as a test of overall significant difference on the SASSI-2 Global scores from pre to post-test administration (see Table 9). Adjusted Means for each group were computed, with the results for each group as follows: Experimental NLM group (.793), Comparison group (.7.539), and Control group (1.368). Table 9 shows any significant difference between all groups on SASSI-2 Global scores from pre to post-test administration.

Table 9

One-Way ANCOVA Summary for Significant Difference Between all Groups on Pre to Post-Test SASSI-2 Global Scores

<table>
<thead>
<tr>
<th>Source</th>
<th>Sum of Squares</th>
<th>df</th>
<th>Mean Square</th>
<th>F</th>
<th>Sign.</th>
</tr>
</thead>
<tbody>
<tr>
<td>Within+Residual</td>
<td>535.68</td>
<td>26</td>
<td>20.6</td>
<td></td>
<td></td>
</tr>
<tr>
<td>Regression</td>
<td>942.42</td>
<td>1</td>
<td>942.42</td>
<td>45.74</td>
<td>0</td>
</tr>
<tr>
<td>Group</td>
<td>258.05</td>
<td>2</td>
<td>129.03</td>
<td>6.26</td>
<td>0.006</td>
</tr>
</tbody>
</table>

There was a significant difference between all groups on the SASSI-2 global scores from pre to post-test administration (p< .05).

A One-Way ANCOVA was then conducted between the Experimental NLM group and Comparison group subjects to determine significant difference between pre and post-test administration of SASSI-2 global scores. Table 10 illustrates a summary of findings for significant difference between the Experimental NLM group (Adj. Mean = 1.071) and the Comparison group (Adj. Mean = 7.029) pre to post-test global SASSI-2 scores.
<table>
<thead>
<tr>
<th>Source</th>
<th>Sum of Squares</th>
<th>df</th>
<th>Mean Square</th>
<th>F</th>
<th>Sign.</th>
</tr>
</thead>
<tbody>
<tr>
<td>Within+Residual</td>
<td>316.32</td>
<td>17</td>
<td>18.61</td>
<td></td>
<td></td>
</tr>
<tr>
<td>Regression</td>
<td>389.38</td>
<td>1</td>
<td>389.38</td>
<td>20.93</td>
<td>0</td>
</tr>
<tr>
<td>Group</td>
<td>153.84</td>
<td>1</td>
<td>153.84</td>
<td>8.27</td>
<td>0.01</td>
</tr>
</tbody>
</table>

There was a significant difference between Experimental NLM group and Comparison group subjects from pre to post-test administration on the SASSI-2 global scores ($p < .05$). An analysis of Tables 2 and 4 shows a greater decrease in SASSI-2 global mean scores from pre to post-test for the Comparison group subjects as compared to Experimental NLM group subjects.

A One-Way ANCOVA was then conducted between the Comparison group and Control group subjects to determine significant difference between pre and post-test administration of SASSI-2 global scores. Table 11 illustrates a summary of findings for significant difference between the Comparison group (Adj. Mean = 6.544) and the Control group (Adj. Mean = .356) pre to post-test global SASSI-2 scores.

<table>
<thead>
<tr>
<th>Source</th>
<th>Sum of Squares</th>
<th>df</th>
<th>Mean Square</th>
<th>F</th>
<th>Sign.</th>
</tr>
</thead>
<tbody>
<tr>
<td>Within+Residual</td>
<td>445.09</td>
<td>17</td>
<td>26.18</td>
<td></td>
<td></td>
</tr>
<tr>
<td>Regression</td>
<td>741.41</td>
<td>1</td>
<td>741.41</td>
<td>28.32</td>
<td>0</td>
</tr>
<tr>
<td>Group</td>
<td>183.81</td>
<td>1</td>
<td>183.81</td>
<td>7.02</td>
<td>0.017</td>
</tr>
</tbody>
</table>

There was a significant difference between Comparison group and Control group.
subjects from pre to post-test administration on the SASSI-2 global scores \( p < .05 \). An analysis of Tables 4 and 6 shows a greater decrease in SASSI-2 global mean scores from pre to post-test administration for the Comparison group subjects as compared to Control group subjects. This indicates that the greatest amount of change from pre to post-test administration of the SASSI-2 occurred for the Comparison group subjects.

A One-Way ANCOVA was then conducted between the Experimental NLM group and Control group subjects to determine significant difference between pre and post-test administration of SASSI-2 global scores. Table 12 illustrates a summary of findings for significant difference between Experimental NLM group subjects (Adj. Mean = 1.749) and the Control group subjects (Adj. Mean = .2.651) pre to post-test global SASSI-2 scores.

**Table 12**

**One-Way ANCOVA Summary for Significant Difference Between Experimental NLM and Control Group Subjects Global SASSI-2 Scores from Pre to Post-Test Administration**

<table>
<thead>
<tr>
<th>Source</th>
<th>Sum of Squares</th>
<th>df</th>
<th>Mean Square</th>
<th>F</th>
<th>Sign.</th>
</tr>
</thead>
<tbody>
<tr>
<td>Within+Residual</td>
<td>270.61</td>
<td>17</td>
<td>15.92</td>
<td></td>
<td></td>
</tr>
<tr>
<td>Regression</td>
<td>793.39</td>
<td>1</td>
<td>793.39</td>
<td>49.84</td>
<td>0</td>
</tr>
<tr>
<td>Group</td>
<td>3.95</td>
<td>1</td>
<td>3.95</td>
<td>0.25</td>
<td>0.625</td>
</tr>
</tbody>
</table>

There was no significant difference observed between Experimental NLM group and Control group subjects from pre to post-test administration on SASSI-2 global scores \( p < .05 \). **Hypothesis 10** It was hypothesized that there would be a significant difference in the amount of change between pre and post-test SASSI-2 FVA, FVOD, DEF, OAT, SAT, and COR subscales scores: a) Experimental NLM subjects would show the greatest decrease; b) Comparison group subjects would show a lesser decrease as compared to the Experimental NLM subjects and; c) Control group subjects would show no
significant decrease. Test of Homogeneity of Regression Assumption for all groups on each subscale of the SASSI-2 was first conducted, with each subscale pre-test as covariate, to insure that the linear regression of the covariate (pre-test) is similar for all groups. Table 13 illustrates a test of Homogeneity of Regression Assumption for the FVA subscale.

**Table 13**

**Test of Homogeneity of Regression Assumption on Subscale FVA Covariate for all Groups**

<table>
<thead>
<tr>
<th>Source</th>
<th>Sum of Squares</th>
<th>df</th>
<th>Mean Square</th>
<th>F</th>
<th>Sign.</th>
</tr>
</thead>
<tbody>
<tr>
<td>Within+Residual</td>
<td>78.18</td>
<td>16</td>
<td>4.89</td>
<td></td>
<td></td>
</tr>
<tr>
<td>PreFVA</td>
<td>54.32</td>
<td>1</td>
<td>54.32</td>
<td>11.12</td>
<td>0.004</td>
</tr>
<tr>
<td>Group</td>
<td>1.46</td>
<td>1</td>
<td>1.46</td>
<td>0.3</td>
<td>0.592</td>
</tr>
<tr>
<td>PreFVA by Group</td>
<td>0.04</td>
<td>1</td>
<td>0.04</td>
<td>0.01</td>
<td>0.926</td>
</tr>
</tbody>
</table>

Test of Homogeneity of the Regression Assumption results show that the linear regression of the covariate (FVA pretest) is similar for each group (0.926).

Table 14 illustrates a test of Homogeneity of Regression Assumption for the FVOD subscale.

**Table 14**

**Test of Homogeneity of Regression Assumption on Subscale FVOD Covariate for all Groups**

<table>
<thead>
<tr>
<th>Source</th>
<th>Sum of Squares</th>
<th>df</th>
<th>Mean Square</th>
<th>F</th>
<th>Sign.</th>
</tr>
</thead>
<tbody>
<tr>
<td>Within+Residual</td>
<td>33.37</td>
<td>16</td>
<td>2.09</td>
<td></td>
<td></td>
</tr>
<tr>
<td>PreFVOD</td>
<td>133.42</td>
<td>1</td>
<td>133.42</td>
<td>63.98</td>
<td>0</td>
</tr>
<tr>
<td>Group</td>
<td>0</td>
<td>1</td>
<td>0</td>
<td>0</td>
<td>0.976</td>
</tr>
<tr>
<td>PreFVOD by Group</td>
<td>0.16</td>
<td>1</td>
<td>0.16</td>
<td>0.08</td>
<td>0.787</td>
</tr>
</tbody>
</table>

Test of Homogeneity of the Regression Assumption results show that the linear regression of the covariate (FVOD pretest) is similar for each group (0.787).
Table 15 illustrates a test of Homogeneity of Regression Assumption for the DEF subscale.

Table 15

<table>
<thead>
<tr>
<th>Source</th>
<th>Sum of Squares</th>
<th>df</th>
<th>Mean Square</th>
<th>F</th>
<th>Sign.</th>
</tr>
</thead>
<tbody>
<tr>
<td>Within+Residual</td>
<td>93.84</td>
<td>16</td>
<td>5.87</td>
<td></td>
<td></td>
</tr>
<tr>
<td>PreDEF</td>
<td>8.83</td>
<td>1</td>
<td>8.83</td>
<td>1.51</td>
<td>0.237</td>
</tr>
<tr>
<td>Group</td>
<td>22.87</td>
<td>1</td>
<td>22.87</td>
<td>3.9</td>
<td>0.066</td>
</tr>
<tr>
<td>PreDEF by Group</td>
<td>1.45</td>
<td>1</td>
<td>1.45</td>
<td>0.25</td>
<td>0.626</td>
</tr>
</tbody>
</table>

Test of Homogeneity of the Regression Assumption results show that the linear regression of the covariate (DEF pretest) is similar for each group (0.626).

Table 16 illustrates a test of Homogeneity of Regression Assumption for the subscale OAT covariate for all groups.

Table 16

<table>
<thead>
<tr>
<th>Source</th>
<th>Sum of Squares</th>
<th>df</th>
<th>Mean Square</th>
<th>F</th>
<th>Sign.</th>
</tr>
</thead>
<tbody>
<tr>
<td>Within+Residual</td>
<td>139.96</td>
<td>16</td>
<td>8.75</td>
<td></td>
<td></td>
</tr>
<tr>
<td>PreOAT</td>
<td>59.75</td>
<td>1</td>
<td>59.75</td>
<td>6.83</td>
<td>0.019</td>
</tr>
<tr>
<td>Group</td>
<td>82.06</td>
<td>1</td>
<td>82.06</td>
<td>9.38</td>
<td>0.007</td>
</tr>
<tr>
<td>PreOAT by Group</td>
<td>9.23</td>
<td>1</td>
<td>9.23</td>
<td>1.06</td>
<td>0.32</td>
</tr>
</tbody>
</table>

Test of Homogeneity of the Regression Assumption results show that the linear regression of the covariate (OAT pretest) is minimally similar for each group (0.32).

Table 17 illustrates a test of Homogeneity of Regression Assumption for the subscale SAT covariate for all groups.
Table 17

Test of Homogeneity of Regression Assumption on Subscale SAT Covariate for all Groups

<table>
<thead>
<tr>
<th>Source</th>
<th>Sum of Squares</th>
<th>df</th>
<th>Mean Square</th>
<th>F</th>
<th>Sign.</th>
</tr>
</thead>
<tbody>
<tr>
<td>Within+Residual</td>
<td>32.82</td>
<td>16</td>
<td>2.05</td>
<td></td>
<td></td>
</tr>
<tr>
<td>PreSAT</td>
<td>12.86</td>
<td>1</td>
<td>12.86</td>
<td>6.27</td>
<td>0.023</td>
</tr>
<tr>
<td>Group</td>
<td>22.64</td>
<td>1</td>
<td>22.64</td>
<td>11.04</td>
<td>0.004</td>
</tr>
<tr>
<td>PreSAT by Group</td>
<td>1.48</td>
<td>1</td>
<td>1.48</td>
<td>0.72</td>
<td>0.408</td>
</tr>
</tbody>
</table>

Test of Homogeneity of the Regression Assumption results show that the linear regression of the covariate (SAT pretest) is minimally similar for each group (0.408).

Table 18 illustrates a test of Homogeneity of Regression Assumption for the subscale COR covariate for all groups.

Table 18

Test of Homogeneity of Regression Assumption on Subscale COR Covariate for all Groups

<table>
<thead>
<tr>
<th>Source</th>
<th>Sum of Squares</th>
<th>df</th>
<th>Mean Square</th>
<th>F</th>
<th>Sign.</th>
</tr>
</thead>
<tbody>
<tr>
<td>Within+Residual</td>
<td>78.97</td>
<td>16</td>
<td>4.94</td>
<td></td>
<td></td>
</tr>
<tr>
<td>PreCOR</td>
<td>73.72</td>
<td>1</td>
<td>73.72</td>
<td>14.94</td>
<td>0.001</td>
</tr>
<tr>
<td>Group</td>
<td>83.1</td>
<td>1</td>
<td>83.1</td>
<td>16.84</td>
<td>0.001</td>
</tr>
<tr>
<td>PreCOR by Group</td>
<td>0</td>
<td>1</td>
<td>0</td>
<td>0</td>
<td>0.983</td>
</tr>
</tbody>
</table>

Test of Homogeneity of the Regression Assumption results show that the linear regression of the covariate (COR pretest) is similar for each group (0.983).

A one-way ANCOVA, with pre-test scores as the covariate, between all groups was conducted as a test of overall significant difference for the FVA SASSI-2 subscale from pre to post-test administration. Table 19 illustrates the summary of these findings for the FVA subscale, with Adjusted Means for each group as follows: Experimental NLM (.970), Comparison (1.099), and Control (.332).
Table 19

One-Way ANCOVA Summary for Significant Difference Between All Groups on FVA SASSI-2 Subscale Scores from Pre to Post-Test Administration

<table>
<thead>
<tr>
<th>Source</th>
<th>Sum of Squares</th>
<th>df</th>
<th>Mean Square</th>
<th>F</th>
<th>Sign.</th>
</tr>
</thead>
<tbody>
<tr>
<td>Within+Residual</td>
<td>127.45</td>
<td>26</td>
<td>4.9</td>
<td></td>
<td></td>
</tr>
<tr>
<td>Regression</td>
<td>98.85</td>
<td>1</td>
<td>98.85</td>
<td>20.17</td>
<td>0</td>
</tr>
<tr>
<td>Group</td>
<td>7.1</td>
<td>2</td>
<td>3.55</td>
<td>0.72</td>
<td>0.494</td>
</tr>
</tbody>
</table>

There was no significant difference between all groups on the FVA SASSI-2 subscale scores from pre to post-test administration (p< .05).

A one-way ANCOVA, with pre-test scores as the covariate, between all groups was conducted as a test of overall significant difference for the FVOD SASSI-2 subscale from pre to post-test administration. Table 20 illustrates the summary of these findings for the FVOD subscale, with Adjusted Means for each group as follows: Experimental NLM (.970), Comparison (1.099), and Control (.332).

Table 20

One-Way ANCOVA Summary for Significant Difference Between All Groups on FVOD SASSI-2 Subscale Scores from Pre to Post-Test Administration

<table>
<thead>
<tr>
<th>Source</th>
<th>Sum of Squares</th>
<th>df</th>
<th>Mean Square</th>
<th>F</th>
<th>Sign.</th>
</tr>
</thead>
<tbody>
<tr>
<td>Within+Residual</td>
<td>103.68</td>
<td>26</td>
<td>3.99</td>
<td></td>
<td></td>
</tr>
<tr>
<td>Regression</td>
<td>217.32</td>
<td>1</td>
<td>217.32</td>
<td>54.5</td>
<td>0</td>
</tr>
<tr>
<td>Group</td>
<td>3.37</td>
<td>2</td>
<td>1.69</td>
<td>0.42</td>
<td>0.659</td>
</tr>
</tbody>
</table>

There was no significant difference between all groups on the FVOD SASSI-2 subscale scores from pre to post-test administration (p< .05).

A one-way ANCOVA, with pre-test scores as the covariate, between all groups was conducted as a test of overall significant difference for the DEF SASSI-2 subscale from pre to post-test administration. Table 21 illustrates the summary of these findings for the
DEF subscale, with Adjusted Means for each group as follows: Experimental NLM (1.580), Comparison (-.753), and Control (-.527).

Table 21

One-Way ANCOVA Summary for Significant Difference Between All Groups on DEF SASSI-2 Subscale Scores from Pre to Post-Test Administration

<table>
<thead>
<tr>
<th>Source</th>
<th>Sum of Squares</th>
<th>df</th>
<th>Mean Square</th>
<th>F</th>
<th>Sign.</th>
</tr>
</thead>
<tbody>
<tr>
<td>Within+Residual</td>
<td>115.84</td>
<td>26</td>
<td>4.46</td>
<td></td>
<td></td>
</tr>
<tr>
<td>Regression</td>
<td>31.46</td>
<td>1</td>
<td>31.46</td>
<td>7.06</td>
<td>0.013</td>
</tr>
<tr>
<td>Group</td>
<td>30.75</td>
<td>2</td>
<td>15.38</td>
<td>3.45</td>
<td>0.047</td>
</tr>
</tbody>
</table>

There was a significant difference between all groups on the SASSI-2 DEF subscale scores from pre to post-test administration (p<.05). The greatest amount of change from pre to post-test administration on the DEF subscale mean scores occurred for the Experimental NLM group. The Comparison group showed no significant change, and the Control group DEF subscale scores increased from pre to post-test administration.

A one-way ANCOVA, with pre-test scores as the covariate, between all groups was conducted as a test of overall significant difference for the OAT SASSI-2 subscale from pre to post-test administration. Table 22 illustrates the summary of these findings for the OAT subscale, with Adjusted Means for each group as follows: Experimental NLM (.511), Comparison (4.489), and Control (1.900).

Table 22

One-Way ANCOVA Summary for Significant Difference Between All Groups on OAT SASSI-2 Subscale Scores from Pre to Post-Test Administration

<table>
<thead>
<tr>
<th>Source</th>
<th>Sum of Squares</th>
<th>df</th>
<th>Mean Square</th>
<th>F</th>
<th>Sign.</th>
</tr>
</thead>
<tbody>
<tr>
<td>Within+Residual</td>
<td>180.67</td>
<td>26</td>
<td>6.95</td>
<td></td>
<td></td>
</tr>
<tr>
<td>Regression</td>
<td>104.03</td>
<td>1</td>
<td>104.03</td>
<td>14.97</td>
<td>0.001</td>
</tr>
<tr>
<td>Group</td>
<td>79.3</td>
<td>2</td>
<td>39.65</td>
<td>5.71</td>
<td>0.009</td>
</tr>
</tbody>
</table>
There was a significant difference between all groups on the SASSI-2 OAT subscale scores from pre to post-test administration (p< .05).

A one-way ANCOVA, with pre-test scores as the covariate, between all groups was conducted as a test of overall significant difference for the SAT subscale from pre to post-test administration. Table 23 illustrates these findings, with Adjusted Means for each group as follows: Experimental NLM (-.420), Comparison (1.800), and Control (1.220).

Table 23

<table>
<thead>
<tr>
<th>Source</th>
<th>Sum of Squares</th>
<th>df</th>
<th>Mean Square</th>
<th>F</th>
<th>Sign.</th>
</tr>
</thead>
<tbody>
<tr>
<td>Within+Residual</td>
<td>54.92</td>
<td>26</td>
<td>2</td>
<td></td>
<td></td>
</tr>
<tr>
<td>Regression</td>
<td>35.28</td>
<td>1</td>
<td>35.28</td>
<td>17.67</td>
<td>0</td>
</tr>
<tr>
<td>Group</td>
<td>25.29</td>
<td>2</td>
<td>12.65</td>
<td>6.33</td>
<td>0.006</td>
</tr>
</tbody>
</table>

There was a significant difference between all groups on the SASSI-2 SAT subscale scores from pre to post-test administration (p< .05).

A one-way ANCOVA, with pre-test scores as the covariate, between all groups was conducted as a test of overall significant difference for the COR SASSI-2 subscale from pre to post-test administration. Table 24 illustrates these findings, with Adjusted Means as follows: Experimental NLM (-.342), Comparison (3.700), and Control (1.942).

Table 24

<table>
<thead>
<tr>
<th>Source</th>
<th>Sum of Squares</th>
<th>df</th>
<th>Mean Square</th>
<th>F</th>
<th>Sign.</th>
</tr>
</thead>
<tbody>
<tr>
<td>Within+Residual</td>
<td>113.16</td>
<td>26</td>
<td>4.35</td>
<td></td>
<td></td>
</tr>
<tr>
<td>Regression</td>
<td>102.34</td>
<td>1</td>
<td>102.34</td>
<td>23.52</td>
<td>0</td>
</tr>
<tr>
<td>Group</td>
<td>81.18</td>
<td>2</td>
<td>40.59</td>
<td>9.33</td>
<td>0.001</td>
</tr>
</tbody>
</table>
There was a significant difference between all groups on the SASSI-2 COR subscale scores from pre to post-test administration (p< .05).

A one-way ANCOVA, with pre-test scores as the covariate, was conducted to assess significant difference for the DEF SASSI-2 subscale from pre to post-test administration between all combinations of groups. Table 25 illustrates the summary of these findings for Comparison and Control groups subjects on the DEF subscale, with Adjusted Means for each group as follows: Comparison (-.598), and Control (-.302).

Table 25

One-Way ANCOVA Summary for Significant Difference Between Comparison and Control Group Subjects DEF SASSI-2 Subscale Scores from Pre to Post-Test Administration

<table>
<thead>
<tr>
<th>Source</th>
<th>Sum of Squares</th>
<th>df</th>
<th>Mean Square</th>
<th>F</th>
<th>Sign.</th>
</tr>
</thead>
<tbody>
<tr>
<td>Within+Residual</td>
<td>81.32</td>
<td>17</td>
<td>4.78</td>
<td></td>
<td></td>
</tr>
<tr>
<td>Regression</td>
<td>30.38</td>
<td>1</td>
<td>30.38</td>
<td>6.35</td>
<td>0.022</td>
</tr>
<tr>
<td>Group</td>
<td>0.39</td>
<td>1</td>
<td>0.39</td>
<td>0.08</td>
<td>0.777</td>
</tr>
</tbody>
</table>

There was no significant difference between the Comparison group subjects and the Control group subjects on the SASSI-2 DEF subscale scores from pre to post-test administration (p< .05).

A one-way ANCOVA, with pre-test scores as the covariate, was conducted to assess significant difference for the DEF SASSI-2 subscale from pre to post-test administration. Table 26 illustrates the summary of these findings for Experimental NLM and Control groups subjects on the DEF subscale, with Adjusted Means for each group as follows: Experimental NLM (1.286), and Control (-.786).
Table 26

One-Way ANCOVA Summary for Significant Difference Between Experimental NLM and Control Group Subjects DEF SASSI-2 Subscale Scores from Pre to Post-Test Administration

<table>
<thead>
<tr>
<th>Source</th>
<th>Sum of Squares</th>
<th>df</th>
<th>Mean Square</th>
<th>F</th>
<th>Sign.</th>
</tr>
</thead>
<tbody>
<tr>
<td>Within+Residual</td>
<td>54.36</td>
<td>17</td>
<td>3.2</td>
<td></td>
<td></td>
</tr>
<tr>
<td>Regression</td>
<td>11.34</td>
<td>1</td>
<td>11.34</td>
<td>3.55</td>
<td>0.077</td>
</tr>
<tr>
<td>Group</td>
<td>21.2</td>
<td>1</td>
<td>21.2</td>
<td>6.63</td>
<td>0.02</td>
</tr>
</tbody>
</table>

There was a significant difference between the Experimental NLM group subjects and the Control group subjects on the SASSI-2 DEF subscale scores from pre to post-test administration (p< .05). An observation of the means for the Experimental NLM group on the DEF SASSI-2 subscale shows a decrease from 5.9 to 4.7 (see Table 3). An observation of the means for the Control group on the DEF SASSI-2 subscale shows an increase from 6.3 to 7 (see Table 7).

A one-way ANCOVA, with pre-test scores as the covariate, was conducted to assess significant difference for the DEF SASSI-2 subscale from pre to post-test administration between Experimental NLM and Comparison groups subjects. Table 27 illustrates the summary of these findings with Adjusted Means for each group as follows: Experimental NLM (1.674), and Comparison (-.674).

Table 27

One-Way ANCOVA Summary for Significant Difference Between Experimental NLM and Comparison Group Subjects DEF SASSI-2 Subscale Scores from Pre to Post-Test Administration

<table>
<thead>
<tr>
<th>Source</th>
<th>Sum of Squares</th>
<th>df</th>
<th>Mean Square</th>
<th>F</th>
<th>Sign.</th>
</tr>
</thead>
<tbody>
<tr>
<td>Within+Residual</td>
<td>95.29</td>
<td>17</td>
<td>5.61</td>
<td></td>
<td></td>
</tr>
<tr>
<td>Regression</td>
<td>21.91</td>
<td>1</td>
<td>21.91</td>
<td>3.91</td>
<td>0.065</td>
</tr>
<tr>
<td>Group</td>
<td>22.87</td>
<td>1</td>
<td>22.87</td>
<td>4.08</td>
<td>0.059</td>
</tr>
</tbody>
</table>
There was no significant difference between the Experimental NLM group subjects and the Comparison group subjects on the SASSI-2 DEF subscale scores from pre to post-test administration (p< .05).

A one-way ANCOVA, with pre-test scores as the covariate, was conducted to assess significant difference for the OAT SASSI-2 subscale from pre to post-test administration between Comparison and Control groups. Table 28 illustrates the summary of these findings for Comparison and Control groups subjects on the OAT subscale, with Adjusted Means for each group as follows: Comparison (4.310), and Control (1.690).

Table 28

One-Way ANCOVA Summary for Significant Difference Between Comparison and Control Group Subjects OAT SASSI-2 Subscale Scores from Pre to Post-Test Administration

<table>
<thead>
<tr>
<th>Source</th>
<th>Sum of Squares</th>
<th>df</th>
<th>Mean Square</th>
<th>F</th>
<th>Sign.</th>
</tr>
</thead>
<tbody>
<tr>
<td>Within+Residual</td>
<td>149.96</td>
<td>17</td>
<td>8.82</td>
<td></td>
<td></td>
</tr>
<tr>
<td>Regression</td>
<td>95.84</td>
<td>1</td>
<td>95.84</td>
<td>10.87</td>
<td>0.004</td>
</tr>
<tr>
<td>Group</td>
<td>34.01</td>
<td>1</td>
<td>34.01</td>
<td>3.86</td>
<td>0.066</td>
</tr>
</tbody>
</table>

There was no significant difference between the Comparison group subjects and the Control group subjects on the SASSI-2 OAT subscale scores from pre to post-test administration (p< .05).

A one-way ANCOVA, with pre-test scores as the covariate, was conducted to assess significant difference for the OAT SASSI-2 subscale from pre to post-test administration between Experimental NLM and Control groups. Table 29 illustrates the summary of these findings for Experimental NLM and Control groups subjects on the OAT subscale, with Adjusted Means for each group as follows: Experimental NLM (.765), and Control (2.035).
There was no significant difference between the Experimental NLM group subjects and the Control group subjects on the SASSI-2 OAT subscale pre to post-test administration (p< .05).

A one-way ANCOVA, with pre-test scores as the covariate, was conducted to assess significant difference for the OAT SASSI-2 subscale from pre to post-test administration between Experimental NLM and Comparison groups. Table 30 illustrates the summary of these findings for Experimental NLM and Comparison groups subjects on the OAT subscale, with Adjusted Means for each group as follows: Experimental NLM (.425), and Comparison (4.575).

Table 30

One-Way ANCOVA Summary for Significant Difference Between Experimental NLM and Comparison Group Subjects OAT SASSI-2 Subscale Scores from Pre to Post-Test Administration

<table>
<thead>
<tr>
<th>Source</th>
<th>Sum of Squares</th>
<th>df</th>
<th>Mean Square</th>
<th>F</th>
<th>Sign.</th>
</tr>
</thead>
<tbody>
<tr>
<td>Within+Residual</td>
<td>149.19</td>
<td>17</td>
<td>8.78</td>
<td>10.32</td>
<td>0.005</td>
</tr>
<tr>
<td>Regression</td>
<td>90.61</td>
<td>1</td>
<td>90.61</td>
<td>10.32</td>
<td>0.005</td>
</tr>
<tr>
<td>Group</td>
<td>82.06</td>
<td>1</td>
<td>82.06</td>
<td>9.35</td>
<td>0.007</td>
</tr>
</tbody>
</table>

There was a significant difference between the Experimental NLM group subjects and the Comparison group subjects on the SASSI-2 OAT subscale scores from pre to
group on the OAT SASSI-2 subscale shows a decrease from 11.4 to 10.5 (see Table 3). An observation of the means for the Comparison group on the OAT SASSI-2 subscale shows a significant decrease from 10.0 to 5.9 (see Table 5). The greatest decrease from pre to post-test scores on the OAT subscale of the SASSI-2 occurred for the Comparison group subjects, when compared to Experimental NLM group subjects.

A one-way ANCOVA, with pre-test scores as the covariate, was conducted to assess significant difference for the SAT SASSI-2 subscale from pre to post-test administration between Comparison and Control groups. Table 31 illustrates the summary of these findings for Comparison and Control groups subjects on the SAT subscale, with Adjusted Means for each group as follows: Comparison (1.552), and Control (1.048).

Table 31

<table>
<thead>
<tr>
<th>Source</th>
<th>Sum of Squares</th>
<th>df</th>
<th>Mean Square</th>
<th>F</th>
<th>Sign.</th>
</tr>
</thead>
<tbody>
<tr>
<td>Within+Residual</td>
<td>30.92</td>
<td>17</td>
<td>1.82</td>
<td></td>
<td></td>
</tr>
<tr>
<td>Regression</td>
<td>34.28</td>
<td>1</td>
<td>34.28</td>
<td>18.85</td>
<td>0</td>
</tr>
<tr>
<td>Group</td>
<td>1.22</td>
<td>1</td>
<td>1.22</td>
<td>0.67</td>
<td>0.424</td>
</tr>
</tbody>
</table>

There was no significant difference between the Comparison group subjects and the Control group subjects on the SASSI-2 SAT subscale from pre to post-test administration (p< .05).

A one-way ANCOVA, with pre-test scores as the covariate, was conducted to assess significant difference for the SAT SASSI-2 subscale from pre to post-test administration between Experimental NLM and Control groups. Table 32 illustrates the summary of these findings for Experimental NLM and Control groups subjects on the SAT subscale, with Adjusted Means for each group as follows: Experimental NLM (-.398), and Control
There was a significant difference between the Experimental NLM group subjects and the Control group subjects on the SASSI-2 SAT subscale scores from pre to post-test administration (p< .05). An observation of the means for the Experimental NLM group on the SAT SASSI-2 subscale shows no change from pre (M = 7.0) to post-test (M = 7) administration (see Table 3). An observation of the means for the Control group on the SAT SASSI-2 subscale shows a decrease from pre (M = 5.8) to post-test (M = 5.0) administration (see Table 7). The Control group showed the greatest difference between pre and post-test scores than the Experimental NLM group on the SAT SASSI-2 subscale.

A one-way ANCOVA, with pre-test scores as the covariate, was conducted to assess significant difference for the SAT SASSI-2 subscale from pre to post-test administration between Experimental NLM and Comparison groups. Table 33 illustrates the summary of these findings for Experimental NLM and Comparison groups subjects on the SAT subscale, with Adjusted Means for each group as follows: Experimental NLM (-.182), and Comparison (1.982).
Table 33

One-Way ANCOVA Summary for Significant Difference Between Experimental NLM and Comparison Group Subjects SAT SASSI-2 Subscale from Pre to Post-Test Administration

<table>
<thead>
<tr>
<th>Source</th>
<th>Sum of Squares</th>
<th>df</th>
<th>Mean Square</th>
<th>F</th>
<th>Sign.</th>
</tr>
</thead>
<tbody>
<tr>
<td>Within+Residual</td>
<td>34.3</td>
<td>17</td>
<td>2.02</td>
<td></td>
<td></td>
</tr>
<tr>
<td>Regression</td>
<td>19.3</td>
<td>1</td>
<td>19.3</td>
<td>9.56</td>
<td>0.007</td>
</tr>
<tr>
<td>Group</td>
<td>22.64</td>
<td>1</td>
<td>22.64</td>
<td>11.22</td>
<td>0.004</td>
</tr>
</tbody>
</table>

There was a significant difference between the Experimental NLM group subjects and the Comparison group subjects on the SASSI-2 SAT subscale scores from pre to post-test administration (p < .05). An observation of the means for the Experimental NLM group on the SAT SASSI-2 subscale shows no change from pre (M = 7.0) to post-test (M = 7) administration (see Table 3). An observation of the means for the Comparison group on the SAT SASSI-2 subscale shows a decrease from pre (M = 6.4) to post-test (M = 4.6) administration (see Table 5). The Comparison group showed the greatest difference between pre and post-test scores than the Experimental NLM group on the SAT SASSI-2 subscale.

A one-way ANCOVA, with pre-test scores as the covariate, was conducted to assess significant difference for the COR SASSI-2 subscale from pre to post-test administration between Comparison and Control groups. Table 34 illustrates the summary of these findings for Comparison and Control groups subjects on the COR subscale, with Adjusted Means for each group as follows: Comparison (3.494), and Control (1.706).
Table 34

One-Way ANCOVA Summary for Significant Difference Between Comparison and Control Group Subjects: COR SASSI-2 Subscale Scores from Pre to Post-Test Administration

<table>
<thead>
<tr>
<th>Source</th>
<th>Sum of Squares</th>
<th>df</th>
<th>Mean Square</th>
<th>F</th>
<th>Sign.</th>
</tr>
</thead>
<tbody>
<tr>
<td>Within+Residual</td>
<td>97.81</td>
<td>17</td>
<td>5.75</td>
<td></td>
<td></td>
</tr>
<tr>
<td>Regression</td>
<td>58.79</td>
<td>1</td>
<td>58.79</td>
<td>10.22</td>
<td>0.005</td>
</tr>
<tr>
<td>Group</td>
<td>15.77</td>
<td>1</td>
<td>15.77</td>
<td>2.74</td>
<td>0.116</td>
</tr>
</tbody>
</table>

There was no significant difference between the Comparison group subjects and the Control group subjects on the SASSI-2 COR subscale from pre to post-test administration (p< .05).

A one-way ANCOVA, with pre-test scores as the covariate, was conducted to assess significant difference for the COR SASSI-2 subscale from pre to post-test administration between Experimental NLM and Control groups. Table 35 illustrates the summary of these findings for Experimental NLM and Control groups subjects on the COR subscale, with Adjusted Means for each group as follows: Experimental NLM (-.306), and Control (1.906).

Table 35

One-Way ANCOVA Summary for Significant Difference Between Experimental NLM and Control Group Subjects: COR SASSI-2 Subscale Scores from Pre to Post-Test Administration

<table>
<thead>
<tr>
<th>Source</th>
<th>Sum of Squares</th>
<th>df</th>
<th>Mean Square</th>
<th>F</th>
<th>Sign.</th>
</tr>
</thead>
<tbody>
<tr>
<td>Within+Residual</td>
<td>47.34</td>
<td>17</td>
<td>2.78</td>
<td></td>
<td></td>
</tr>
<tr>
<td>Regression</td>
<td>56.06</td>
<td>1</td>
<td>56.06</td>
<td>20.13</td>
<td>0</td>
</tr>
<tr>
<td>Group</td>
<td>23.12</td>
<td>1</td>
<td>23.12</td>
<td>8.3</td>
<td>0.01</td>
</tr>
</tbody>
</table>

There was a significant difference between the Experimental NLM group subjects and the Control group subjects on the SASSI-2 COR subscale scores from pre to post-
test administration (p< .05). An observation of the means for the Experimental NLM group on the COR SASSI-2 subscale shows a slight decrease from pre (M = 10.1) to post-test (M = 10) administration (see Table 3). An observation of the means for the Control group on the SAT SASSI-2 subscale shows a greater decrease from pre (M = 8.5) to post-test (M = 7) administration (see Table 7). The Control group showed a greater decrease between pre and post-test scores than the Experimental NLM group on the COR SASSI-2 subscale.

A one-way ANCOVA, with pre-test scores as the covariate, was conducted to assess significant difference for the COR SASSI-2 subscale from pre to post-test administration between Experimental NLM and Comparison groups. Table 36 illustrates the summary of these findings for Experimental NLM and Comparison groups subjects on the COR subscale, with Adjusted Means for each group as follows: Experimental NLM (1.706), and Comparison (3.494).

Table 36

One-Way ANCOVA Summary for Significant Difference Between Experimental NLM and Comparison Group Subjects COR SASSI-2 Subscale from Pre to Post-Test Administration

<table>
<thead>
<tr>
<th>Source</th>
<th>Sum of Squares</th>
<th>df</th>
<th>Mean Square</th>
<th>F</th>
<th>Sign.</th>
</tr>
</thead>
<tbody>
<tr>
<td>Within+Residual</td>
<td>97.81</td>
<td>17</td>
<td>5.75</td>
<td></td>
<td></td>
</tr>
<tr>
<td>Regression</td>
<td>58.79</td>
<td>1</td>
<td>58.79</td>
<td>10.22</td>
<td>0.005</td>
</tr>
<tr>
<td>Group</td>
<td>15.77</td>
<td>1</td>
<td>15.77</td>
<td>2.74</td>
<td>0.116</td>
</tr>
</tbody>
</table>

There was no significant difference between the Experimental NLM group and Comparison group subjects on the SASSI-2 COR subscale from pre to post-test administration (p< .05).

Hypothesis 11. It was hypothesized that the pre-test mean scores on the Rotter Internal-External Locus of Control Scale (I-E Scale) for all three subject groups would classify
each group in the direction of internal locus of control. A one-tailed, one sample t-test, with a test value of 12, was implemented to determine the internal vs. external orientation of each group. Pre-test for each group represents pre-test raw scores on internal locus of control items (see Table 37).

Table 37

One Sample t-Test with Test Value = 12
Assessing Internal vs. External Locus of Control Orientation

<table>
<thead>
<tr>
<th>Source</th>
<th>N</th>
<th>Mean</th>
<th>S.D.</th>
<th>S.E.M.</th>
<th>t-Valuel-tail Prob</th>
</tr>
</thead>
<tbody>
<tr>
<td>Experimental</td>
<td></td>
<td></td>
<td></td>
<td></td>
<td></td>
</tr>
<tr>
<td>Pre-test</td>
<td>10</td>
<td>15</td>
<td>3.232</td>
<td>1.022</td>
<td>2.94 0.008</td>
</tr>
<tr>
<td>Comparison</td>
<td></td>
<td></td>
<td></td>
<td></td>
<td></td>
</tr>
<tr>
<td>Pre-test</td>
<td>10</td>
<td>15.8</td>
<td>2.7</td>
<td>.854</td>
<td>4.45 0.001</td>
</tr>
<tr>
<td>Control</td>
<td></td>
<td></td>
<td></td>
<td></td>
<td></td>
</tr>
<tr>
<td>Pre-test</td>
<td>10</td>
<td>14.3</td>
<td>3.335</td>
<td>1.055</td>
<td>2.18 0.028</td>
</tr>
</tbody>
</table>

The figures listed in Table 37 reveal that scores on the I-E Scale classify each of the three groups (Experimental NLM, Comparison and control) in the internal locus of control direction (p< .05). All groups showed to be significantly placed in the internal direction, with Probability Values of .008, .001 and .028, respectively.

Hypothesis 12. It was hypothesized that post-test mean scores for the Experimental NLM subject group and the Comparison subject group on the I-E Scale would shift away from the internal direction and toward the external direction as compared to pre-test scores. A one-tailed t-test was implemented to assess any significant difference between pre and
post-test mean scores for both groups (see Table 38).

Table 38

<table>
<thead>
<tr>
<th>t-Test Between Pre and Post-Test External Locus of Control (ELC) Mean Scores for Both Experimental NLM and Comparison Groups</th>
</tr>
</thead>
<tbody>
<tr>
<td><strong>Experimental Group</strong></td>
</tr>
<tr>
<td>-------------------------</td>
</tr>
<tr>
<td>Post-ELC</td>
</tr>
<tr>
<td>Pre-ELC</td>
</tr>
</tbody>
</table>

<table>
<thead>
<tr>
<th><strong>Comparison Group</strong></th>
<th><strong>Source</strong></th>
<th><strong>N</strong></th>
<th><strong>Mean</strong></th>
<th><strong>S.D.</strong></th>
<th><strong>S.E.M.</strong></th>
<th><strong>t-Value 1-tail</strong></th>
<th><strong>Prob</strong></th>
</tr>
</thead>
<tbody>
<tr>
<td>Post-ELC</td>
<td>10</td>
<td>7.7</td>
<td>1.494</td>
<td>0.473</td>
<td>0.56</td>
<td>0.293</td>
<td></td>
</tr>
<tr>
<td>Pre-ELC</td>
<td>10</td>
<td>7.2</td>
<td>2.7</td>
<td>0.854</td>
<td>-0.2</td>
<td>0.423</td>
<td></td>
</tr>
</tbody>
</table>

The t-test comparisons indicated no significant difference between pre and post-test ELC means for the Experimental NLM group (p < .05). The results indicated no significant difference between pre and post-test ELC means for the Comparison group (p < .05).

**Hypothesis 13** It was hypothesized that Experimental NLM group subjects would exhibit a significantly greater shift in mean scores from a more internal locus of control to a more external locus of control from pre to post-test mean scores on the Rotter I-E Scale in relation to the Comparison group subjects. Experimental NLM group subjects showed no significant difference between pre and post-test mean scores on the I-E Scale (p < .05) (see Table 38). Comparison group subjects showed no significant difference between pre and post-test mean scores on the I-E Scale (p < .05) (see Table 9).

**Hypothesis 14** It was hypothesized the Control group subjects would exhibit no significant difference in mean post-test scores on the I-E Scale when compared to pre-test mean scores. A two-tailed t-test was implemented to assess any significant difference
between pre and post-test mean scores for Control group subjects (see Table 39). The mean scores represent the total number of external locus of control (ELC) responses given.

Table 39

<table>
<thead>
<tr>
<th>Source</th>
<th>N</th>
<th>Mean</th>
<th>S.D.</th>
<th>S.E.M.</th>
<th>t-Value 2-tail</th>
<th>Prob</th>
</tr>
</thead>
<tbody>
<tr>
<td>Post-ELC</td>
<td>10</td>
<td>8.2</td>
<td>1.687</td>
<td>0.533</td>
<td>-0.57</td>
<td>0.581</td>
</tr>
<tr>
<td>Pre-ELC</td>
<td>10</td>
<td>8.7</td>
<td>3.335</td>
<td>1.055</td>
<td>-0.57</td>
<td>0.581</td>
</tr>
</tbody>
</table>

The t-test comparison indicated no significant difference between pre and post-test ELC means on the I-E Scale for the Control group (p< .05).

Summary of Results

The results of this study indicate that the Comparison Group is an effective treatment modality for promoting recovery for chemically addicted adult males in the criminal justice system according to scores on the SASSI-2. The global SASSI-2 scores for the Comparison group showed a significant decrease from pre to post-test administration (.018) at the (p< .05) level. In addition, the Comparison group showed a significantly greater change on SASSI-2 global scores when compared to the Experimental Node-Link Mapping (NLM) group and the Control group from pre to post-test administration. The Experimental NLM group showed no significant difference from pre to post-test administration on the SASSI-2 global scores. In addition to the Experimental NLM group, the Control group showed no significant difference from pre to post-test administration on the SASSI-2 global scores.

No significant difference was found between groups on the FVA and FVOD SASSI-2 subscales. Significant difference between all groups was found on the DEF (.047), OAT (.009), SAT (.006) and COR (.001) subscales of the SASSI-2 from pre to post-test.
administration. The DEF subscale scores showed significant change (.0445) at the (p< .05) level only for the Experimental NLM group. A significant difference from pre to post-test administration on the OAT (.011), SAT (.007), and COR (.004) subscales was found for the Comparison group. Significant difference was found on the OAT (.025) subscale for the Control group at the (p< .05) level from pre to post-test administration.

Between group analysis on the SASSI-2 subscales reveals that no significant difference was found between the Experimental NLM group and the Comparison group on DEF SASSI-2 subscale scores from pre to post-test administration. In addition, significant difference was not found between the Comparison and Control groups on the DEF subscale. Significant difference was found between the Experimental NLM group and the Control group on the DEF subscale, with the significant change occurring for the Experimental NLM group. The only significant difference between groups from pre to post-test administration on the OAT SASSI-2 subscale exists between the Experimental NLM and Comparison groups (.007) at the (p< .05) level, with the greatest amount of change occurring for the Comparison group.

Between group analysis for the SAT SASSI-2 subscale reveals a significant difference from pre to post-test administration between Experimental NLM and Comparison groups (.004) at the (p< .05) level, with the greatest amount of change exhibited by the Comparison group. A Significant difference (.04) was also found between the Experimental NLM group and the Control group on the SAT SASSI-2 subscale, with the Control group showing the greatest change from pre to post-test administration. No significant difference was found between the Comparison group and the Control group on the SAT subscale. The only significant difference between groups on the COR SASSI-2 subscale exists between the Experimental NLM group and the Control group (.01), with the Control group exhibiting the greatest amount of change from pre to post-test administration.
An analysis of the Rotter Internal-External Locus of Control (I-E Scale) scores shows that all groups scored in the internal locus of control direction. An analysis of the post-test scores showed no significant difference from pre to post-test administration for any of the three groups.

Discussion

Rational Recovery (RR) has been proposed as an alternative to the twelve step approach of Alcoholics Anonymous/Narcotics Anonymous (AA/NA) for the treatment of chemical dependency (Trimpey, 1992). This experimental research was designed to assess the efficacy of RR as a viable treatment alternative. Not only was RR incorporated, but an attempt to further enhance the recovery process was made by including node-link mapping as a means of presenting information, ideas and processes inherent to RR. The results indicate that the RR modality alone as implemented in the comparison group is an effective treatment.

Specifically, the purpose of this research was to determine if node-link mapping (NLM), within a Rational Recovery (RR) self-help environment, along with RR alone, enhanced the recovery process for chemically addicted adult males in early stages of attitude change as measured by the SASSI-2. The research evaluated locus of control (I-E Scale) and the degree of symptoms/problems and defensiveness (SASSI-2) of all subjects prior to and following treatment.

Hypotheses 1, 2, 12 and 13 were found to be non-significant, and thus were rejected. Hypotheses 3, 7, 11, and 14 showed significant results, and were accepted. Hypotheses 4, 8, 9, and 10 showed significant results in part of the Hypotheses. Hypothesis 3 addressed significant decreases in global SASSI-2 scores for the Comparison group subjects. Table 4 reveals a significant difference (.018) for Comparison group subjects. This is indicative of Comparison Group subjects shifting toward a non-chemical dependency status.
Hypothesis 4 addressed the difference in specific subscales of the SASSI-2 for the Comparison group from pre to post-test administration. Of the six subscales evaluated, Table 5 shows a significant difference on OAT, SAT and COR for the Comparison group. As stated previously, the Obvious Attributes (OAT) subscale measures the openness of the client to admit to symptoms or problems related to substance abuse. An elevated OAT score lends to a conclusion of chemical dependency. Two conclusions could be drawn from a significant decrease on the OAT subscale: a) openness decreased while problems/symptoms remained constant or worsened, or b) problems/symptoms decreased while openness increased or remained constant. A further observation of the significant difference from pre to post-test scores on the Subtle Attributes (SAT) subscale for the Comparison group provides further analysis toward one of these two possible conclusions, due to the homogeneity of items for the SASSI-2. A significant difference on the SAT subscale suggests a decrease in masking for subjects in the Comparison group. This suggests an increase in degree of openness. Hence, a significant decrease on the OAT subscale indicates a lesser degree of problems/symptoms for Comparison group subjects.

The COR subscale was also addressed in Hypothesis 4 (see Table 5). A significant difference was found from pre to post-test administration for the Comparison group subjects on the COR subscale. The Correctional (COR) Scale is a measure of relative risk of criminality, with an elevated score of 11 or more showing response patterns similar to individuals who have relatively extensive criminal histories. A significant difference from pre to post-test scores suggests a decrease in relative risk of criminality for Comparison group subjects.

Hypothesis 7 proposed that Control group subjects would exhibit no significant difference from pre to post-test global scores on the SASSI-2. In this case, the null hypothesis was rejected. The Control group subjects showed no significant difference in
mean global scores on the SASSI-2 from pre to post-test administration. This suggests subjects in the Control group exhibited no shift in openness/masking, defensiveness, problems/symptoms, or risk of criminality as measured by the SASSI-2.

Hypothesis 8 proposed no significant difference for Control group subjects from pre to post-test mean scores on the FVA, FVOD, DEF, OAT, SAT and COR subscales of the SASSI-2. Of these, only the OAT subscale significantly decreased for the Control group (see Table 7). As mentioned above, two conclusions could be drawn from a significant decrease on the OAT subscale: a) openness decreased while problems/symptoms remained constant or worsened, or b) problems/symptoms decreased while openness increased or remained constant. Unlike the Comparison group, the Control group showed no significant decrease on the SAT subscale, disallowing further speculation as to possible conclusions.

Hypothesis 9 addressed the amount of change from pre to post-test SASSI-2 global mean scores for all three groups. It was hypothesized that the Experimental NLM group would show the greatest significant decrease, Comparison group would show a lesser decrease than the Experimental NLM group, but significantly greater than the Control group, and the Control group would show no significant decrease. A test of overall significant difference between all groups showed to be significant (see Table 9). Further analysis revealed a significantly greater decrease for the Comparison group when compared to the Experimental NLM and Control groups. No significant difference was found between the Experimental NLM and Control groups. This, along with a lack of significant difference on SASSI-2 global mean scores for either the Experimental NLM or Control groups, suggests that recovery was enhanced within the RR group format, as measured by the SASSI-2. RR alone appears to be effective in enhancing the recovery process.

Hypothesis 10 considered significant differences in the amount of change from pre to
post-test mean scores on the SASSI-2 FVA, FVOD, DEF, OAT, SAT and COR subscales. Specifically, it was hypothesized that the Experimental NLM subjects would show the greatest decrease, Comparison group subjects would show a lesser decrease as compared to the Experimental NLM subjects, and the Control group subjects would show no significant decrease. A test of overall significant difference between all groups on each SASSI-2 subscale showed that the DEF, OAT, SAT, and COR subscales were significantly different between all groups, but non-significant for the FVA and FVOD subscales (see Tables 19, 20, 21, 22, 23, 24).

Between group analysis on the DEF subscale showed a significant difference found only between the Experimental NLM and Control groups, with the greatest decrease found for the Experimental NLM group (see Table 26). The Defensiveness (DEF) Scale was designed to discriminate between criterion groups composed of candid abusers, and defensive abusers. A high score on the DEF yields evidence of defensiveness, and suggests that the subject is denying aspects of his substance abuse (Kerr, 1993). The findings indicate that node-link mapping with RR was effective in decreasing defensiveness and, hence, enhancing recovery for Experimental NLM subjects.

Between group analysis on the OAT subscale showed the only significant difference between groups was found between the Experimental NLM and Comparison groups (see Table 30). Further analysis reveals that the Comparison group exhibited the greatest decrease on the OAT subscale. Since there was no significant difference found between these two groups on the DEF subscale, further speculation cannot be made. Possibilities of this finding include no change in openness with a decrease or no change in symptoms/problems, or a decrease in openness with no change or an increase in symptoms/problems related to substance abuse.

Between group analysis on the SAT subscale revealed no significant difference between the Comparison and Control groups. Significant difference was found between
the Experimental NLM group and the Control group (see Table 32), and between the Experimental NLM and Comparison groups (see Table 33) on the SAT SASSI-2 subscale. Between the Experimental NLM and Control groups, the greatest amount of change occurred for the Control group. This indicates that the Control group subjects showed less masking tendencies when compared to the Experimental NLM group. This finding may reflect the impact of the agency treatment protocol (AA/NA) to which the Control group was exposed, although the Control group showed no significant difference from pre to post-test mean scores on the other subscales or the global SASSI-2 mean score. Between group analysis for the Experimental NLM and Comparison groups showed a significant difference on the SAT subscale, with the Comparison group exhibiting the greatest amount of change from pre to post-test administration. This suggests that RR alone was more effective at lessening the masking tendency of chemically dependent individuals, thereby promoting recovery. Further support is lacking, with no significant difference found between the Comparison group and the Control group on the SAT SASSI-2 subscale.

Between group analysis on the COR subscale revealed no significant difference between the Comparison and Control groups, or between the Experimental NLM and Comparison groups. Significant difference was found between the Experimental and Control groups (see Table 35). Further analysis reveals that the greatest amount of change occurred for the Control group. This suggests that the agency protocol received by the Control group was more effective in decreasing the relative risk of criminality when compared to the Experimental group.

Hypothesis 11 proposed that all three groups would score in the internal locus of control direction on the I-E Scale. Table 37 shows that all three groups scored in the internal locus of control direction at significant levels. This supports the previous research proposing that chemically addicted individuals tend to score in the internal locus of
control direction (Bunch & Schneider, 1991; Abbott, 1982; Gozali & Sloan, 1971).

Gozali & Sloan theorized that a chemically dependent individual's beliefs in one's ability to control one's drinking may be partly responsible for the continuation of the drinking behavior. Results showed, however, that no significant change occurred for either the Experimental NLM or the Comparison groups regarding locus of control (see Table 38). In other words, both groups remained in the internal locus of direction from pre to post-test administration. Node-link mapping with RR and RR alone appear to have had no influence on locus of control for these subjects.

Hypothesis 14 suggested that the Control group would show no significant change for mean scores on the I-E Scale from pre to post-test administration. Table 39 shows that no change occurred for the Control group in terms of locus of control orientation. This indicates that the agency treatment protocol is ineffective in terms of altering locus of control orientation for the Control group subjects.

Limitations

The most obvious limitation of this study is the low sample size included in the research (N=30). This number was the minimum acceptable for this study, considering financial resources, subject availability and time restraints. However, the primary limitation in collecting a larger sample size resulted from treatment protocols for all groups. The treatment protocols disallowed large group sizes, RR being designed for groups of 5-15 individuals, with the agency at which the research was conducted not allowing groups larger than 20. In addition, the subjects in this study volunteered for participation, which may imply other extraneous variables. Once subjects volunteered, however, they were randomly assigned to one of the three groups. Furthermore, all subjects were adjudicated male, adult clients mandated to treatment by the criminal justice system. The generalizability of this research is limited to this population.
Another possible limitation is the use of the SASSI-2 in a pre and post-test fashion. No literature was found which utilized the SASSI-2 in this capacity, or as an instrument of measurement for recovery. However, it was proposed as a possibility in the SASSI manual (Miller, 1985), and suggested as a focus for further research. The results of this study do show decreases in SASSI-2 scores, both globally and on several subscales, from pre to post-test administration. For the Experimental group, the type of population may have interfered with the lack of NLM success, in regard to educational levels. Finally, the limited time frame for treatment (12 weeks) also may have inhibited the effectiveness of NLM for the Experimental group.

Conclusion

Rational Recovery (RR) appears to be an effective treatment modality for enhancing the recovery process for chemically dependent adult males. Proposed as a possible alternative to the twelve steps of AA/NA, RR seems to decrease the global SASSI-2 scores, which could result in a non-chemically dependent classification, as well as the OAT, SAT and COR subscales. The node-link mapping RR group, as well as the Control group, showed only minimal change, further supporting the effectiveness of RR alone in enhancing the recovery process. Node-link mapping (NLM) showed less change within a RR group, possibly due to the necessity of approaching the chalkboard, effecting the group process. As discussed previously, the effective use of NLM requires that the counselor approach the chalkboard in order to illustrate the connectedness and interaction between any ideas, feelings, and/or processes being discussed in the group. Once the counselor rises and approaches the chalkboard, eye contact and other nonverbal listening behaviors are discontinued. This may adversely effect the "process" of the group, interrupting a sequence of work on the part of the client. This may have interrupted the learning process for any or all clients in the Experimental NLM group format.

The greatest changes occurred within the aspects of openness/masking, relative risk
of criminal behavior and overall SASSI-2 global scores for the RR group. According to the chemical dependency field, a decrease in masking, increase in openness, decrease in defensiveness and relative risk of criminal behavior are all correlated with recovery from chemical dependency.

Future investigation which utilizes the SASSI-2 as a measurement of recovery is warranted. Since the SASSI-2 is administered by many local, county and state criminal justice systems for assessing the necessity of chemical dependency treatment of individuals on probation and/or parole, SASSI-2 scores can be easily gathered and utilized in a pre-test fashion. One would only need to administer the SASSI-2 in a post-test fashion, utilize follow-up information, and determine correlation. Global SASSI-2 scores could be used to determine any change for clients from chemical dependency classification to non-chemical dependency classification. Further examination of locus of control could also be beneficial to the chemical dependency field, while assessing the impact of altering locus of control from an internal orientation to a more moderate orientation.

Alcoholics Anonymous (AA) is the primary referral source for the criminal justice system, as well as the primary influential component within a majority of agencies serving as referral sources with probation and parole offices. Due to this, the efficacy of AA must be further evaluated in research studies. Research incorporating RR in an experimental fashion with a singular comparison group receiving twelve-step, AA support may also be beneficial, allowing for comparison of results for those two treatment modalities. Further research is also warranted evaluating the effectiveness of RR as a viable treatment approach for the treatment of chemical dependency.

Finally, other treatment regimens for the treatment of chemical dependency also exist, which have received relatively little attention in the professional literature in regard to chemical dependency treatment. One example is biofeedback as a viable alternative. Biofeedback alone, as well as biofeedback coupled with RR and AA could be evaluated in
terms of its effectiveness in treating chemical dependency.
APPENDIX A

ROTTER INTERNAL-EXTERNAL LOCUS OF CONTROL
Appendix A

Example of The Rotter Internal-External Locus of Control Scale

Before reading the instructions, please put your name at the top of the sheet. Thanks.

This is a questionnaire to find out the way in which certain important events in our society affect different people. Each item has both an "a" and a "b" choice. Please select the one, and only one, you actually believe to be true as far as you concerned. Be sure to choose the one you believe to be more true. Please do not make your choices based on what you think you should choose or based on what you would like to be true. This is only asking you for your personal beliefs: there are no right or wrong answers.

When you have finished, please return your answers to me and return to your seat.

1. (a) Children get into trouble because their parents punish them too much.
   (b) The trouble with most children nowadays is that their parents are too easy with them.

2. (a) Many of the unhappy things in people's lives are partly due to bad luck.
   (b) People's misfortunes result from the mistakes they make.

3. (a) One of the major reasons why we have wars is because people don't take enough interest in politics.
   (b) There will always be wars, no matter how hard people try to prevent them.

4. (a) In the long run, people get the respect they deserve in this world.
   (b) Unfortunately, an individual's worth often passes unrecognized no matter how hard he tries.

5. (a) The idea that teachers are unfair to students is nonsense.
   (b) Most students don't realize the extent to which their grades are influenced by accidental happenings.
6. (a) Without the right breaks, one cannot be an effective leader.
   (b) Capable people who fail to become leaders have not taken advantage of their opportunities.

7. (a) No matter how hard you try, some people just don't like you.
   (b) People who can't get others to like them don't understand how to get along with others.

8. (a) Heredity plays the major role in determining one's personality.
   (b) It is one's experiences in life which determine what they're like.

9. (a) I have often found that what is going to happen will happen.
   (b) Trusting to fate has never turned out as well for me as making a decision to take a definite course of action.

10. (a) In the case of the well prepared student, there is rarely, if ever, such a thing as an unfair test.
    (b) Many times exams questions tend to be so unrelated to course work that studying is really useless.

11. (a) Becoming a success is a matter of hard work, luck has little or nothing to do with it.
    (b) Getting a job depends mainly on being in the right place at the right time.

12. (a) The average citizen can have an influence in government decisions.
    (b) This world is run by the few people in power, and there is not much the little guy can do about it.

13. (a) When I make plans, I am almost certain that I can make them work.
    (b) It is not always wise to plan too far ahead because many things turn out to be a matter of good or bad fortune anyhow.

14. (a) There are certain people who are just no good.
    (b) There is some good in everybody.
15. (a) In my case, getting what I want has little or nothing to do with luck.

(b) Many times we might just as well decide what to do by flipping a coin.

16. (a) Who gets to be the boss often depends on who was lucky enough to be in the right place first.

(b) Getting people to do the right thing depends on ability, luck has little or nothing to do with it.

17. (a) As far as world affairs are concerned, most of us are the victims of forces we can neither understand, nor control.

(b) By taking an active part in political and social affairs, the people can control world events.

18. (a) Most people don't realize the extent to which their lives are controlled by accidental happenings.

(b) There really is no such thing as "luck."

19. (a) One should always be willing to admit mistakes.

(b) It is usually best to cover up one's mistakes.

20. (a) It is hard to know whether a person really likes you.

(b) How many friends you have depends on how nice you are.

21. (a) In the long run, the bad things that happen to us are balanced by the good ones.

(b) Most misfortunes are the result of lack of ability, ignorance, laziness or all three.

22. (a) With enough effort, we can wipe out political corruption.

(b) It is difficult for people to have much control over the things politicians do in office.

23. (a) Sometimes I can't understand how teachers arrive at the grades they give.

(b) There is a direct connection between how hard I study and the grades I get.

24. (a) A good leader expects people to decide for themselves what they should do.

(b) A good leader makes it clear to everybody what their jobs are.
25. (a) Many times I feel that I have little influence over the things that happen to me.
   
   (b) It is impossible for me to believe that chance or luck plays an important role in my life.

26. (a) People are lonely because they don't try to be friendly.
   
   (b) There's not much use in trying too hard to please people, if they like you, they like you.

27. (a) There is too much emphasis on athletics in high school.
   
   (b) Team sports are an excellent way to build character.

28. (a) What happens to me is my own doing.
   
   (b) Sometimes I feel that I don't have enough control over the direction my life is taking.

29. (a) Most of the time I can't understand why politicians behave the way they do.
   
   (b) In the long run, the people are responsible for bad government on a national as well as on a local level.
Appendix B

Participant Informed Consent

Please read this form carefully, sign and date it, and place it in the plain white envelope. If you would like a copy for yourself, one will be made for you.

I agree to participate in a study conducted by Eric A. Schmidt, M.Ed., L.C.D.C., a doctoral candidate at the University of North Texas. This study is being done to investigate the possible benefits of Rational Recovery and a counseling tool called mapping in promoting and enhancing the recovery process.

I understand that I will complete the Substance Abuse Subtle Screening Inventory-2, the Rotter Internal-External Locus of Control Scale, and a brief demographic sheet. I understand that I will attend one 2 hour group session per week for a period of 12 weeks. I also understand that any personal information revealed will be kept confidential and will be protected from inadvertent or improper use.

In addition, I understand that the information gathered through this study will be included with that of the others in the reporting of the study, and that my identity will be kept completely anonymous.

I understand that my participation is voluntary and I am free to withdraw my consent to participate in this study at any time with no penalty, prejudice or loss of benefits. Should you have any questions and/or concerns regarding the research, please contact me at (817) 497-2870.

I have read the above and agree to participate in this study.

Signature: ___________________________ Date: ______________

*This project has been reviewed and approved by the Institutional Review Board committee at the University of North Texas for the protection of human subjects.*
Appendix C
An example of an Outline Map

Beast Messages

1. 

2. 

3. 

4. 

5. 

6. 

Changing the Beast Messages

1. 

2. 

3. 

4. 

5. 

6.
APPENDIX D

DEMOGRAPHIC INFORMATION
Appendix D

Demographic Information

Please answer all of the questions below.

D.O.B.: ___________  Age: _________  Gender (circle one):  Female  Male

Ethnicity (circle one):  African American  Anglo/White  Asian  Hispanic  
Native American  Other: ________________

* Substance of Choice Prior to arrest: ________________

Frequency of use:  Daily (how many times per day?) ________________
Weekly (how many times per week?) ________________
Monthly (how many times per month?) ________________

* At what age did you first use alcohol? _____
* At what age did you first use marijuana? _____
* At what age did you first use your substance of choice? _____
* How long have you been addicted to your substance of choice? __________

* Have you ever attempted to quit using alcohol/drugs? yes no

If yes, how?  hospital  outpatient clinic  personal physician  
private counselor  on your own

* Have you ever attended Alcoholics Anonymous (AA)? yes no

If yes, how helpful was it in helping you stop your drug and alcohol use?
Very helpful  Somewhat helpful  Not very helpful
Not helpful at all  I am unsure

* How helpful did you find other treatment(s)?
*How helpful do you think this treatment will be?

Very helpful  Somewhat helpful  Not very helpful

Not helpful at all  I am unsure

*How long have you been in this treatment facility?

*How helpful has this treatment facility been for you?

Very helpful  Somewhat helpful  Not very helpful

Not helpful at all  I am unsure

*How likely do you think you are to use alcohol and/or drugs again?

Very likely  Somewhat likely  I am not sure

Somewhat unlikely  Very unlikely
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