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Alcohol Pattern Test for Adolescents

Santee, Robert George, Ph.D.
University of Hawaii, 1990

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ALCOHOL PATTERN TEST
FOR
ADOLESCENTS

A DISSERTATION SUBMITTED TO THE GRADUATE DIVISION OF THE
UNIVERSITY OF HAWAII IN PARTIAL FULFILLMENT OF THE
REQUIREMENTS FOR THE DEGREE OF

DOCTOR OF PHILOSOPHY
IN
EDUCATIONAL PSYCHOLOGY
MAY 1990

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Abstract

The Alcohol Pattern Test for Adolescents (APT-A) was constructed to discriminate between adolescents who have problems with substance use (problem group) and adolescents who either do not have problems with substance use or do not use substances at all (no problem group). The APT-A is to be utilized as a screening device to assist in the identification of possible problem substance users and to facilitate the development of individualized treatment plans. The usefulness of this instrument will be found in the accuracy of its assignment of individuals to either the problem or no problem group. The specific population explored for the current study was high school students. The APT-A is a 51 item, six scale, self-report questionnaire that was designed specifically to assess possible adolescent problem substance use from affective, cognitive, physical, familial and social perspectives. The APT-A was administered, in three separate studies, to a multiracial sample of adolescents (999) ranging in age from 13-19. There was a significant difference between the problem substance group and the no problem substance group across all three studies. Cutoff scores were developed for clinicians to assist in assessing possible adolescent problem substance use. The classification accuracy for the total test score cutoff averaged 93.78% for the problem
substance use group and 78.64% for the no problem group across two cross validation studies. The internal consistency reliability averaged .897 across three studies. The utilization and the limitations of the APT-A were explored.
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CHAPTER ONE

Introduction

Although there are numerous psychometric instruments available for the assessment of problems with alcohol and other drug use, there are many difficulties with these instruments. The first problem is that the majority of these instruments were developed for use with adults. The second problem is, by and large, these instruments were only developed to assess problem alcohol use. The third problem is the length of a number of these instruments do not make them practical from a treatment provider's perspective. These instruments are simply too time consuming and require complex scoring procedures which render them essentially useless for assessing adolescent problem substance use. The fourth problem is many of these instruments do not furnish the treatment provider with any useful information about intervention strategies. The only information provided is whether or not an adolescent may have a substance use problem. These norms are, primarily, frequency and quantity of substance use. These norms do not take into consideration individual differences. Since individuals may have different "causes" for their problem with substance use, the assessment instruments need to differentiate between these various "causes." By allowing the treatment
provider to focus on different areas, individualized
treatment strategies may be developed and applied.

The Alcohol Pattern Test for Adolescents (APT-A) was
developed specifically for adolescents. The APT-A was
constructed to be easily administered, require little time
to complete and be directly applicable to the development
and evaluation of individualized treatment plans.

An Overview of the Current Study

The Second Chapter in this study examines the use of
substance use within the schools, some of the current
problem substance use instruments, and the development of
the Alcohol Pattern Test (APT). The Alcohol Pattern Test
for Adolescents (APT-A) was derived, in part, from the APT.
The Third Chapter is concerned with the development of the
Alcohol Pattern Test for Adolescents. The selection of
items and the development of the scales are examined. The
Fourth Chapter focuses on the pilot study and the two cross
validation studies. This chapter examines the psychometric
structure of the APT-A. The Fifth Chapter explores the
clinical utilization of the APT-A. The final chapter,
Chapter Six, examines the current status of the APT-A.
CHAPTER TWO

Literature Review

Since alcoholic beverages are the most used substances by both adults and adolescents (Anderson & Deck, 1987; Blane & Leonard, 1987; Brook, Lettieri, Brook, & Stimmel, 1985; MacDonald, 1987; Mendelson & Mello, 1985) the theoretical basis of the APT-A is primarily derived from research in the field of alcohol use. Although this instrument is based on research in alcohol use, researchers have demonstrated that the problem of alcohol use does not exist in isolation from the use of other substances (Anderson & Deck, 1987; Bennet, 1987; Blane & Leonard, 1987; Clayton & Ritter, 1985; Cohen, 1981; MacDonald, 1987).

The APT-A assesses adolescent substance use from the multivariate perspective of the individual's cognitive component, affective component, social component and physical component. In general, the current methods of assessment either focus on the quantity and frequency of ingestion of a substance and the individual's subsequent behavior or the emotionality/personality status of the individual.
Adolescent Substance Use

The 1985 Gallop Poll, surveying students between the ages of 13 and 18, found that these students identified drugs as the number one problem confronting young people today (Bennet, 1987). The 1986 Gallop Pole on education identified drug use as the number one problem within the schools (Bennet, 1987). A survey in Hawaii (Anderson & Deck, 1987), found that only 22% of high school seniors were identified as having a low probability for developing substance use problems. This study found that there was an increase of adolescents using alcohol from 52% in 1979 to 66% in 1987. One of the more startling bits of information from this study was that 48% of the sixth graders had used alcohol! By the tenth grade, over 80% of the students in this survey felt that there was a substance use problem in their school. This study shows that 86% of high school seniors in Hawaii have used alcohol. In response to this survey, the Hawaii Superintendent of Education, Charles Toguchi, acknowledged that there is a serious substance use problem among Hawaii students and presented to the public a series of programs to combat the problem (Star Bulletin/Honolulu Advertiser, 1988).
Substances such as alcohol, cocaine and marijuana interfere with many cognitive processes such as memory, sensation, concentration, attention, motor coordination, speech, judgment, reaction time and perception. Continued use of these substances result in memory lapses, problems with concentration, poor coordination and a short attention span (Bennet, 1987). Baumrind and Moselle (1985) propose that marijuana use by adolescents results in a decrease of mental and physical energy and an overall lack of effortful activity. The interference of these substances on the adolescent’s cognitive processes are often manifested in the classroom. There is considerable evidence that substance use interferes with a student’s performance in the classroom. Poor academic performance is related to substance use (Baumrind & Moselle, 1985; Bennet, 1987; Herbert, 1987; Mendelson & Mello, 1985). Truancy and dropping out of school are associated with substance use (Bennet, 1987; Mendelson & Mello, 1985). Behavioral problems within the schools have also been found to be associated with substance use (Bennet, 1987; California, 1982; Cohen, 1981; Hendin & Haas, 1985; Mendelson & Mello, 1985).

That substance use is associated with crime is true by definition since the substance is illegal for adolescent ingestion. The problem goes deeper, however, because a
number of schools are becoming marketplaces for drug deals and substance use (Bennet, 1987). A 1985 study of adolescent cocaine users found that 57% bought their drugs at school. A survey in 1986, of high school seniors found that 33% of marijuana users had used marijuana in school. Sixty percent of high school seniors that said they used amphetamines claimed to have taken them in school (Bennet, 1987).

A third area where substance use, primarily alcohol, creates a major problem, for both adults and adolescents, is driving while intoxicated. Drinking and driving accounts for 80% to 90% of all vehicular accidents (Brook et al., 1985). Forty percent of all alcohol related accidents are caused by individuals between the ages of 16 and 24 (California, 1982). Young men under the age of twenty-one account for almost 25% of deaths due to driving while under the influence of alcohol. This group, however, represents only about 10% of the nation's drivers. The leading cause of death for young men between the ages of 15 and 24 is alcohol related driving accidents (California, 1982).

A fourth area where substance use is a glaring problem is that of adolescent suicide, the second major cause of death among young people, between the ages of 15 and 24 (MacDonald, 1987). More than half of all adolescent suicides involve drugs (Bennet, 1987).
Another problematic area of substance use is that it has become apparent that individuals are no longer restricting their use to one particular substance. They may have a particular drug of choice, but they are often using a variety of other substances both individually and in conjunction with their favorite drug. In many cases, the utilization of more than one drug at a time has an effect which is more than merely additive. The use of alcohol in conjunction with barbiturates increases the depressant effect of both drugs synergistically. This synergistic effect greatly increases the likelihood of a possible drug overdose or death. In a report for the National Institute on Drug Abuse, Cohen (1981) predicted the days of being able to label an individual specifically as an alcoholic, coke-freak, pill-popper, pothead or smack-freak will soon disappear. Royce (1981) gave credence to this prediction by making reference to alcohol counselors who claimed not to have seen a "pure' alcoholic in years, Jessor, Chase and Donovan (1980), in their study of the relationship between alcohol use and marijuana use in adolescents, provide evidence for poly-substance use by drawing the conclusion from their survey of over 10,000 junior and senior high school students that marijuana and alcohol use tend to covey.
The 1985 National Household Survey on Drugs by the National Institute on Drug Abuse (MacDonald, 1987) reports current drug users between the ages of 12 and 17 are poly-substance users. This report states that of those youths that smoke cigarettes, 74% also drink alcohol, 47% smoke marijuana and 9% use cocaine. For those individuals who drink alcohol, 37% smoke marijuana and 5% use cocaine. For those youths that smoke marijuana, 84% drink alcohol and 12% use cocaine.

Mendelson and Mello (1985) in their book on teenage drinking report a survey of an adolescent substance use treatment center found two-thirds of the youths used other drugs in conjunction with alcohol. Wolfson and Erbaugh (1984) in their study of how adolescents, ages 13 to 18, responded to the MacAndrew Alcoholism Scale found the majority of their adolescent substance use treatment sample (N=100) were poly-substance users. In fact, very few of these adolescents used only alcohol or marijuana. Clayton and Ritter (1985), in their study of the epidemiology of adolescent substance use, attempt to bring to the attention of researchers in the field of adolescent substance use the serious problem of poly-substance use. They conclude that, in general, if an individual is a frequent drug user, then he is a poly-drug user.
The study by Anderson and Deck (1987) provides evidence that poly-substance use is still a serious problem. In their survey of high school seniors across the nation they found some rather startling facts. Ninety-one percent of high school seniors have used alcohol. Sixty-eight percent smoke or have smoked tobacco. Fifty-one percent of these seniors use or have used marijuana. Twenty-three percent of these high school seniors use or have used stimulants. Seventeen percent of the seniors across the nation have used or use cocaine. Eleven percent of this population use or have used opiates/heroin or tranquilizers.

The research that has been reviewed demonstrates that there is, indeed, a serious substance use problem among adolescents. This problem is magnified by the fact that the evidence shows poly-substance use, among adolescents, is significantly prevalent. The problem of indicating which adolescents may be problem substance users falls within the domain of assessment.

Current Methods of Assessment

There are two major approaches to the assessment of alcoholism. The first approach focuses on observable drinking and drinking related behaviors. The extent of the problem with alcohol is determined by the quantity and
frequency of alcohol consumption, and subsequent alcohol related behaviors. The assumption of this position is the manifested behaviors (symptoms) are due to an underlying physiological disease. The second approach focuses on personality characteristics. The extent of the problem with alcohol is determined by the presence of various configurations of personality characteristics. The assumption of these positions is that alcohol problems are due to psychological characteristics.

The physiological/disease perspective views alcoholism as being biologically/genetically based. This viewpoint holds that for most people alcohol is relatively harmless. There is, however, a small group of people for whom alcohol is a debilitating substance. This viewpoint is still prevalent today with recent research suggesting there may be an inherited genetic factor predisposing some people to the possibility of developing problems with alcohol (Lewis, Dana, & Blevins, 1988). The disease concept perspective of alcoholism states that individuals progress through distinct stages, from an early dependence on alcohol to a final bottoming out with total loss of control (Alcoholics Anonymous, 1976; Royce, 1981; Wanberg, Horn, & Foster, 1977). The individual's behavior is due to the disease of alcoholism and, thus, he is not held responsible for his behavior. The individual cannot be cured of his alcoholism,
he can only be in a state of recovery. Recovery is only possible by total abstinence from alcohol (Alcoholics Anonymous, 1976; Goodwin, 1981; Milan & Ketcham, 1981; Wanberg & Horn, 1983).

The DSM-III-R (1987) supports the notion of a genetic factor being involved with problem alcohol use and alcohol dependence. This claim is based on the "fact" that problem alcohol use and alcohol dependence are more common among family members than in the population as a whole. This disease concept of alcoholism is supported by the American Medical Society on Alcoholism (National Council on Alcoholism, 1976).

The three criteria, listed by the DSM-III-R, for problem substance use are a maladaptive pattern of psychoactive substance use, persistence of symptoms for at least one month or a repeated occurrence over a longer duration and no withdrawal or tolerance symptoms. Substance dependence would consist of the first two criteria plus tolerance or withdrawal.

According to various psychological theories, individuals drink and continue to drink for various reasons. These theories have been concerned with such areas as tension reduction (Cappell & Greeley, 1987), stress response dampening (Sher, 1987), the need to feel powerful (Cox, 1987), expectancies about the effect of alcohol (Brown,

Individuals whose alcohol use problems are due to psychological factors are said to manifest a wide array of problems. Depending on the specific theory, the problems range from impairment of attention and memory, social alienation, disruption of psychosocial, cognitive and moral development, a motivational syndrome (Baumrind & Moselle, 1985), anxiety, depression, boredom and restlessness (Miller, 1981) aggression (Goldman et al., 1987; Mendelson & Mello, 1985) to poor self-esteem (Cox, 1987).

These two approaches to the problem of alcoholism are operationalized through the use of objective assessment instruments. Miller (1976), in his review of objective instruments for the detection of alcoholism, divides the instruments into direct and indirect measures. The direct methods have high face-validity and inquire explicitly about drinking and drinking-related behaviors. The indirect
approach has no face-validity and examines psychological factors that seem to have little apparent relationship to alcoholism. In general, most of the indirect methods are derived from the MMPI.

Direct Methods

In their review of alcoholism assessment instruments, Midchke and Venner (1987) established that the Michigan Alcoholism Screening Test (MAST) (Selzer, 1971) is the most extensively researched and best known of all alcoholism assessment instruments. Lewis et al. (1988), in their text on substance abuse counseling, include the MAST in their examination of assessment devices because of its wide use and empirical validity. The MAST is representative of the direct approach to alcoholism assessment.

The MAST was developed by Selzer (1971) to provide a short, reliable, easily administrated instrument for the detection of alcoholism. The MAST consists of 25 questions inquiring specifically about drinking and drinking related behavior. A simple weighted procedure was developed in order for the MAST to be administered by both professionals and non-professionals. The test was normed on individuals convicted of drinking under the influence of liquor (DUIL), drunk and disorderly (D & D), hospitalized alcoholics,
individuals awaiting drivers license review for non-alcohol related traffic violations and a control group. A validation score for each individual was derived though the examination of medical, legal and social agencies records. A score of five or more points (validation score) denoted alcoholism. A score of five or more points on the MAST also denoted alcoholism.

Fifty-five percent of the individuals in the category of DUIL were categorized as alcoholic, while 59% of those in the D & D category were categorized as alcoholic. An analysis of the MAST scores showed that there were more severe alcoholics in the D & D category than there were in the DUIL category. Of all the individuals who scored in the non-alcoholic range, there were 15 who were shown by a subsequent review of the records and their validation score to have been alcoholics (false negatives). Selzer reasoned these non-alcoholic scores were due to denial. He recommends when using the MAST for screening purposes, clinical verification may be necessary.

Miller (1976) found the MAST to be a promising diagnostic instrument but felt further research was necessary. Problems were raised about the high face validity of the test because the questions seemed so obvious and open to denial. Selzer, Vinokur, and Rooijen (1975) had found the effect of denial on the Short Michigan Alcohol
Screening Test (SMAST) to be negligible. Their analysis found the reliability and validity for the SMAST in screening for alcoholism to be as effective as the MAST with which it is highly correlated. This conclusion has been supported by subsequent research (Lewis et al. 1988).

Studies by Moore (1972), and Favazza and Pires (1974), with the MAST, have obtained high false positive rates. Moore's study had a 13% false positive rate, while Favazza and Pires' study had a false positive rate of 29%. Favazza and Pires argued that their false positive rate may, in part, reflect an accurate diagnosis considering their sample (enlisted men). They cite research suggesting the rate of alcoholism, for enlisted men, may be as high as 39%. This suggests the false positives may, in fact, have an alcohol problem, and were correctly classified by the MAST.

Skinner and Sheu (1982) administered the MAST to 83 alcoholics. A test-retest coefficient of .84 was obtained. A coefficient alpha of .85 and .88 respectively was obtained for both of the administrations. Considering the differences in administrators, administrations of the test, setting and time interval between the tests, the authors concluded that the resulting reliability coefficients were a conservative estimate of the MAST. The authors also pointed out that the individuals being assessed by the MAST responded more consistently to questions about objective
behavior or events than they did to questions about their subjective evaluation about problem alcohol use.

Mischke and Venneri (1987), for their study on the reliability and validity of alcohol assessment instruments, reviewed 26 diagnostic instruments. They discovered four common characteristics among most of the instruments. The instruments (1) had high face validity; (2) were easily administered and scored; (3) had an inadequate data base on which to make evaluations regarding predictive validity or reliability and (4) were problematic in regard to making generalizations to specific populations (minorities, women, etc.).

Since there is a wide range of drinking severity in the driving while intoxicated population, the authors assert that the traditional categorization of alcoholic and non-alcoholic is inadequate. They recommend a multi-dimensional diagnostic approach which would provide a more sensitive and complete assessment of drinking resulting in a more comprehensive treatment.

In the Mischke and Venneri study (1987) the MAST was administrated by numerous alcohol counselors at various treatment facilities to individuals (n=90, 85% men) convicted of drinking while intoxicated (DWI). In general, the agencies administering the MAST espoused the disease concept of alcoholism and viewed alcoholism as a univariate
condition. The counselor’s assessment, independent of the MAST score, was the criterion measure.

Mischke and Vernneri (1987) found the MAST to have an internal reliability coefficient of .84 and a validity coefficient of .65. The MAST identified 85% of those individuals assessed by the counselors to have a significant alcohol problem. The MAST defined rate of alcoholism was 48% while that of the counselors was 30%. The counselors rate of identification, however, was lower than is normally found in this population. The authors concluded further research is needed on the MAST to determine if it is capable of providing an adequate drinking severity range for the DWI population.

The MAST and the SMAST were developed for the assessment of alcoholism with, primarily, adult males. The high rate of false positives and high face validity, of the MAST, still needs to be explored relative to its capability as a diagnostic instrument. There have been serious questions raised about its sensitivity to various types of drinking problems. The focus, of the MAST and the SMAST, on adult drinking and drinking related behaviors seems to restrict their utilization to an adult population. As such, generalization to an adolescent population is problematic.
Indirect Methods

Davis, Colligan, Morse, and Offord (1987) in their examination of MMPI derived alcoholism scales determined that the MacAndrew Scale (MAC) (MacAndrew, 1965) is the most thoroughly explored and clinically promising of the indirect methods. Preng and Clopton (1986), in their review of the literature on the MAC scale, suggest that the MAC scale is assessing an attribute of personality that exists prior to the unfolding of alcoholism.

The MacAndrew Scale (MAC) (MacAndrew, 1965) was developed to determine whether male alcoholics were simply neurotics who drank too much or if they possessed personality characteristics that were substantially different from neurotics. Following the selection of 600 subjects who had previously taken the MMPI, 566 items of the MMPI were examined for 200 alcoholic outpatients and 200 nonalcoholic psychiatric outpatients. Fifty-one items were eliminated. The final version of the MAC scale contained 49 items. The 49 item MAC scale was then used to obtain a MAC score for the 200 individuals in the alcoholic group and the 200 individuals in the non-alcoholic group. MacAndrew concluded that significant differences exist between alcoholics and neurotics. The MAC correctly classified 81.75% of the patients. In the cross-validation samples
(the remaining 200 from the initial 600, 100 alcoholics and 100 non-alcoholics), 81.5% were correctly classified. Although there is an expectation of shrinkage due to the new sample group, there was only a .25% difference between the two sample groups for correct classification. MacAndrew found this small difference between the two samples demonstrated the discriminable capacity of the scale.

Rosenberg (1972) in his examination of MMPI derived scales concluded that personality variables other than excessive drinking may be reflected in the clinical diagnosis of alcoholism. Kranitz (1972) discovered that the MAC significantly discriminated non-problem substance users from alcoholics and heroin addicts. However, there was no significant difference between the alcoholics and the heroin addicts. Kranitz suggested that the MAC scale may be inappropriate for inpatient populations due to low classification rates and high rates of false positives. Whisler and Cantor (1966) had a 55% classification rate for their inpatient sample. Uecker (1970) had a high rate of false positives for the inpatient psychiatric controls in his study of the MAC. Rhodes (1969) replicated MacAndrew's original study and obtained an accurate classification rate of 76%. He concluded that the MAC was valid for outpatient populations.
After reviewing the literature on the MAC, Miller (1976) concluded it may be possible to utilize the MAC to detect high risk individuals prior to the development of alcohol involved problems. However, further research is necessary to empirically validate this possibility.

MacAndrew (1981) postulated that there were two types of alcoholics identified by the MAC. The first type is emotional extroversion (high scorers) or primary alcoholic. The second type is emotional introversion (low scorers) or secondary alcoholic. The mean score for the primary alcoholic is 28.3. The primary alcoholic’s behavior in the world is primarily punishment avoidance. These characteristics are not short-term or long-term consequences of alcohol abuse, but stable traits that exist prior to the development of alcoholism. MacAndrew asserts that there is no single alcoholic personality. He argues that individual differences cannot be ignored and consequently treatment must be tailored for the individual rather than for groups.

A longitudinal study by Cloniger, Sigvardsson and Bohman (1988) in Sweden provides some empirical evidence for MacAndrew’s claim. A group of children were given an extensive behavioral assessment at the age of 11. They were then reevaluated when they were 27. Three largely uncorrelated dimensions (reward dependence, novelty seeking
and harm avoidance) were identified and each was found to be predictive of later alcohol problems.

Snowden, Campbell and Nelson (1984) examined 385 convicted drunk drivers with 14 MMPI scores. They found that personality variables have a unique and more powerful role in determining problem drinking than do demographic variables. The interesting aspect of this study is that the dependent variable of problem drinking was assessed by the administration of the MAST.

Craig (1984) investigated drug addicts with and without concurrent alcoholism. He found that MAC was a robust scale that not only assesses general substance use, but may be sensitive enough to detect alcoholism in drug addicts.

Preng and Clompton (1986) while agreeing that the MAC scale does measure stable traits that are associated with and precede the development of alcoholism, nonetheless argue that these traits are not restricted to alcoholism. These traits may be found in antisocial individuals or individuals with a combined psychiatric and alcohol abuse problems. It is questionable whether the MAC scale is sensitive enough to detect these differences.

Preng and Clompton assert that although the MAC scale can discriminate between alcoholic and non-alcoholic groups, the clinical effectiveness of the MAC to detect alcoholism has not been sufficiently developed. They suggested the
clinical effectiveness of the MAC would be established if the MAC could detect alcoholism in individuals who are trying to conceal or minimize their enslavement with alcohol. An individual with a high MAC score but who denies problems with school could be investigated by interviewing someone (family member, boss, etc.) who could validate the MAC score.

Preng and Clompton recommended four areas where research on the MAC needs to be improves. The first point is that researchers need to report classification accuracy for all groups as well as mean differences. A significant difference between the means does not necessarily indicate that the MAC classification rate will be any better than chance. The classification rate is probably overestimated for the MAC since the base rate for alcoholism in the various studies usually is 50%, whereas in a normal population the base rate is considerably lower. The second point is that the cutoff scores should be relative to specific groups. The third point is that classification scores should include both false positives and false negatives. An extremely low cutoff score may correctly identify all the alcoholics but it may at the same time have an extremely high rate of false positives. The fourth point is that studies of the MAC should analyze the effect variables such as sex and age may have on the MAC scores.
In a study of predominantly middle class medical outpatients and inpatients Davis et al. (1987) found the MAC to be an inadequate screening device for substance dependence with the exception of males between the ages of 18 and 24 (classification rate for this group was 90%). Overall, the MAC accurately identified 70.7% of the men and only 37.9% of the women. Only 41% of the women in the 18-24 years old category were correctly identified. The high rate of false positives raised serious problems with the MAC’s predictive validity. The expected prevalence rate of alcoholism for the various groups in this sample was overestimated from 1.5 to 4 times greater by the MAC scores.

The ability of the MAC to assess addiction proneness was not substantiated by the data. Only between 23-30% of the individuals in the substance dependency groups were correctly identified.

The reason for the poor detection rate in both the alcoholic and substance dependency groups may have to do with the sample. The sample in this study was essentially of a higher socioeconomic group than was utilized in MacAndrew’s (1965) original study. The variable of age also seemed to have an affect on the scores. A final reason offered by the authors was that the MAC scale presupposes an underlying personality type. Beardslee and Vaillant (1984) assert that there is no personality type that can be
detected during adolescence that can predict the development of alcoholism.

Unlike the MAST, there has been considerable exploration of adolescent substance use with the MAC. Rathus, Fox and Ortins (1980) utilizing an abbreviated version of MAC (first 20 items), in their study of suburban high school students, found that the MAC was not uniquely sensitive to alcohol use. The MAC is, instead, sensitive to a group of behaviors (thrill-seeking, hedonism, theft, property destruction and violence) of which drinking is only a part. They raise the issue that alcohol use by adolescents may differ considerable from adults. Excessive drinking in adolescence may simply reflect the normal developmental process of which rebellion is an active part, while for the adult, this type of behavior is viewed as deviant or as a disease. Thus, the factors involved in excessive drinking may or may not be the same for adolescents and adults.

In his study of adolescent Caucasian males (16-20 years old) convicted of misdemeanor offenses, Moore (1984) obtained an accurate classification rate with the MAC of 75%, which was similar to adults. However, only 53.1% of marijuana users were correctly classified. The false positive rate for users of alcohol who occasionally became intoxicated (11 times a year) was 50%. Although the MAC
seems to be sensitive to the personality style of the true positives (emotional extroversion), it was not sensitive to the personality style of the false negatives (emotional introversion). In fact, the false negatives did not even resemble MacAndrew's (1981) neurotic style of the false negatives in his study.

Wolfson and Erbaugh (1984) utilized different cut off scores with the MAC for male and female adolescent problem substance users (13-18 years old) to obtain the highest accurate classification rate with an optimal balance between false positives and false negatives. An overall accurate classification rate of 74% was obtained for females while a rate of 68% was obtained for males. The authors asserted that the MAC was useful for discriminating between substance user and problem substance user groups. They felt, however, that the MAC was of little use in differentiating between conduct disorder (stealing, running away, lying, fire setting physical aggression, truancy) substance users and conduct disorder problem substance users. The authors suggested that further research is needed (1) in the area of conduct disorder substance users; (2) to determine if the MAC can accurately predict problem substance use; (3) assess the validity of the MAC for younger adolescents and (4) to determine if the MAC can discriminate between problem substance users and individuals with conduct disorders.
MacAndrew (1986) utilizing a sample of young men (16-22 years old) developed a scale (Substance Abuse Proclivity (SAP)) derived from the MMPI to detect problem substance use. The overall accurate classification rate for the standardization samples averaged 85%. MacAndrew suggested that a percentage of the false positives may, in fact, be problem substance users. A comparison of the scores of false positives with true negatives on six circular items showed that their scores were significantly different from the true negatives. He concluded that the tendency for young men to abuse drugs is psychometrically detectable at the personality/character level. He suspects that youths who use substances have the same reward seeking orientation to the world as do adults who score high on the MAC and use substances.

The authors of both the Mast and the MAC scales implicitly accept the univariate disease concept of alcoholism (Miler, 1976). This concept has been severely questioned. It has been described as a political concept to obtain economic funding for treatment and research (Blane & Leonard, 1987; Mendelson & Mello, 1985). Alcoholism has been described as being merely a label for several distinct conditions (Wanberg & Horn, 1983). Miller’s extensive literature review (1976) raises serious questions about the inability of studies to demonstrate a consistent progression
of symptoms or the inability to stop drinking. The necessity of refraining from drinking has been challenged by various researchers (Lewis, Dana, & Blevins, 1988; Miller, 1985; Pattison, 1966, 1968; Pattison, Headely, Gleser, & Gottschalk, 1968; Sobell & Sobell, 1973, 1984). Researchers (Bauman & Bryan, 1980; Bauman, Fisher, Bryan, & Chenoweth, 1985; Brown, Christiansen & Goldman, 1987; Christiansen & Goldman, 1983; Christiansen, Goldman, & Inn, 1982; Goldman, Brown, & Christiansen, 1987) have suggested that alcohol related behavior may, in a large part, be due to expectations about the effect of alcohol rather than the effect of alcohol itself.

Multivariate Assessment Methods

The univariate concept of alcoholism seems to offer little in the way of understanding or treating the problem of alcoholism (Wanberg & Horn, 1983; Wanberg, Horn, & Foster, 1977). To provide a better understanding and a more comprehensive treatment approach for problems with alcohol, a multivariate perspective is necessary. Wanberg and Horn (1983) argue that to define alcoholism by a single set of symptoms ignores the fact that the symptoms are made up of parts that seem to have different developmental causes and
are manifested differently by individuals. Thus, different concepts of alcoholism need to be acknowledged.

The Alcohol Use Inventory (AUI) (Horn, Wanberg, & Adams, 1974; Wanberg & Horn, 1983; Wanberg et al., 1977) was developed to assess these various concepts of alcoholism. The AUI consists of 65 items with high face validity that inquires directly about different aspects of drinking and drinking related behavior. Their sample consisted of 5000 individuals (80% male with a mean age between 39-42) admitted, over a 15 year period, for alcohol treatment. There were no control groups assessed in this study.

The major concern of the study was to demonstrate that alcoholism is not a univariate concept, provide reliable operationalized definitions of alcoholism, demonstrate that the definitions are different and have different etiologies, provide a method for diagnosing the different alcoholisms and to demonstrate how the AUI can be applicable to treatment. They recommend that, for the future, understanding and treatment of alcoholism should be based on a multivariate measurement.

The fact that the AUI is based on a primarily male adult alcoholic sample raises doubts about its utilization as a screening device for adolescents. In so far as there was no control group, it is impossible to talk about mean
group differences. In addition, there was no classification accuracy rate provided.

The Alcohol Expectancy Questionnaire (AEQ) was developed to assess the extent to which adults and adolescents expect alcohol to produce a variety of general and specific results (Brown et al., 1987). The AEQ is a 90 item self-report questionnaire that specifically asks about drinking and drinking behavior. There is both an adult and an adolescent form, with the main difference being that the adult form asks about the effect of alcohol on the respondent while the adolescent form asks about the effect on people in general. The research on this instrument has demonstrated that positive expectancies most consistently detect distinct drinking populations (Goldman et al., 1987). Christiansen et al. (1982) discovered that of the six expectancy factors (physical tension reduction, diversion from worry, increased interpersonal power, magical transformation of experience, enhanced pleasure and modification of social-emotional behavior) that were found in three adolescent groups who had used alcohol (12-14 years old, 15-16 years old, 17-19 years old), five of these factors were found in adolescents with little or no drinking experience. The results indicate that fairly strong expectancies about alcohol exist, for adolescents, before the actual ingestion of alcohol. These expectancies are
reinforced with the actual ingestion, in most cases, of alcohol. Christiansen and Goldman (1983) point out that these expectancies remain fairly consistent throughout adolescence even after alcohol consumption is increased as the individual becomes older.

Brown et al. (1987) state that both forms of the AEQ are able to discriminate between problem drinkers and non problem drinkers in adolescent, college and non college populations. However, no accuracy classification rate is provided. The authors suggest that the next stage of expectancy research should focus on the utility of the AEQ in prevention and treatment.

Goldman et al. (1987) criticize the current methods of utilizing "scare" tactics to prevent adolescents from using drugs. This approach for the prevention of drug use has not been empirically verified. As an alternative method of prevention the authors suggest that adolescents should be taught alternative methods to reach the same effects and exposed to the falseness of the positive expectancies of alcohol.

Christiansen, Roehling, Smith, and Goldman (1989) have demonstrated that the AEQ is able to predict self-reported drinking behavior of seventh and eighth graders one year later. The strength of the expectancies (AEQ scores) of the students from the first year predicted about 25% of the
variance of self-reported quantity/frequency drinking behavior one year later. The AEQ predicted about 24% of the variance of self-reported problem drinking one year later. The AEQ predicted 13% of the variance of self-reported problem drinking onset.

The difficulty with this study is that the concepts of problem drinking and the onset of problem drinking are derived from the self-reported Drinking Style. There are no external criterion such as previous or current treatment of problems with substance use, identification by counselors, parents or teachers as having a substance use problem or legal problems related to substance use. Since the sample consisted of seventh and eighth graders who were not previously identified as problem substance users there was no classification accuracy, of the AEQ, reported for problem substance users and non problem substance users.

The next section examines the Alcohol Pattern Test (APT). This test was developed to assess adult problem substance use. The reliability, validity and the classification accuracy of the APT were examined in two studies.

The Alcohol Pattern Test for Adolescents (APT-A) is derived, in part, from the Alcohol Pattern Test. Both the APT and the APT-A were constructed to assist the treatment
provider or the test examiner in the identification of problem substance users.

The Alcohol Pattern Test

The APT was developed to explore the emotional, social, physical, problem solving and drinking perspective of adults who had been defined as having a drinking problem. The purpose of the APT is to act as a screening device to assist in the identification of problem substance users and to facilitate the development of individualized treatment programs.

The APT was normed, in two separate studies, on several problem substance use samples and non problem substance use samples from the state of Hawaii. A member of the problem substance use sample was any individual who was seeking treatment for problem substance use. The non problem substance use sample consisted of, primarily, undergraduate and graduate college students. The use of college students as a comparison group is certainly problematic. Individuals in this group may vary systematically from the problem substance users on such variables as education and socio-
economic status. This consideration raises serious questions about external validity. The initial studies with the APT, however, must be viewed as exploratory.

First Study

The questions in the APT were derived from the author's interactions with residents and counselors in a treatment facility. The residents were asked why they used drugs, when they used drugs, what drugs did for them and with whom they used drugs. The residents were also asked how they felt when they used drugs and whether intoxication interfered with or enhanced their thinking. The counselors provided information about the residents' family background, emotional status and socio-economic status. The specific types of questions that were asked of both the residents and the counselors were based, primarily, on Royce's (1981) examination of the field of alcoholism. Based on the responses the residents and the counselors provided the author, 53 questions were developed for the initial study of the APT. The three questions that were included on the second study were derived from an examination of Royce's work (1981).
In the initial study (Santee, 1984) the APT (see Appendix A) consisted of 53 questions that were answered either true or false. The correct answer for each of the items reflect how, theoretically, a problem substance user would answer the item. One point is given for each correct answer and no points for an incorrect answer. The higher the total score, the closer the theoretical resemblance between the test taker and the problem substance user.

The 53 items of the APT were, a priori, partitioned into five scales (see Appendix A). The five scales are Drinking Pattern, (10 items), Child History (11 items), Self Worth (10 items), Problem Solving (12 items) and Lie (10 items). The scales were devised to determine whether problem substance users presented a different scoring pattern than the non problem substance users.

Method

The APT was administered to three groups of individuals. The first group consisted of 15 individuals, who were seeking treatment for problems with alcohol, in a detox/short-term inpatient alcohol treatment program. There were 12 males and 3 females ranging in age from 18-54 in this group (mean=35.38). The second group consisted of 26 college students in a graduate course in counseling. There
were 18 females and 8 males ranging in age from 21-58 (mean=33.96) in this group. The third group consisted of 19 Alcoholics Anonymous members. There were 16 males and 3 females ranging in age from 20-56 (mean=36.94) in this group.

Results

The total score was used as the dependent variable while group membership was used as the independent variable. A SAS (Ray, 1982) regression procedure was used to determine if there was a significant difference between the groups. A F-Value of 56.96 (p<.0001) was obtained indicating there was a significant difference between the groups. A Duncan's Multiple Range Test and a Waller-Duncan K-Ratio T-Test were utilized to isolate the difference between the groups. There was no significant difference between the inpatients group (mean=25.26) and the AA group (mean=28.00). Both of these groups, however, were significantly different from the college students group (mean=12.12).

Although the test demonstrates a significant difference between the groups, the results did not provide specific information about the individuals that may be utilized for developing individualized treatment programs. In addition,
the APT needs to be analyzed from the perspective of how accurately it is able to classify individuals into their appropriate groups. Even though the APT is capable of significantly discriminating between the groups, if it has a low classification accuracy rate, then it is not very useful from the clinical perspective. Since the inpatient and AA groups were not significantly different, they were combined into one group and compared against the student group.

A regression analysis, discriminate analysis and a reliability analysis were performed using the total score and the five scales. The results of the regression analysis indicated that the two groups were significantly different on four of the five scales. The lie scale was the only scale where there was no significant difference between the groups.
Table 1
Total Score and Scale Score F-Ratio for the APT comparing Non Problem Substance Users (N=26) and Problem Substance Users (N=34) (df=1/58)

<table>
<thead>
<tr>
<th>Scale</th>
<th>F-Value</th>
<th>P-Value</th>
</tr>
</thead>
<tbody>
<tr>
<td>Drinking Pattern</td>
<td>64.62</td>
<td>.0001</td>
</tr>
<tr>
<td>Child History</td>
<td>17.40</td>
<td>.0001</td>
</tr>
<tr>
<td>Self Worth</td>
<td>57.80</td>
<td>.0001</td>
</tr>
<tr>
<td>Lie</td>
<td>0.74</td>
<td>.3921</td>
</tr>
<tr>
<td>Problem Solving</td>
<td>109.23</td>
<td>.0001</td>
</tr>
<tr>
<td>Total Score</td>
<td>109.45</td>
<td>.0001</td>
</tr>
</tbody>
</table>

The Veldman program Testav (Dunn-Rankin, 1983) was used to score the test, determine scale and total score reliability and obtain the means and standard deviations for the five scales and the total score. The means and the differences between the means for the two groups are presented in Table 2.
Table 2

APT Raw Score Means for Six Scales and Total Score for Problem Substance Users (N=34) and Non Problem Substance Users (N=26) (I)

<table>
<thead>
<tr>
<th>Scale</th>
<th>Item N</th>
<th>Problem Mean</th>
<th>Non Problem Mean</th>
<th>Differences</th>
</tr>
</thead>
<tbody>
<tr>
<td>Drinking Pattern</td>
<td>10</td>
<td>6.66</td>
<td>2.30</td>
<td>4.36</td>
</tr>
<tr>
<td>Child History</td>
<td>11</td>
<td>4.00</td>
<td>1.69</td>
<td>2.31</td>
</tr>
<tr>
<td>Self Worth</td>
<td>10</td>
<td>7.03</td>
<td>4.19</td>
<td>2.84</td>
</tr>
<tr>
<td>Lie</td>
<td>10</td>
<td>1.41</td>
<td>1.77</td>
<td>-.36</td>
</tr>
<tr>
<td>Problem Solving</td>
<td>12</td>
<td>7.68</td>
<td>2.08</td>
<td>5.60</td>
</tr>
<tr>
<td>Total Score</td>
<td>53</td>
<td>26.79</td>
<td>12.12</td>
<td>14.67</td>
</tr>
</tbody>
</table>

Problem=Problem Use Group  Non Problem=Non Problem Use Group

The alpha coefficient for the APT is 0.89. The alpha coefficient for the total score and the five scales are presented in Table 3.
Table 3

APT Internal Consistency (Alpha) Reliability (I)

<table>
<thead>
<tr>
<th>Scale</th>
<th>DP</th>
<th>CH</th>
<th>SW</th>
<th>L</th>
<th>PS</th>
<th>Total</th>
</tr>
</thead>
<tbody>
<tr>
<td>Item N</td>
<td>(10)</td>
<td>(11)</td>
<td>(10)</td>
<td>(10)</td>
<td>(12)</td>
<td>(53)</td>
</tr>
<tr>
<td>Alpha</td>
<td>.84</td>
<td>.72</td>
<td>.47</td>
<td>.55</td>
<td>.83</td>
<td>.89</td>
</tr>
</tbody>
</table>

DP=Drinking Pattern  CH=Child History  SW=Self Worth
L=Lie  PS=Problem Solving

A discriminate analysis procedure was used to determine group membership. This procedure develops a discriminate model to classify each of the observations into a specific group. In this case, the observations were classified into either the problem substance use group or the non problem substance use group. The first discriminant analysis procedure used the total score as the predictor variable and group membership as the criterion variable. The second procedure used the five scales as the predictor variables and group membership as the criterion variable.

When the criterion variable was selected as the predictor variable, 91% of the problem substance users were correctly classified while 92% of the non problem group were correctly classified. When the five scales were used as the
predictor variables, 88% of the problem use group were correctly classified while 96% of the non problem use group were correctly classified.

A factor analysis and an item analysis were performed on the data derived from the administration of the APT. The factor analysis did not support the theoretical scale delineation. The scales were revised according to the factor analysis. The new scales (see Appendix A) are Alcohol Thinking (30 items), Alienation (13 items) and Lie (10 items). As a result of the item analysis, three questions were removed. Three new questions were created and placed in the test (see Appendix A).

The initial study of the APT demonstrated that this instrument significantly discriminated between problem substance users and non problem substance users. The APT has a high internal reliability (alpha=.89) and its construct validity is supported by its ability to correctly classify individuals as belonging to a problem substance use group population (19.18%) or a non problem substance use group (92.31%). With the exception of the Lie scale, the empirical validity of the remaining four scales was established through a regression analysis which demonstrated a significant difference between the groups on all four scales. A subsequent factor analysis did not support the a priori delineation of the APT into five scales. However,
the resulting scales from the factor analysis are suspect since the 10 to 1 ratio of subjects to variables was not attained (Nunnally, 1978).

Two of the individuals in the non problem group were classified, using total score, as belonging to the problem substance use population. Only one of these individuals was available for a follow-up interview. This individual stated that she had an "addictive personality" and was unable to drink or use drugs. She also stated that both her father and her brother were alcoholics.

**Second Study**

The second study of the APT (Santee, 1985) was concerned with correcting some of the deficiencies of the first study and with cross-validating the results of the first study. As a result of the first study, a revised version of the APT (see Appendix A) was utilized for the second study.
Method

A sample of 120 individuals was selected for the administration of the revised version of the APT. The test was administered to four groups.

The first group consisted of 18 males and 13 females in a short-term/long-term inpatient alcohol treatment program located on the grounds of the state hospital. The second group consisted of 12 males and 9 females in a short-term (28 days) alcohol treatment program located in Castle Hospital. The third group consisted of 9 females in a women’s alcohol treatment program located in St. Francis Hospital. The fourth group consisted of 23 males and 36 females who were either graduate students in college or worked in a local hospital.

The second study corrected some of the deficiencies of the first study. The sample size was increased from 60 individuals in the first study to 120 individuals in the second study. The first study had 34 individuals who had problems with alcohol and 26 individuals who did not have problems with alcohol. The second study had 61 problem substance users and 59 non problem substance users. The sample size of females with a substance use problem was increased from 6 in the first study to 31 in the second
study. The sample size of non problem substance using males was increased from 8 in the first study to 23 in the second study.

Reliability studies, regression analyses, discriminant analyses and a factor analysis were all performed on the data obtained in the second study. The total score, the three revised scales and group membership were the variables utilized in this study.

Results

A regression procedure was utilized to determine if there was a significant difference between the groups. The total score was used as the dependent variable while group membership was used as the independent variable. A F-Value of 125.95 (p<.0001) was obtained indicating that there was a significant difference between the groups. A Duncan's Multiple Range Test and a Waller-Duncan K-Ratio T-Test were run to determine which of the groups were significantly different. The state hospital group (mean=30.64), the Castle Hospital group (mean=23.86) and the St. Francis hospital group (mean=22.11) were all significantly different from the non problem substance using group (mean=9.25). The state hospital group was significantly different from the
Castle and St. Francis hospital groups. The St. Francis and Castle hospital groups were not significantly different from each other.

Since the members of the problem substance use groups were all in treatment for their drug/alcohol problem, they were treated as one group. One possible reason for the significant difference between the state hospital group and the other two hospital groups may be socio-economic status. The individuals in the treatment center on the state hospital grounds were, by and large, welfare recipients whereas the other two hospital programs required a fairly substantial fee. It may have been the case that the individuals in Castle and St. Francis hospitals still had some stability in their lives (economic/family), while the individuals in the program on the state hospital grounds may have been more debilitated by the effects of alcohol.

When the three problem substance use groups were combined into one group and compared against the non problem substance use group, a significant ($p < .0001$) F-value of 279.74 was obtained. The mean total score for the problem substance use group was 27.03. while the mean for the non problem substance use group was 9.25.
Table 4

APT Raw Score Means for Problem Substance Users (N=61) and Non Problem Substance Users (N=59) (II)

<table>
<thead>
<tr>
<th>Scale</th>
<th>Item N</th>
<th>Problem</th>
<th>Non Problem</th>
<th>Differences</th>
</tr>
</thead>
<tbody>
<tr>
<td>Alcohol Thinking</td>
<td>30</td>
<td>20.18</td>
<td>5.88</td>
<td>14.30</td>
</tr>
<tr>
<td>Alienation</td>
<td>13</td>
<td>5.57</td>
<td>1.59</td>
<td>3.98</td>
</tr>
<tr>
<td>Lie</td>
<td>10</td>
<td>1.60</td>
<td>1.78</td>
<td>-0.18</td>
</tr>
<tr>
<td>Total Score</td>
<td>53</td>
<td>27.03</td>
<td>9.25</td>
<td>17.78</td>
</tr>
</tbody>
</table>

Problem=Problem Use Group  Non Problem=Non Problem Use Group

Coefficient alpha's were calculated to determine the internal reliability of the APT. The reliability of the APT for the second study was .92 for the total score. Since the reliability for the first study was .89 for the total score, it appears the APT has a stable internal consistency.
Table 5
Internal Consistency Reliability for the APT (II)

<table>
<thead>
<tr>
<th>Scale</th>
<th>Item N</th>
<th>Alpha</th>
</tr>
</thead>
<tbody>
<tr>
<td>Alcohol Thinking</td>
<td>30</td>
<td>.94</td>
</tr>
<tr>
<td>Alienation</td>
<td>13</td>
<td>.80</td>
</tr>
<tr>
<td>Lie</td>
<td>10</td>
<td>.63</td>
</tr>
<tr>
<td>Total Score</td>
<td>53</td>
<td>.92</td>
</tr>
</tbody>
</table>

In the second study of the APT, the revised scales and the total score were used to predict group membership for the discriminate analysis. When the Alcohol Thinking, Alienation and Lie scales were used 90.16% of the problem substance users and 96.61% of the non problem substance users were correctly classified. When the total score was used, the classification results were the same as the three revised scales.

The results of the factor analysis supported the previous delineation of the APT into three scales. The three new items (see Appendix A) loaded on the Alcohol Thinking scale.
Discussion

The second study demonstrates that the APT continues to significantly discriminate between problem substance use and non problem substance use populations. However, since there have been changes in the items and the scale structure the validity has not been established for the initial version of the APT. In addition, the revised version of the APT needs to be cross-validated with a less restricted sample before proceeding with a discussion of the validity of the instrument.

A follow up interview was conducted with the two individuals from the non problem substance use group who were classified as belonging to the problem substance use group. In this instance, both individuals were available for the interview.

In the first case, the individual was a recovering alcoholic. The classification of belonging to the problem substance use group was appropriate.

In the second case, the individual insisted that he did not have a problem with alcohol. In fact, he said he did not drink very much at all. He said when he did drink, he felt less tense and was able to express himself. He denied having any problem with drugs. He noted his father drank a lot when he was a child. He pointed out that he smoked pot
which also reduced his level of stress. When asked if he had received any treatment for his stress problem, he said he was seeing a psychiatrist.

In this instance, it is somewhat difficult to make an assessment based on the limited interaction with the individual. However, the similarity in his response pattern and the total score to that of a problem substance user warrants further exploration by a specialist in the substance use field.

Although a second factor analysis, a priori selection of three factors, supports the initial partitioning of the APT into three scales, there still remains the difficulty of the sample size being too small. Nunnally's (1978) ratio of 10 times as many subjects as there are variables (items) is violated. This raises a serious question about the utilization of these scales.

Conclusion

Two independent studies have demonstrated that the APT significantly discriminates between adult substance users and problem substance users. It has a correct classification rate of 90% or better. The internal consistency reliability (alpha) of the test is .92. It must be pointed out, however, that since there have been changes
in both the items and the scale structure, the second study does not cross-validate the first study. In addition, the revised version needs to be cross-validated with a sample where the non problem group is not restricted, primarily, to college students.

The APT was used as the basis for the development of the Alcohol Pattern Test for Adolescents (APT-A). The APT was revised to explore the problem of adolescent substance use.
CHAPTER THREE

Test Construction

The Alcohol Pattern Test for Adolescents (APT-A) consists of 51 true/false items (see Appendix B). Each of the items represent, theoretically, an attribute of an adolescent problem substance user. One point is given for each item that is answered true. Adolescents who have problems with substance use should, in theory, score significantly higher on the APT-A than adolescents who either do not use substances or do not have problems with substance use.

The APT-A was, in part, adapted from the APT. A total of 24 items from the APT were not utilized in the construction of the APT-A. The 10 items from the Lie scale were not utilized, for the APT-A, because they did not discriminate between the adult problem substance users and the non problem substance users. The three items on the APT that asked about physical and sexual abuse were eliminated because of ethical considerations. The concern with this area was due to the possible impact these types of items may have on the adolescent who has been abused. Since the APT-A was developed to assess the problem of adolescent substance use from a non substance use perspective, the seven alcohol
use items from the APT were not utilized in the construction of the APT-A. Four more items were also eliminated because it was felt these items expressed, primarily, adult concerns. The remaining 29 items from the APT were either altered or left unchanged for use in the APT-A (see Appendix B). The alteration of questions, for use in the APT-A, was primarily concerned with changing items of the APT that referred to the past (When I was a child, my mother drank a lot of alcohol) to refer to the present (My mother drinks a lot of alcohol). The construction of the remaining 22 question for the APT-A is based on a review of the literature and they will be discussed in the next section.

Both the APT and the APT-A were administered to nine adolescents at the Salvation Army’s Addiction Treatment Facility. A significant correlation (p<.005) of .81 was obtained demonstrating a marked relationship (Guilford, 1950) between both versions of the instrument.

The APT-A assesses adolescent problem substance use from a cognitive, affective, social, familial and physical perspective. The APT-A is partitioned, a priori, into six scales. These six scales represent various theoretical perspectives about problem substance use. The six scales are Family, School, Emotion, Problem Solving, Physical and Interact.
Although Nunnally's (1978) recommendation of a 10 to 1 ratio of observations to variables (in this case, items) was not met, a factor analysis (N=308) was attempted to determine if the 51 items were all measuring problem substance use. The factor analysis procedure selected 15 factors.

Research by Gorsuch (1983) has shown that dichotomous data may distort a factor analysis. This distortion results in the creation of spurious factors. Gorsuch suggests a higher order or second order factor analysis be performed either on the correlational data derived from the primary factor analysis or on miniscale scores (minimum of 3 items) created from the items of the instrument. In both cases, the dichotomous data would be eliminated.

The six scales of the APT-a were factor analyzed resulting in one factor. This finding suggests the six scales are all measuring the same hypothetical variable. In this case, the hypothetical variable is problem substance use.

The APT-A approaches adolescent problem substance use from a multivariate perspective. There is no evidence to suggest there is one unique cause or one specific theory which adequately explains adolescent problem substance use (Lettieri, 1985). Current research indicates a need for a multivariate approach to both adolescent and adult problem
substance use (Blane & Leonard, 1987; Baumrind & Moselle, 1985; Lettieri, 1985; Rhodes & Jason, 1988; Royce, 1981; Wanberg & Horn, 1983). This multivariate approach is particularly manifest in the area of research on treatment. Problem substance users may have different "causes" for their substance use behavior. A single treatment applied to all individuals equally does not address other factors which may underlie the problem substance use behavior. Research into both adolescent and adult problem substance use discloses treatment needs to be individualized contingent upon the unique factors of the problem substance user (Austin, 1988, 1988; Lewis, Dana, & Blevins, 1988; Miller & Heather, 1986).

The APT-A addresses the individualized treatment concerns through its six scales. Each of the scales represent a theoretical perspective about the "cause" of adolescent problem substance use. The six scales are not viewed as being separate from each other. Each of scales are assessing the same domain of adolescent problem substance use. The difference is each of the scales focus on a different aspect of adolescent problem substance use. The six scales, in theory, will allow the treatment provider the opportunity to develop treatment plans relative to how the individual scored on the six scales. In theory, it is possible to have two individuals identified as problem
substance users with the same total score but different scale patterns. One individual may manifest difficulties, relative to the scales, in the areas of problem solving and social interaction. On the other hand, the other individual may have familial and emotional problems. The same treatment for both individuals wound not appear to be adequate. The issue of treatment, based on scale patterns, however, will not be investigated in the present study. The present study is concerned with establishing the reliability and the validity of the APT-A relative to discriminating between problem substance users and non problem substance users. The extent to which scale patterns are able to isolate possible "causes" of problem substance use, and the subsequent success of treatment based on the scale patterns is an issue that needs to be investigated, by trained professionals, in future studies with the APT-A.

The APT-A does not represent one particular theoretical bias nor treatment methodology. Instead, it attempts to utilize various theories in order to provide a multivariate approach to assessment and treatment. The APT-A has no face validity relative to actual substance use. There is not a single item that asks about the test-takers substance use behavior. The APT-A has no lie scale. Previous research with the APT found, in two separate studies, no significant difference between the problem substance users and the non
problem substance users relative to their scores on the Lie scale of the APT. In addition, Wanberg and Horn (1983) found lie scales to be susceptible to distortion and recommended more indirect self-report measure rather than the utilization of a lie scale. The APT-A has followed this suggestion and approaches adolescent problem substance use from an indirect perspective.

Scale Development

The six scales of the APT-A furnish the treatment provider with a profile of the individual taking the test. The profile should, in theory, show a significant difference between the problem substance user and the non problem substance user on all six scales. Each of the specific scales assess problem substance use from a theoretically different perspective. This is not to suggest the scales are independent from each other, since the previous factor analysis has already shown the scales are measuring the same factor, but simply different theories focus on different aspects of problem substance use. Although a specific theory may focus on familial interaction/non-interaction (Spots & Shontz, 1985) as the "cause" of problem substance use, such factors as problem solving and stress are involved
in the familial context. On the other hand, there are theories that focus, primarily, on the lack of problem solving skills (Wills & Shiffman, 1985) or stress reduction (Cappell & Greeley, 1987). These two theories need a context, such as the family, society or the school, wherein the problem solving difficulties or stress problems can manifest themselves. It is in this sense the different theories or problem substance use are not really independent from each other. It is just the focus of attention is different.

Lettieri (1985), in his study on problem substance use, examined 43 different explanations of substance dependence. He organized these various explanations into categories such as physiological factors, cognitive factors, personological factors, stress reduction and drug knowledge. The six scales of the APT-A address five of these factors. The only factor that is not included in the APT-A is drug knowledge. Although research (Christiansen, Roehling, Smith, & Goldman, 1989) has shown promising results utilizing alcohol expectancies (drug knowledge) to predict adolescent drinking behavior, prevention and treatment programs that focus on drug knowledge and information have not been effective in decreasing substance use (Rhodes & Jason, 1988). Since the APT-A is being developed to not only identify the possible problem substance user but to also provide a profile for
treatment intervention, the inclusion of a drug knowledge scale is not warranted.

**Family Scale**

The family scale consists of nine items that assess problem substance use from the perspective of family interaction. Spotts and Shontz (1985) propose that adolescent problem substance use is based on dysfunctional relationships within the family. These dysfunctional relationships may be due to parental separation, child abuse or neglect, sexual abuse, emotional abuse, parental coping patterns or parental alcoholism (Brenner, 1984). Rhodes and Jason (1988) argue that adolescents who have not assimilated their parents values or standards, or lack role identification with their parents may have a higher probability for developing problems with substance use. Mendelson and Mello (1985) suggest that adolescents coming from families which show little affection, unity or positive reinforcement may be more prone to developing problems with substance use. Mendelson and Mello also point out that an adolescent who perceives a substantial level of disagreement between his parents and his peers is more likely to be influenced by peer pressure and, thus, is more susceptible to developing substance use problems.
Brenner (1984) indicated that the most extensive cause for severe stress in children and adolescents is parental alcoholism. It has been estimated that children of alcoholics have a risk four times that of children of non-alcoholics of becoming an alcoholic (Goodwin, 1981). Research has shown that children of alcoholics (Marlier, 1988) and abused and neglected children (Mayall, 1983) both have difficulties trusting their parents.

The following nine items of the Family scale assess the problems of the dysfunctional family:

17. My father drinks a lot of alcohol.
18. My parents do not live together.
20. I do not trust my father.
24. I do not get along with members of my family.
25. I do not feel much love from my mother.
30. I don't feel much love from my father.
33. My mother drinks a lot of alcohol.
37. My parents are not very strict with me.
44. There is not much love in my family.
The School Scale consists of 10 items assessing problem substance use from the perspective of the adolescents' attitude toward school, attending church, peer involvement, excitement seeking and truthfulness. Research has identified numerous influences on adolescent substance use with peer influence appearing to be the strongest factor (Oetting & Beauvais, 1986; Swaim, Oetting, Edwards & Beauvais, 1989). Kandel (1985) found that peer influence was the most important factor in an adolescents' initiation into marijuana use. Newcomb and Bentler (1989) have found factors such as poor school performance and low religious involvement are associated with substance use. Kleinman, Wish, Deren and Rainone (1988) suggest that students who are "heavy" users of marijuana tend to cut class, have low grades and spend minimal time on homework. Nelson (1978) indicates as adolescents become more regular substance users, there may be an increase in lying about substance use, truancy, loss of non substance using friends and the development of coping problems in school. Nelson also points out as substance use increases the adolescent develops self-hate and increases his risk taking behavior.

The National Council of Juvenile and Family Court Judges (1989) indicates a low involvement with education and
the lack of bonding with the school are risk factors for developing substance use problems. Anderson and Deck (1987) in their analysis of adolescent substance use in the state of Hawaii, suggest problem substance use is associated with school attendance problems. Bennett (1987) cites radical drops in school grades and increased absenteeism as changes in school performance associated with substance use problems.

The following 10 items of the School scale are utilized to assess attitudes toward school, church and relationships with peers:

6. I feel inferior to some of my friends.
11. I have been suspended from school.
16. Some of my best friends smoke pot.
35. I don’t like school.
36. Going to church is a waste of time.
38. I like to do dangerous things.
39. I have cut a lot of classes.
43. My friends don’t really know me.
46. I do not have many friends.
47. I lie a lot.
Emotion Scale

The Emotion scale consists of nine items assessing problem substance use from the perspective of stress and emotional difficulties. Research by Christiansen et al. (1982), found that adolescents expect alcohol to reduce physical tension and divert their thoughts from worry. Sher (1987) asserts drinking alcohol to reduce stress is contingent upon a number of factors, especially the individual's perception of the extent to which he can cope without alcohol. Researchers (Cappell & Greeley, 1987) have found that although alcohol may reduce tension, it is not very effective because it has side effects at larger doses which negate its tension reduction qualities.

The DSM-III (1980) asserts that an individual's attempt to control mood disturbances through the use of substances affecting the central nervous system may intensify anxiety or depression associated with Borderline Personality Disorder. Nelson (1978) indicates that adolescents who have a substance use problem have poor self-esteem and may have increased thoughts about suicide. Bennett (1987) declares adolescents who have problems with substance use show an increase in hostility, irritability and anger, and a decrease in energy, motivation and a lack of interest in hobbies and extracurricular activities.
The following nine items of the emotion scale assess adolescent problem substance use from the perspective of emotional disturbance:

3. I get bored a lot.
9. I get nervous easily.
13. I get angry a lot.
22. I do not think much of myself.
26. I don’t care much about anything.
28. I get uptight a lot.
42. I often worry about the same thing.
45. I do a lot of things without thinking about what will happen to me.
48. I do not care what happens to me.

Problem Solving Scale

use prevention program for seventh grade black students. The authors concluded that decision making and problem solving strategies combined with information about drugs show promise as a prevention strategy for black adolescents. Newcomb and Bentler (1988) indicate substance use in adolescents causes cognitive processes to be disorganized and bizarre. The authors assert these cognitive changes may affect problem solving abilities. Christiansen and Goldman (1983) found the expectation that drinking alcohol would improve cognitive and motor performance was the strongest indicator of adolescent problem drinking.

The eight items of the Problem Solving scale approach problem substance use from the perspective that the adolescent's cognitive skills may have been impaired through his use of substances. The following eight items make up this scale:

7. I would rather have someone tell me the answer to a problem than work it out myself.
10. It takes me several days to get over my failures.
14. I have a hard time doing school work.
19. I have a difficult time setting goals for myself.
27. I have a hard time making decisions.
32. I have a lot of free time without anything to do.
34. I'd rather give up than try to solve a problem.
40. I think homework is a waste of time.

Physical Scale

The five items on the Physical scale assess problem substance use by the physical effect the substance has on the adolescent. Bennett (1987) lists memory problems, attention span difficulties and problems with concentration as signs of possible problem substance use. Royce (1981) observes excessive alcohol consumption causes blackouts and sleep disturbances. The five items on this scale are:

4. Recently, I have had trouble remembering things.
5. I have trouble sleeping.
12. I hardly dream at all.
23. I have a hard time concentrating.
29. I am easily confused.
Interact Scale

The 10 items on the Interact scale address the issue of adolescent problem substance use from the perspective of social interaction. The assumption of this scale is the adolescent problem substance user has a low self-esteem which results in his inability to interact with other individuals in a normal manner. This perceived inability to interact raises the adolescents stress level. The use of substances artificially increases the adolescents self-esteem which, in turn, takes away the fear (stress) of interacting with other individuals. The items assess the adolescents' perception of himself from the perspective of not being under the influence of a particular substance.

Rhodes and Jason (1988) indicate some adolescents may use substances because of an inability to interact with their parents or teachers. Newcomb and Bentler (1989) argue that the most effective prevention for problem substance use are programs that build self-confidence, increase social competence, promote alternative activities and broaden experiences. Research by Swaim, Oetting, Edwards and Beauvais (1989) indicates adolescents with emotional problems may be more susceptible to forming friendships with adolescents who use and encourage the use of substances. Substance use, according to Oetting and Beauvais (1986), is
due, primarily, to peer relationships and not emotional stress. The reinforcement for the continued use of the substance, according to Oetting and Beauvais, would seem to come from the adolescents' peers and not the substance itself.

The 10 items of the interact scale are:

1. I have a hard time telling people how I feel.
2. I am easily angered by people who argue with me
8. If someone criticizes me it makes me feel worthless
15. I don't trust other people.
21. I have a hard time getting along with people.
31. Nobody cares about me.
41. Nobody listens to me.
49. I have an after school job.
50. I don't think anybody really likes me.
51. When I am with other people, I need to be the boss.

Conclusion

This chapter has been concerned with the presentation of the theoretical basis of the APT-A and its six scales. In the following chapter, three separate studies are used to determine the reliability and the validity of the test and the scales. An item analysis is utilized to determine which
of the individual items discriminate between high scorers and low scorers. A cut off score is established to determine the classification accuracy of the test.
CHAPTER FOUR

Psychometric Considerations

The APT-A was administered in the state of Hawaii, by teachers and counselors, in three studies, to a multi-racial sample (Part-Hawaiian=28.29%, Inter-racial=22.78%, Caucasian=15.2%, Japanese=14.8%, Filipino=7%, and Chinese=3%) of 1069 adolescents ranging in age from 13-19. Testing was conducted at 7 high schools, 6 treatment facilities, a youth correctional institute and a detention home. Only one of the six treatment facilities specifically treated adolescent problem substance use. The other five facilities not only treated problem substance use, but treated other problems such as physical abuse, sexual abuse, emotional disorders, runaways and school/behavioral difficulties.

Each of the students received a demographic questionnaire and a copy of the APT-A. The students were informed that participation was voluntary and they would not be identified if they chose to participate.

A total of 70 tests (6.5%) were rejected because of response patterns, failure to complete the test, no demographic data or inappropriate responses on the demographic sheet which questioned the seriousness of their
responses on the APT-A. A total of 999 observations (male=51% and female=49%) were used for the three studies. The sample size was 308 for the first study (pilot study), 323 for the second study and 368 for the third study (cross-validation studies).

Method of Classification

To determine whether the APT-A can accurately classify an adolescent as having a substance use problem, two a priori methods of classification were developed. These two methods utilized four items from the demographic questionnaire. The first method used the two items that asked about substance use problems.

1. Have you ever been told that you have a drug/alcohol problem?

2. Do you think you have a drug/alcohol problem?

If an adolescent answered "yes" to item number 1 and/or item number 2, he was labeled as having a substance use problem. If the adolescent did not answer "yes" to either of these two questions, the second a priori method was utilized to determine whether the adolescent had a substance use problem.
The second method used the two items on the demographic questionnaire that asked specifically about substance use. The labeling of an adolescent as having a substance use problem was contingent, for this method, upon the number of substances that adolescent admitted to using.

3. Please circle, which, if any, of the following drugs that you have used.

   Alcohol Pot Cigarettes Cocaine Uppers Downers Heroin
   LSD Glue Paint Crystal-Meth Ice

4. If you use/have used drugs, which drug do/did you use most often?

   In a study by Johnston, O’Mally and Bachman (1988), for the National Institute on Drug Abuse (NIDA), it was found that alcohol (92%), cigarettes (67%) and marijuana (50%) were the three most used substances by high school seniors (N=16,300) from the class of 1987. The next closest substance was non-prescribed stimulants. These three gateway drugs (Oetting & Beauvais, 1986) are viewed as stepping stones to more "serious" drugs. Anderson and Deck (1987) in the development of their scale for the severity of
substance use, utilize poly-substance use as one of the
criteria for defining heavy or problem substance use.

Based on the information from these three studies, an
adolescent was defined as having a substance use problem if
he used five or more substances. The choice of five or more
substances rather than four was simply an attempt to define
the labeling process a little more conservatively. It
should be pointed out that a severe substance use problem
can result from the use of only one substance. One needs
only to consider the alcohol problem (Califano, 1982) in
this country to demonstrate the truth of this claim.

In addition to the classification category of problem
substance use, five other categories were created. If an
adolescent was not placed in the category of problem
substance use, he was placed in one, and only one, of the
five remaining categories. The first category,
(no substance use) consisted of those adolescents who
admitted to no substance use (obtained from the four items
of the demographic questionnaire), did not have a parent
that used a lot of alcohol (obtained from items 17 and 33
from the APT-A) and affirmed that their parents live
together (obtained from item 18 of the APT-A and one item on
the demographic questionnaire). The second category
(parental separation) was defined by the parents not living
together, neither parent drinking a lot of alcohol and no
defined substance use problem. The third category (parental alcoholism) was defined as one or both of the parents drinking a lot of alcohol, parents living together and no defined substance use. The fourth category (combination of parental alcoholism and parental separation) consisted of one or both parents drinking a lot of alcohol, parents not living together and no defined substance use problem. The fifth category (non problem substance use) consisted of no defined substance use problem, neither parent drinking a lot of alcohol and the parents living together. All adolescents, from the pilot study and both cross-validation studies, were classified into one, and only one, of the six categories.

The impact of parental alcoholism, parental separation or the combination of both on the adolescent is quite severe (Brenner, 1984; Thompson & Rudolph, 1988). Children of alcoholics manifest many of the same behavioral patterns as their alcoholic parent (Marlin, 1987). In order to control for the effect that parental alcoholism and/or parental separation may have on the adolescents' responses on the APT-A, the categories of parental alcoholism, parental separation and parental alcoholism/parental separation were created. This allows for the examination of the responses from the no substance use group and the no problem substance use group independent of the effects of parental alcoholism.
and/or parental separation. Since the dysfunctional family is one of the variables associated with adolescent problem substance use, the adolescents placed into the category of problem substance use may have separated parents and/or parents that drink a lot of alcohol.

Reliability

In the pilot study, the APT-A was administered to 308 adolescents. An alpha coefficient of .91 was obtained for the total test score. The standard error of measurement for the total test score was 2.90. Table 6 reports the alpha coefficients and standard errors of measurement for the six scales and the total score.
### Table 6

**Alpha Coefficients and the Standard Errors of Measurement for the Six Scales and the Total Score for the Pilot Study of the APT-A (N=308)**

<table>
<thead>
<tr>
<th>Scale</th>
<th>Items</th>
<th>Mean</th>
<th>SD</th>
<th>Alpha</th>
<th>$S_{em}$</th>
</tr>
</thead>
<tbody>
<tr>
<td>Family</td>
<td>9</td>
<td>2.1</td>
<td>1.9</td>
<td>.67</td>
<td>1.1</td>
</tr>
<tr>
<td>School</td>
<td>10</td>
<td>3.2</td>
<td>2.3</td>
<td>.67</td>
<td>1.3</td>
</tr>
<tr>
<td>Emotion</td>
<td>9</td>
<td>3.3</td>
<td>2.3</td>
<td>.72</td>
<td>1.2</td>
</tr>
<tr>
<td>Problem Solving</td>
<td>8</td>
<td>2.7</td>
<td>2.0</td>
<td>.62</td>
<td>1.2</td>
</tr>
<tr>
<td>Physical</td>
<td>5</td>
<td>1.4</td>
<td>1.4</td>
<td>.57</td>
<td>0.9</td>
</tr>
<tr>
<td>Interact</td>
<td>10</td>
<td>2.5</td>
<td>2.0</td>
<td>.66</td>
<td>1.2</td>
</tr>
<tr>
<td>Total</td>
<td>51</td>
<td>15.1</td>
<td>9.5</td>
<td>.91</td>
<td>2.9</td>
</tr>
</tbody>
</table>

In the second study (first cross validation study), the APT-A was administered to 323 adolescents. An alpha coefficient of .90 was obtained for the total test score. The standard error of measurement for the total test score was 2.8. Table 7 reports the alpha coefficients and the standard error of measurement for the six scales and the total test score for the first cross validation study.
Table 7

Alpha Coefficients and the Standard Errors of Measurement for the Six Scales and the Total Score for the First Cross Validation Study of the APT-A (N=323)

<table>
<thead>
<tr>
<th>Variable</th>
<th>Items</th>
<th>Mean</th>
<th>SD</th>
<th>Alpha</th>
<th>$S_{em}$</th>
</tr>
</thead>
<tbody>
<tr>
<td>Family</td>
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<td>1.9</td>
<td>1.9</td>
<td>.69</td>
<td>1.1</td>
</tr>
<tr>
<td>School</td>
<td>10</td>
<td>2.8</td>
<td>2.1</td>
<td>.62</td>
<td>1.3</td>
</tr>
<tr>
<td>Emotion</td>
<td>9</td>
<td>3.0</td>
<td>2.3</td>
<td>.72</td>
<td>1.2</td>
</tr>
<tr>
<td>Problem Solving</td>
<td>8</td>
<td>2.2</td>
<td>1.9</td>
<td>.64</td>
<td>1.1</td>
</tr>
<tr>
<td>Physical</td>
<td>5</td>
<td>1.2</td>
<td>1.3</td>
<td>.51</td>
<td>.8</td>
</tr>
<tr>
<td>Interact</td>
<td>10</td>
<td>2.5</td>
<td>2.0</td>
<td>.65</td>
<td>1.2</td>
</tr>
<tr>
<td>Total</td>
<td>51</td>
<td>13.6</td>
<td>8.8</td>
<td>.90</td>
<td>2.8</td>
</tr>
</tbody>
</table>

In the third study (second cross validation study) the APT-A was administrated to 368 adolescents. An alpha coefficient of .90 was obtained for the total test score. The standard error of measurement for the total score was 2.9. Table 8 reports the alpha coefficients and standard errors of measurement for the six scales and the total test score for the second cross validation study.
Table 8

Alpha Coefficients and Standard Errors of Measurement for the Six Scales and Total Score for the Second Cross Validation Study of the APT-A (N=368)

<table>
<thead>
<tr>
<th>Variable</th>
<th>Items</th>
<th>Mean</th>
<th>SD</th>
<th>Alpha</th>
<th>$S_{em}$</th>
</tr>
</thead>
<tbody>
<tr>
<td>Family</td>
<td>9</td>
<td>2.1</td>
<td>1.9</td>
<td>.65</td>
<td>1.1</td>
</tr>
<tr>
<td>School</td>
<td>10</td>
<td>3.0</td>
<td>2.1</td>
<td>.59</td>
<td>1.3</td>
</tr>
<tr>
<td>Emotion</td>
<td>9</td>
<td>3.3</td>
<td>2.3</td>
<td>.70</td>
<td>1.3</td>
</tr>
<tr>
<td>Problem Solving</td>
<td>8</td>
<td>2.6</td>
<td>2.0</td>
<td>.66</td>
<td>1.2</td>
</tr>
<tr>
<td>Physical</td>
<td>5</td>
<td>1.4</td>
<td>1.3</td>
<td>.53</td>
<td>.9</td>
</tr>
<tr>
<td>Interact</td>
<td>10</td>
<td>2.6</td>
<td>1.8</td>
<td>.58</td>
<td>1.2</td>
</tr>
<tr>
<td>Total</td>
<td>51</td>
<td>15.0</td>
<td>8.7</td>
<td>.89</td>
<td>2.9</td>
</tr>
</tbody>
</table>

The average alpha coefficient for the total test score across three studies is .90. The average standard error of measurement for the total test score across three studies is 3.86. The average alpha coefficient for the six scales across three studies ranged from .54 (Physical scale, item N=5) to .71 (Emotion scale, item N=9). For future studies, the number of items in the Physical Scale will be increased in order to raise the reliability of the scale.
Item Analysis

In the pilot study, an item analysis, utilizing a chi-square test, indicated that 50 of the 51 items significantly discriminated (p<.0001, df=306) between the upper 1/3 and the lower 1/3 (total test score) of the test takers. The only item that did not significantly discriminate between those two groups was:

49. I have an after school job.

These results were replicated in both the first cross validation study (df=321) and the second cross validation study (df=366). The same 50 items significantly discriminated (p<.0001), in both cross validation studies, between the upper 1/3 and the lower 1/3 (total test score) of the test takers. The only item that did not discriminate between the two groups, in both cross validation studies, was item 49 (I have an after school job). As a result of the three item analyses, item 49 will be deleted from the instrument for future studies.
Validity

In the pilot study (N=308), a regression analysis was performed using the total score as the dependent variable and the six classification categories (group membership) as the independent variable. A significant F (p<.0001, df=5/305) of 25.96 was obtained. A multiple comparison revealed that the no substance use group and the non problem substance use group were not significantly different from each other. Both of these groups, however, were significantly different from the problem substance use group. Based on these results, the no substance use group and the non problem substance use group were combined into one group labeled as the no problem group (N=139). For simplicity sake, the problem substance use group will be relabeled as the problem group.

The APT-A was constructed to discriminate between those adolescents who have problems with substance use (problem group) and those adolescents (no problem group) who either do not use substances or have no problems with substance use, independent from the effects of parental alcoholism and/or parental separation. This being the case, the parental alcoholism group, the parental separation group and the combined parental alcoholism/separation group were
eliminated for all remaining studies. The validity studies will compare only the problem group and the no problem group.

Construct Validity

The APT-A examines adolescent problem substance use behavior from a multi-theoretical perspective rather than from a single theoretical perspective. Each of the individual scales on the APT-a represent a theoretical explanation of adolescent problem substance use. It is hypothesized that there are numerous, inter-related causes for adolescent problem substance use. In order to determine whether the theoretical basis of the APT-a is valid in explaining adolescent problem substance use behavior, it is necessary to compare those adolescents who have been categorized as having a substance use problem with those adolescents who have been categorized as not having a substance use problem. The hypothesis is that the group mean of adolescents who have been categorized as having a substance use problem (problem group) will be significantly higher, on all six scales and the total test score of the APT-A, than the group mean of those adolescents who have been categorized as not having a substance use problem (no problem group). If the null hypothesis of no difference
between the groups is rejected, the construct validity of the APT-A's multi-theoretical explanation of adolescent problem substance use would be substantiated.

In the pilot study (N=218), the no problem group (N=139) was compared to the problem group (N=79), with the total score as the dependent variable, using a regression analysis. A significant F (p=0.0001, df=1/216) of 103.0 was obtained. The null hypothesis of no difference between the groups is rejected as the problem group (mean=22.7) scored significantly higher than the no problem group (mean=9.55). Table 9 reports the regression analysis results comparing the problem group and the no problem group on the six scales. The results indicate that the problem group scores significantly higher than the no problem group on all six scales.
Table 9

APT-A Regression Analysis, for the Pilot Study, comparing the Problem Group (N=79) and the No Problem Group (N=139) with Raw Score Means, on Six Scales (df=1/216)

<table>
<thead>
<tr>
<th>Scale</th>
<th>Item</th>
<th>Problem Group Mean</th>
<th>No Problem Group Mean</th>
<th>F</th>
</tr>
</thead>
<tbody>
<tr>
<td>Family</td>
<td>9</td>
<td>3.1</td>
<td>.91</td>
<td>101.40*</td>
</tr>
<tr>
<td>School</td>
<td>10</td>
<td>5.4</td>
<td>1.90</td>
<td>187.50*</td>
</tr>
<tr>
<td>Emotion</td>
<td>9</td>
<td>4.7</td>
<td>2.20</td>
<td>75.48*</td>
</tr>
<tr>
<td>Problem Solving</td>
<td>8</td>
<td>3.8</td>
<td>1.90</td>
<td>53.77*</td>
</tr>
<tr>
<td>Physical</td>
<td>5</td>
<td>2.2</td>
<td>.94</td>
<td>47.00*</td>
</tr>
<tr>
<td>Interact</td>
<td>10</td>
<td>3.5</td>
<td>1.70</td>
<td>44.73*</td>
</tr>
</tbody>
</table>

* p<.0001

The first cross validation study (N=214) followed the same methodology utilized, in the pilot study, for comparing the problem group and the no problem group. A significant F (<.0001, df=1/212) of 182.44 was obtained. The results demonstrate that the problem group (N=50, mean=24.5) continues to score significantly higher than the no problem group (N=164, mean=9.85) when the total score is used as the dependent variable. Table 10 reports the regression
analysis results comparing the problem group and the no problem group on the six scales. The results indicate that the problem group continues to score significantly higher than the no problem group on all six scales.

Table 10

APT-A Regression Analysis, for the First Cross Validation Study, comparing the Problem Group (N=50) and the No Problem Group (N=164), with Raw Score Means, on Six Scales (df=1/212)

<table>
<thead>
<tr>
<th>Scale</th>
<th>Item</th>
<th>Problem Group Mean</th>
<th>No Problem Group Mean</th>
<th>F</th>
</tr>
</thead>
<tbody>
<tr>
<td>Family</td>
<td>9</td>
<td>3.56</td>
<td>.87</td>
<td>123.30*</td>
</tr>
<tr>
<td>School</td>
<td>10</td>
<td>5.22</td>
<td>2.12</td>
<td>117.40*</td>
</tr>
<tr>
<td>Emotion</td>
<td>9</td>
<td>5.30</td>
<td>2.44</td>
<td>78.32*</td>
</tr>
<tr>
<td>Problem Solving</td>
<td>8</td>
<td>3.84</td>
<td>1.60</td>
<td>72.79*</td>
</tr>
<tr>
<td>Physical</td>
<td>5</td>
<td>2.26</td>
<td>.93</td>
<td>54.13*</td>
</tr>
<tr>
<td>Interact</td>
<td>10</td>
<td>4.10</td>
<td>1.84</td>
<td>73.68*</td>
</tr>
</tbody>
</table>

* p<.0001.
In the second cross validation study (N=243), the problem group (N=71) was compared with the no problem group (N=172) utilizing the same procedure as the previous two studies. A significant F (p<.0001, df=1/241) of 200.60 was obtained indicating that the problem group (mean=24.51) continues to score significantly higher than the no problem group (mean=10.97) when the total test score is used as the dependent variable. Table 11 reports the results of the regression analysis comparing the problem group and the no problem group on the six scales. The results indicate that the problem group continues to score significantly higher than the no problem group on all six scales.
Table 11

APT-A Regression Analysis, for the Second Cross Validation Study, comparing the Problem Group (N=71) and the No Problem Group (N=172), with Raw Score Means, on Six Scales (df=1/241)

<table>
<thead>
<tr>
<th>Scale</th>
<th>Item</th>
<th>Problem Group Mean</th>
<th>No Problem Group Mean</th>
<th>F</th>
</tr>
</thead>
<tbody>
<tr>
<td>Family</td>
<td>9</td>
<td>3.41</td>
<td>.97</td>
<td>120.33*</td>
</tr>
<tr>
<td>School</td>
<td>10</td>
<td>5.38</td>
<td>2.31</td>
<td>167.03*</td>
</tr>
<tr>
<td>Emotion</td>
<td>9</td>
<td>5.25</td>
<td>2.56</td>
<td>93.03*</td>
</tr>
<tr>
<td>Problem Solving</td>
<td>8</td>
<td>4.48</td>
<td>1.90</td>
<td>116.79*</td>
</tr>
<tr>
<td>Physical</td>
<td>5</td>
<td>2.15</td>
<td>1.16</td>
<td>31.41*</td>
</tr>
<tr>
<td>Interact</td>
<td>10</td>
<td>3.66</td>
<td>2.03</td>
<td>53.11*</td>
</tr>
</tbody>
</table>

* p<.0001.

The results of the three studies indicate that the APT-A has construct validity in explaining adolescent problem substance use behavior. The null hypothesis of no difference between the groups is rejected across all three studies for the total test score and all six scales. It must be pointed out, however, that the construct validity of the APT-A must be considered as tentative.
One of the methods for determining construct validity consists of correlating scores on the exploratory instrument (in this case, the APT-A) with scores on an instrument which has an established reliability and validity for the same domain. The higher the correlation between the two instruments, the higher the construct validity of the exploratory instrument. This methodology, however, was not followed in the present study.

It was not possible to locate an instrument that was specifically constructed to assess adolescent (ages 13-19) problem substance use that had an acceptable reliability and validity, reported the classification accuracy of the instrument, and was constructed to assist in the development of individualized treatment plans. The APT-A was constructed because there were no problem substance use instruments that addressed all these areas.

Even if an adequate problem substance use instrument was located, there were restrictions that, in all likelihood, would have precluded its administration. Both teachers and administrators were extremely concerned with the amount of instructional time that would be lost due to the administration of one test. Any additional tests would have compounded that concern and might have prevented the administration of even the APT-A. The administration, in some schools, was highly suspicious about the administration
of a substance use test in their school. They seemed to be under the belief that the research was attempting to demonstrate that their school had a substance use problem. Although it was explained to them this was not the case, a few schools refused to participate in the study.

Concurrent Validity

It was not possible to establish the concurrent validity of the APT-A during the present study. Since the adolescents responding to the test had anonymity, there was no assessment, by an individual trained in substance use counseling, to determine if the members of the problem group displayed clinical symptoms demonstrating a substance use problem. In future studies with the APT-A, the instrument needs to be administrated to adolescents who have been clinically identified, by a professional, as having a substance use problem.

Predictive Validity

In the pilot study (N=218), five regression analyses were performed to determine the best models for predicting group membership (problem group=79, no problem group=139).
The first analysis used the total test score to predict group membership. A significant $F$ ($p<.0001$, $df=1/126$) of 103.0 was obtained. The adjusted R-Squared was .32.

The second analysis used the six scales for predicting group membership. A significant $F$ ($p<.0001$, $df=6/211$) of 36.41 was obtained. The adjusted R-Squared was .50. An examination of the model indicated that only two of the scales (family and school) contributed significantly to the model. These two scales were examined as individual models and as a combined model.

The third analysis used the combined model of the family scale and the school scale to predict group membership. A significant $F$ ($p<.0001$, $df=2/215$) of 107.6 was obtained. The adjusted R-Squared was .50.

The fourth analysis used the family scale to predict group membership. A significant $F$ ($p<.0001$, $df=1/216$) of 101.4 was obtained. The adjusted R-squared was .32.

The fifth analysis used the school scale to predict group membership. A significant $F$ ($p<.0001$, $df=1/216$) of 187.5 was obtained. The adjusted R-Squared was .46.

Since only two scales (family and school) of the six scale regression model contributed significantly to the model, the six scale regression model was eliminated for the cross validation studies. The total score, family and
school, family, and school regression models were used to predict group membership for the two cross validation studies.

In the first cross validation study (N=214), predictive validity coefficients, for group membership (problem group=50, no problem group=164), were generated for the four models. A predictive validity coefficient of .68 was obtained with the total test score model. A predictive validity coefficient of .67 was obtained with the family and school scale model. A predictive validity coefficient of .61 was obtained with the family scale model. A predictive validity coefficient of .60 was obtained with the school model. All four predictive validity coefficients were significant at the .0001 level.

Predictive validity coefficients, for group membership (problem group=71, no problem group=172), were also generated for the second cross validation study (N=243). In this study, a predictive validity coefficient of .69 was obtained with the family and school scale model. A predictive validity coefficient of .67 was obtained with the total test score model. A predictive validity coefficient of .64 was obtained with the school scale model. A predictive validity coefficient of .58 was obtained with the family scale model. All four predictive validity coefficients were significant at the .0001 level.
The predictive validity coefficients remained fairly stable across the two cross validation studies. The total test score model displayed a slight shrinkage from .68 in the first cross validation study to 67 in the second cross validation study. The family and school scale model showed a slight increase from .67 in the first cross validation study to .69 in the second cross validation study. The school scale model showed an increase from .60 in the first cross validation study to .64 in the second cross validation study. The family scale model displayed a decrease from .61 in the first cross validation study to .58 in the second cross validation study.

Classification Accuracy

To utilize the APT-A for initial problem substance use screening, a classification method, using the total test score, was developed. In the pilot study, the problem group (N=79) had a total test score mean of 22.7 and a standard deviation of 9.4. All total test scores that were more than one standard deviation below the mean (below 12) were eliminated from the analysis. The removal of these scores raised the mean, for the problem group (N=70), to 24.5 and lowered the standard deviation to 8.5. The mean for the no problem group (N=139) is 9.5 while the standard deviation is
6. One standard deviation above the mean, for the no problem group, is 15.5 while one standard deviation below the mean, for the problem group, is 16. Using this information, a problem substance use classification cutoff score of 16 was selected.

The cutoff score (16) that was established in the pilot study, was used in the first cross validation study (N=214) to classify members of the problem group (N=50) and the no problem group (N=164). The cutoff score method correctly classified 96% of the problem group and 81.7% of the no problem group. This method incorrectly classified 4% of the problem group (false negatives) and 18.3% of the no problem group (false positives).

The same cutoff score method was used in the second cross validation study (N=243). The cutoff score method correctly classified 91.55% of the problem group (N=71) and 75.58% of the no problem group (N=172). This method also incorrectly classified 8.45% of the problem group (false negatives) and 24.42% of the no problem group (false positives).

The APT-A was developed to act as a screening device to assist in the assessment of possible problem substance use. Adolescents who were members of the no problem group but were incorrectly classified (false positives), by the cutoff score method, as belonging to the problem group represent
possible problem substance users. The no problem group misclassification rate (false positives) averaged over the two cross validation studies is 21.36%. This 21.36% misclassification rate (false positives) of the no problem group falls within the 17-24% estimated range of Hawaii sophomores and seniors who have a high probability of having or developing a substance use problem (Anderson & Deck, 1987). Because of the anonymity of the study, it was not possible to follow up with those adolescents who were misclassified (false positives) as belonging to the problem group. Although the cutoff score method appears to be supported by the Anderson and Deck (1987) study (classification rate similarities), the accuracy of the cutoff score method must be determined, ultimately, through a follow up study, by trained professionals, of the misclassified adolescents.

Demographic Analysis

In the pilot study, five demographic variables were selected to determine the extent to which the total test score was effected by variables other than problem substance use. The five variables are age, sex, class, race and drug preference.
In the first cross validation study (N=323), five regression analyses, with a Scheffe's multiple comparison test, were performed to determine if there were significant differences between ages, sexes, classes, races and drug preference relative to total test score. There were no significant differences between ages, races, sexes or classes. There was a significant difference in the category of drug preference. While there were no significant differences between specific drugs, there was a significant difference between adolescents who did not use drugs and adolescents who used either marijuana or the combination of marijuana and alcohol.

In the second cross validation study (N=368), five regression analyses, with a Sheffé's multiple comparison method, were also performed with the same variables utilized in the first cross validation study. As in the first cross validation study, there were no significant differences between ages, sexes, races or classes relative to total test score. While there were no significant differences between specific drugs, there was a significant difference between adolescents who did not use drugs and adolescents who used either marijuana or crystal crystal-meth.
Conclusion

The two cross validation studies demonstrate that the APT-A is both a reliable and valid instrument for assessing adolescent problem substance use. The predictive validity, construct validity, reliability and classification accuracy remained stable across two cross validation studies.
CHAPTER FIVE

Clinical Considerations

The APT-A was developed specifically for adolescents with a substance use problem. The APT-A was constructed to be easily administered, require little time to complete and be directly applicable to the development and evaluation of individualized treatment plans.

Administration

The time required for an adolescent to complete the APT-A is approximately 10 minutes. The time may vary depending upon the adolescent’s response rate. The test must be administered, scored and interpreted by a professional trained not only in tests and measurement, but also in problem substance use counseling. The administrator must tell the adolescent:

1. The test is concerned with the feelings and thoughts you have about yourself.
2. There are no right or wrong answers.
3. Fill in the circle for either true or false for each question. There must not be more than one answer for each question.

4. Answer all of the questions.

Scoring

To use the APT-A as an initial screening device, the trained professional needs to simply count all of the responses that have been marked true. A total test score (raw score) of 16 or above is indicative of a possible substance use problem. With a standard error of measurement of 3 (rounded for clinical purposes), scores from 13 to 15 may also be indicative of a possible substance use problem. It must be pointed out that there should be a suspicion of possible substance use or the manifestation of problems that are suggestive of problem substance use before the APT-A is administered. The test must not be used by itself for the diagnosis of problem substance use. The test was developed to be used in conjunction with a clinical evaluation, by a trained professional, to assess the possibility of adolescent problem substance use.

If the total test score indicates the possibility of adolescent problem substance use, the trained professional should determine the raw scores for each of the scales.
this may be accomplished by simply counting all the true responses for each of the scales. Once the raw scores have been determined for each of the scales, the scores can be converted to standard scores using the conversion table (see Appendix C).

Standard Scores

The standard scores are based on the average raw scores, on each of the scales, for the problem substance use group. The standard scores have a mean of 10 and a standard deviation of 3. The mean of 10 represents the specific raw score mean, of the problem substance use group, for each of the individual scales. The standard scores range from 2 to 19, and indicate the extent to which the adolescent's performance on each of the scales deviates from the average performance of the problem substance use group. The standard error of the difference between two scores was determined for each of the scales. Each of the standard errors of the difference were multiplied by 1.44 to obtain the 85% confidence level. The 85% confidence level was selected to provide an ample interval for researching the differences between scales relative to treatment considerations. The resulting scores ranged from 3.37 to
3.8. In general, a standard score difference of 3 or more between any pair of scale scores indicates a significant difference, at the 85% confidence level, between the attributes measured by the scales.

Treatment Considerations

Once the standardized scores have been obtained for each of the scales, the next step is to determine the average standardized score (mean) for the adolescent. This is accomplished by summing the 6 standard scale scores and dividing by 6. A standard scale score that is 3 or more points above the mean represents a relative weakness for the adolescent. A standard scale score that is 3 or more points below the mean represents a relative strength for the adolescent. In theory, the use of the adolescent’s relative strength/strengths and his relative weakness/weaknesses, if there are any, would allow the treatment provider to individualize the treatment program. The adolescent’s relative strength/strengths would provide an individualized foundation for approaching the substance use problem. The relative weakness/weaknesses would allow the treatment process to focus on what may be the "cause/causes" of the adolescent’s substance use problem.
It is likely that an adolescent may have a flat profile in which there are no strengths or weaknesses. In this case, a more general approach to treatment focusing on the problem substance use behavior may be warranted.

In order to demonstrate this process more concretely, it is necessary to look at some actual scores from members of the problem substance use group.
Table 12

APT-A Problem Substance Use Group and No Problem Substance Use Group Standard Score Profile (mean=10, sd=3) for Six Scales with the Average Standard Score

<table>
<thead>
<tr>
<th>Scale</th>
<th>Problem Use Group Standard Score</th>
<th>No Problem Use Group Standard Score</th>
</tr>
</thead>
<tbody>
<tr>
<td>Family</td>
<td>10</td>
<td>7</td>
</tr>
<tr>
<td>School</td>
<td>10</td>
<td>5</td>
</tr>
<tr>
<td>Emotion</td>
<td>10</td>
<td>6</td>
</tr>
<tr>
<td>Problem Solving</td>
<td>10</td>
<td>7</td>
</tr>
<tr>
<td>Physical</td>
<td>10</td>
<td>8</td>
</tr>
<tr>
<td>Interact</td>
<td>10</td>
<td>7</td>
</tr>
</tbody>
</table>

Average

Standard Score 10  7
Table 13
APT-A Standard Scores (mean=10, sd=3), of Three Subjects from the Problem Substance Use Group, for Six Scales with the Average Standard Score

<table>
<thead>
<tr>
<th>Scale</th>
<th>Subject I</th>
<th>Subject II</th>
<th>Subject III</th>
</tr>
</thead>
<tbody>
<tr>
<td>Family</td>
<td>8</td>
<td>8</td>
<td>13</td>
</tr>
<tr>
<td>School</td>
<td>8</td>
<td>12</td>
<td>12</td>
</tr>
<tr>
<td>Emotion</td>
<td>14</td>
<td>10</td>
<td>10</td>
</tr>
<tr>
<td>Problem Solving</td>
<td>6</td>
<td>13</td>
<td>9</td>
</tr>
<tr>
<td>Physical</td>
<td>10</td>
<td>10</td>
<td>8</td>
</tr>
<tr>
<td>Interact</td>
<td>13</td>
<td>7</td>
<td>7</td>
</tr>
</tbody>
</table>

Average Standard Score 10 10 10

Before proceeding with the analysis, it must be pointed out that the treatment implications of utilizing this method are purely theoretical. The validity of the specific treatments (strengths and weaknesses) based on this method have not been established. Although the scales are significantly different, relative to the problem group and
the no problem group, it has not been demonstrated that each of the scales measure what they purport to measure. Future studies, by trained professionals, will need to examine this area to determine the extent to which these scales are valid for treatment purposes.

The scale scores of subject number one indicate, in theory, that he has a relative strength in problem solving (problem solving scale) and relative weaknesses in interacting with people (interact scale) and coping with his feelings (emotion scale). The relative weaknesses and the relative strength, for this subject, are based on the fact that these specific scale scores are 3 or more standard scores from his average standard score (mean). An individualized treatment plan would, in theory, utilize his problem solving abilities to approach his emotional difficulties and his problems interacting with people.

The scale scores of subject number two indicate that he has a relative strength interacting with people (interact scale) and a relative weakness in problem solving (problem solving scale). An individualized treatment program would, in theory, focus on his ability to interact with people as a means to examine his difficulties with problem solving.

The scale scores of subject number three indicate that he has a relative weakness in family relationships (family scale) and a relative strength in interacting with people
(interact scale). An individualized treatment plan would, in theory, use his abilities in getting along with people to approach his strained family relationships.

Based on the face validity of the items and the scales, subject number one's substance use problems are most likely due to emotional conflicts and the inability to get along with people. Subject number two's substance use problems are most likely due to problem solving difficulties. Subject number three's substance use problems are most likely due to strained family relationships.

An examination of the average standard score for each of the subjects indicates that they all have the same score of 10. An examination of the individual profiles, however, shows a marked difference, in a number of instances, between their scale scores. Although these three individuals have the "same" substance use problem, it would appear that they each have a different "cause" for their problem. It would seem to be counter productive to treat these three individuals in exactly the same manner. Their individual strengths and weaknesses should, in theory, be considered relative to their treatment programs. It must be reiterated, however, that the validity of this approach has not been established and awaits verification in future studies with the APT-A.
CHAPTER SIX

Conclusion

The APT-A was specifically constructed to discriminate between adolescents (problem group) who have problems with substance use and adolescents (no problem group) who either do not have problems with substances or do not use them at all. The pilot study and the two cross validation studies have demonstrated that the APT-A significantly discriminates between these two groups.

At the root of the APT-A are theoretical structures that attempt to explain adolescent problem substance use from a non disease (single theory) perspective. The disease perspective simply does not take into consideration alternative causes for adolescent substance use. The six scales of the APT-A represent six interrelated theoretical positions about the possible "cause/causes" of adolescent problem substance use. The theoretical basis of the APT-A does not stress the dominance of one theory over another theory. The research literature suggests there are numerous "causes" for adolescent problem substance use. There is no evidence to suggest that there is one unique "cause" or one specific theory that adequately explains adolescent problem substance use (Lettieri, 1985). The six interrelated scales
were constructed to incorporate and operationalize these various causes within the structure of the APT-A. A factor analysis has demonstrated that these various "causes" are interrelated and subsumed under one factor. In this case, the factor is defined as adolescent problem substance use. This single factor is not interpreted to represent a single explanation for adolescent problem substance use. The single factor demonstrates that the six scales are interrelated and share a common domain. This common domain is adolescent problem substance use. Each of the scales provide a possible explanation for behavior that is called adolescent problem substance use. Since each of the scales are attempting to explain the same domain, it is not difficult to understand why they are subsumed under one factor.

The results of the pilot study and the two cross validation studies demonstrate that the total test score and each of the six scales significantly discriminate between the problem group and the no problem group. These finding indicate that the APT-A is a valid instrument for assessing adolescent problem substance use. The APT-A was not developed, however, simply to discriminate between adolescents who have problems with substance use and adolescents who do not have problems with substance use. The APT-A was constructed to isolate possible "causes" of
adolescent problem substance use, through the use of the six scales, which would allow the treatment provider an intervention point to address the possible "cause/causes" of the problem. The profile provided by the six scales would allow the treatment provider to develop an individualized plan. Research into both adolescent and adult problem substance use discloses that treatment needs to be individualized contingent upon the unique factors of the problem substance user (Miller & Heather, 1986). The six scales of the APT-A address, based on their face validity, the unique factors of the problem substance users.

Although the six scales have been validated relative to discriminating between the problem substance users and the no problem substance users, the six scales have not been validated to treatment considerations. It has not been demonstrated that a significant score on one or more of the scales indicates that the "cause/causes" of an adolescents substance use problem is explained by the scale/scales. It has not been demonstrated that an individualized treatment program, based on the scale profile, will be of any assistance in significantly reducing the adolescents’ problem substance use behavior.

Both of these areas need to be addressed, by trained professional in the problem substance use counseling and psychometrics, in future studies with the APT-A. It must be
recognized that the APT-A is only to be utilized by a professional trained in problem substance use counseling and psychometrics. This point cannot be emphasized enough!

The APT-A was not developed to be the sole indicator of adolescent problem substance use. No single test can diagnose whether or not an adolescent has a substance use problem. The APT-A was developed as a screening device to assist a professional trained in counseling and psychometrics in assessing the possibility of adolescent problem substance use. The cutoff score, developed from the total test score, is not to be used as an either/or indicator of adolescent problem substance use. The standard error of measurement is provided to give the trained professional a range within which to assess the adolescent’s total score. Although the standard scores and average standard score allow for the generation of relative weaknesses and strengths for treatment considerations, it must be re-emphasized that the validity of the scales of the APT-A for treatment considerations have not been established!

In addition to treatment considerations, there are two other areas that need to be addressed in future studies with the APT-A. The first area is scale reliability. The number of items in the Physical scale need to be increased to raise the reliability of the scale. The second area is concerned
with the problem of denial. The APT-A was constructed without any face validity to prevent the adolescent from lying about substance use difficulties. Although the total test score 93.78% average classification accuracy of the problem substance group, across the two cross validation studies, appears to indicate the success of this approach, it may still be necessary to develop a social desirability scale to address this issue. It is quite possible that an adolescent may be denying his feelings and attempting to see himself from an ideal perspective rather than a realistic perspective. His subsequent responses on the APT-A would reflect his denial resulting in a low score. This adolescent would then be missed by the APT-A. If on the other hand, the APT-A included a social desirability scale, the adolescent's low score would be suspect because of an inflated social desirability score.

One of the goals of this study was the construction of a valid and reliable instrument for the assessment of adolescent problem substance use. This goal has been reached. The goal of the instrument being directly applicable to the development of individualized treatment plans for adolescents with substance use problem awaits future studies.
## APPENDIX A

### Alcohol Pattern Test

<table>
<thead>
<tr>
<th></th>
<th>T</th>
<th>F</th>
</tr>
</thead>
<tbody>
<tr>
<td>1. When a problem arises I stick with it until I find a solution.</td>
<td>o</td>
<td>o</td>
</tr>
<tr>
<td>2. I am always happy.</td>
<td>o</td>
<td>o</td>
</tr>
<tr>
<td>3. When I was a child, I was physically abused by my mother.</td>
<td>o</td>
<td>o</td>
</tr>
<tr>
<td>4. I like to be with other people.</td>
<td>o</td>
<td>o</td>
</tr>
<tr>
<td>5. My parents are divorced.</td>
<td>o</td>
<td>o</td>
</tr>
<tr>
<td>6. When I drink alcohol, I feel that I can really express myself.</td>
<td>o</td>
<td>o</td>
</tr>
<tr>
<td>7. I do not get angry.</td>
<td>o</td>
<td>o</td>
</tr>
<tr>
<td>8. I have a difficult time holding a job.</td>
<td>o</td>
<td>o</td>
</tr>
<tr>
<td>9. I am always relaxed.</td>
<td>o</td>
<td>o</td>
</tr>
<tr>
<td>10. I do not really trust other people.</td>
<td>o</td>
<td>o</td>
</tr>
<tr>
<td>11. When I was a child, I felt a lot of affection from my father.</td>
<td>o</td>
<td>o</td>
</tr>
<tr>
<td>12. I have a number of friends who drink alcohol.</td>
<td>o</td>
<td>o</td>
</tr>
<tr>
<td>13. I have a difficult time with members of my family.</td>
<td>o</td>
<td>o</td>
</tr>
<tr>
<td>14. I have never stolen anything.</td>
<td>o</td>
<td>o</td>
</tr>
<tr>
<td>15. I am shy and self-conscious in social situations.</td>
<td>o</td>
<td>o</td>
</tr>
</tbody>
</table>
16. When I was a child, there was someone that I wanted to be like when I grew up.

17. When I was a child, my father drank a lot of alcohol.

18. It is hard for me to make a decision.

19. I am in perfect control of my emotions.

20. I find it difficult to tell people how I feel.

21. As a child, I trusted my mother.

22. When I drink alcohol I like to drink alone.

23. I get nervous easily.

24. I do not tell lies.

25. It takes me several days or longer to get over a failure that I have experienced.

26. When I was a child, I was sexually abused.

27. I like to go to parties and drink alcohol.

28. I have a difficult time in setting goals for myself.

29. I never get confused.

30. I am easily irritated by people who argue with me.

31. As a child, I did not trust my father.

32. When I have sexual relations, I feel more comfortable if the other person is intoxicated.

33. I have a difficult time getting along with people.
34. I never had any problems as a child.

35. If someone criticizes me to my face it makes me feel low and worthless.

36. When I was a child, I did not get along with members of my family.

37. I find it a lot easier to deal with people when I drink alcohol.

38. I would rather someone tell me the solution to a problem than work it out myself.

39. Sometimes I get angry and feel like breaking things.

40. I feel inferior as a person to some of my friends.

41. When I was a child I did not feel a lot of affection from my mother.

42. I am less tense when I drink alcohol.

43. I have trouble sleeping.

44. Once in a while, I swear.

45. In all honesty, I do not think much of myself.

46. When I was a child, I was physically abused by my father.

47. When I was a child, my mother drank a lot of alcohol.

48. I often find myself worrying about the same thing.
49. I am easily bored.

50. It is important for me for people to like me.

51. As a child, I was physically abused by an adult other than my parents.

52. Sexual relationships are a lot easier when I drink alcohol.

53. I often find that I have a lot of free time without anything to do.
Five Scales

Drinking Pattern

6. When I drink alcohol, I feel that I really express myself
12. I have a number of friends who drink alcohol.
17. When I was a child, my father drank a lot of alcohol.
22. When I drink alcohol I like to drink alone.
27. I like to go to parties and drink alcohol.
32. When I have sexual relations, I feel more comfortable if the other person is intoxicated.
37. I find it a lot easier to deal with people when I drink alcohol.
42. I am less tense when I drink alcohol.
47. When I was a child, my mother drank a lot of alcohol.
52. Sexual relationships are a lot easier when I drink alcohol.
Child History

3. When I was a child, I was physically abused by my mother.

5. My parents are divorced.

11. When I was a child, I felt a lot of affection from my father.

16. When I was a child, there was someone that I wanted to be like when I grew up.

21. As a child, I trusted my mother.

26. When I was a child, I was sexually abused.

31. As a child, I did not trust my father.

36. When I was a child, I did not get along with members of my family.

41. When I was a child I did not feel a lot of affection from my mother.

46. When I was a child, I was physically abused by my father.

51. As a child, I was physically abused by an adult other than my parents.
Self-Worth

4. I like to be with other people.
10. I do not really trust other people.
15. I am shy and self-conscious in social situations.
20. I find it difficult to tell people how I feel.
25. It takes me several days or longer to get over a failure that I have experienced.
30. I am easily irritated by people who argue with me.
35. If someone criticizes me to my face it makes me feel low and worthless.
40. I feel inferior as a person to some of my friends.
45. In all honesty, I do not think much of myself.
50. It is important for me for people to like me.
Lie

2. I am always happy.
7. I do not get angry.
9. I am always relaxed.
14. I have never stolen anything.
19. I am in perfect control of my emotions.
24. I do not tell lies.
29. I never get confused.
34. I never had any problems as a child.
39. Sometimes I get angry and feel like breaking things.
44. Once in a while, I swear.
Problem Solving

1. When a problem arises I stick with it until I find a solution.

8. I have a difficult time holding a job.

13. I have a difficult time with members of my family.

18. It is hard for me to make a decision.

23. I get nervous easily.

28. I have a difficult time in setting goals for myself.

33. I have a difficult time getting along with people.

38. I would rather someone tell me the solution to a problem than work it out myself.

43. I have trouble sleeping.

49. I am easily bored.

53. I often find that I have a lot of free time without anything to do.
Item Analysis

Items Removed

12. I have a number of friends who drink alcohol.
15. I am shy and self-conscious in social situations.
50. It is important for me for people to like me.

New Items

12. I exercise at least three times a week.
15. I have poor eating habits.
50. Recently, I have had trouble remembering what I have done.
New Scales

Alcohol Thinking

1. When a problem arises I stick with it until I find a solution.
6. When I drink alcohol, I feel that I really express myself.
8. I have a difficult time holding a job.
12. I exercise at least three times a week.
13. I have a difficult time with members of my family.
15. I have poor eating habits.
18. It is hard for me to make a decision.
20. I find it difficult to tell people how I feel.
22. When I drink alcohol I like to drink alone.
23. I get nervous easily.
25. It takes me several days or longer to get over a failure that I have experienced.
27. I like to go to parties and drink alcohol.
28. I have a difficult time in setting goals for myself.
32. When I have sexual relations, I feel more comfortable if the other person is intoxicated.
35. If someone criticizes me to my face it makes me feel low and worthless.
36. When I was a child, I did not get along with members of my family.
37. I find it a lot easier to deal with people when I drink alcohol.
38. I would rather someone tell me the solution to a problem than work it out myself.
40. I feel inferior as a person to some of my friends.
42. I am less tense when I drink alcohol.
43. I have trouble sleeping.
45. In all honesty, I do not think much of myself.
48. I often find myself worrying about the same thing.
50. Recently, I have had trouble remembering what I have
53. I often find that I have a lot of free time without anything to do.
Alienation

4. I like to be with other people.

5. My parents are divorced.

10. I do not really trust other people.

11. When I was a child, I felt a lot of affection from

16. When I was a child, there was someone that I wanted.
   to be like when I grew up.

17. When I was a child, my father drank a lot of
   alcohol.

21. As a child, I trusted my mother.

26. When I was a child, I was sexually abused.

31. As a child, I did not trust my father.

33. I have a difficult time getting along with people.

41. When I was a child I did not feel a lot of affection

46. When I was a child, I was physically abused by my
    father.

47. When I was a child, my mother drank a lot of
    alcohol.

51. As a child, I was physically abused by an adult
    other than my parents.
Lie

2. I am always happy.
7. I do not get angry.
9. I am always relaxed.
14. I have never stolen anything.
19. I am in perfect control of my emotions.
24. I do not tell lies.
29. I never get confused.
34. I never had any problems as a child.
39. Sometimes I get angry and feel like breaking things.
44. Once in a while, I swear.
## APPENDIX B

**Alcohol Pattern Test for Adolescents**

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<tr>
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<tbody>
<tr>
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<td>O</td>
</tr>
<tr>
<td>2. I am easily angered by people who argue with me.</td>
<td>O</td>
<td>O</td>
</tr>
<tr>
<td>3. I get bored a lot.</td>
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</tr>
<tr>
<td>4. Recently, I have had trouble remembering things.</td>
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<tr>
<td>5. I have trouble sleeping.</td>
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<td>O</td>
</tr>
<tr>
<td>6. I feel inferior to some of my friends.</td>
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</tr>
<tr>
<td>7. I would rather have someone tell me the answer to a problem than work it out myself.</td>
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</tr>
<tr>
<td>8. If someone criticizes me it makes me feel worthless.</td>
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</tr>
<tr>
<td>9. I get nervous easily.</td>
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<tr>
<td>10. It takes me several days to get over my failures.</td>
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<tr>
<td>11. I have been suspended from school.</td>
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<td>O</td>
</tr>
<tr>
<td>12. I hardly dream at all.</td>
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<td>O</td>
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<td>13. I get angry a lot.</td>
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<td>14. I have a hard time doing school work.</td>
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<td>15. I don’t trust other people.</td>
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<td>O</td>
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<tr>
<td>16. Some of my best friends smoke pot.</td>
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<td>O</td>
</tr>
<tr>
<td>17. My father drinks a lot of alcohol.</td>
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<td>O</td>
</tr>
<tr>
<td>18. My parents do not live together.</td>
<td>O</td>
<td>O</td>
</tr>
<tr>
<td>19. I have a difficult time setting goals for myself.</td>
<td>O</td>
<td>O</td>
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</tbody>
</table>
20. I do not trust my father. 0 0 0
21. I have a hard time getting along with people. 0 0 0
22. I do not think much of myself. 0 0 0
23. I have a hard time concentrating. 0 0 0
24. I do not get along with members of my family. 0 0 0
25. I do not feel much love from my mother. 0 0 0
26. I don't care much about anything. 0 0 0
27. I have a hard time making decisions. 0 0 0
28. I get uptight a lot. 0 0 0
29. I am easily confused. 0 0 0
30. I don't feel much love from my father. 0 0 0
31. Nobody cares about me. 0 0 0
32. I have a lot of free time without anything to do. 0 0 0
33. My mother drinks a lot of alcohol. 0 0 0
34. I'd rather give up than try to solve a problem. 0 0 0
35. I don't like school. 0 0 0
36. Going to church is a waste of time. 0 0 0
37. My parents are not very strict with me. 0 0 0
38. I like to do dangerous things. 0 0 0
39. I have cut a lot of classes. 0 0 0
40. I think homework is a waste of time. 0 0 0
41. Nobody listens to me. 0 0 0
42. I often worry about the same thing. 0 0 0
43. My friends don't really know me. 0 0 0
44. There is not much love in my family.  
45. I do a lot of things without thinking about what will happen to me.  
46. I do not have many friends.  
47. I lie a lot.  
48. I do not care what happens to me.  
49. I have an after school job.  
50. I don’t think anybody really likes me.  
51. When I am with other people, I need to be the boss.

ATP Adapted Questions

1. When a problem arises, I stick with it until I find a solution.
5. My parents are divorced.
10. I do not really trust other people.
11. When I was a child, I felt a lot of affection from my father.
13. I have a difficult time with members of my family.
17. When I was a child, my father drank a lot of alcohol.
18. It is hard for me to make a decision.
20. I find it difficult to tell people how I feel.
21. As a child, I trusted my mother.
23. I get nervous easily.
24. I do not tell lies.
25. It takes me several days or longer to get over a failure that I have experienced.
28. I have a difficult time in setting goals for myself.
29. I never get confused.
30. I am easily irritated by people who argue with me.
31. As a child, I did not trust my father.
33. I have a difficult time getting along with people.
35. If someone criticizes me to my face it makes me feel low and worthless.
36. When I was a child, I did not get along with members of my family.
38. I would rather someone tell me the solution to a problem than work it out myself.
40. I feel inferior as a person to some of my friends.
41. When I was a child, I did not feel a lot of affection from my mother.
43. I have trouble sleeping.
45. In all honesty, I do not think much of myself.
47. When I was a child, my mother drank a lot of alcohol.
48. I often find myself worrying about the same thing.
49. I am easily Bored.
50. Recently, I have trouble remembering what I have done.
53. I often find that I have a lot of free time without anything to do.
Table 14
Table for converting Raw Scale Scores on the APT-A to Problem Group Standard Scale Scores (mean=10, sd=3)

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<thead>
<tr>
<th>Raw Scale Score</th>
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<th>Probsolv</th>
<th>Physical</th>
<th>Inter</th>
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</tbody>
</table>

Family=Family Scale  | School=School Scale
Emotion=Emotion Scale | Probsolv=Problem Solving Scale
Physical=Physical Scale | Inter=Interact Scale
APPENDIX D

APT-A SCALES

FAMILY SCALE

17. My father drinks a lot of alcohol.
18. My parents do not live together.
20. I do not trust my father.
24. I do not get along with members of my family.
25. I do not feel much love from my mother.
30. I don’t feel much love from my father.
33. My mother drinks a lot of alcohol.
37. My parents are not very strict with me.
44. There is not much love in my family.

Reliability=.63
Adjusted R-Squared=.41
SCHOOL SCALE

6. I feel inferior to some of my friends.
11. I have been suspended from school.
16. Some of my best friends smoke pot.
35. I don’t like school.
36. Going to church is a waste of time.
38. I like to do dangerous things.
39. I have cut a lot of classes.
43. My friends don’t really know me
46. I do not have many friends.
47. I lie a lot.

Reliability=.63
Adjusted R-Squared=.41
Emotion Scale

3. I get bored a lot.
9. I get nervous easily.
13. I get angry a lot.
22. I do not think much of myself.
26. I don’t care much about anything.
28. I get uptight a lot.
42. I often worry about the same thing.
45. I do a lot of things without thinking about what will happen to me.
48. I do not care what happens to me.

Reliability=.71
Adjusted R-Squared=.27
Problem Solving Scale

7. I would rather have someone tell me the answer to a problem than work it out myself.
10. It takes me several days to get over my failures
14. I have a hard time doing school work.
19. I have a difficult time setting goals for myself.
27. I have a hard time making decisions.
32. I have a lot of free time without anything to do.
34. I'd rather give up than try to solve a problem.
40. I think homework is a waste of time.

Reliability=.64
Adjusted R-Squared=.26
Physical Scale

4. Recently, I have had trouble remembering things.
5. I have trouble sleeping.
12. I hardly dream at all.
23. I have a hard time concentrating.
29. I am easily confused.

Reliability=.54
Adjusted R-Squared=.16
Interact Scale

1. I have a hard time telling people how I feel.
2. I am easily angered by people who argue with me.
8. If someone criticizes me it makes me feel worthless.
15. I don’t trust other people.
21. I have a hard time getting along with people.
31. Nobody cares about me.
41. Nobody listens to me.
49. I have an after school job.
50. I don’t think anybody really likes me.
51. When I am with other people, I need to be the boss.

Reliability=.63
Adjusted R-Squared=.20
APPENDIX E

Standard Score Profiles for the High Schools and Treatment Facilities utilized for the Pilot Study and two Cross Validation Studies of the APT-A Pilot Study
(N=308)

Addiction Treatment Facility: The Salvation Army's Addiction Treatment Facility offers an inpatient treatment program for adolescents with substance use problems. There were 11 adolescents (mean age=16.1) who participated in the study.

Residential Facilities for Child and Youth: This facility, also managed by the Salvation Army, offers an inpatient treatment program for emotionally disturbed youth, and youth who are diagnosed as having both an emotional problem and a substance use problem. There were 20 adolescents (mean age=14.1) who participated in the study.
Central Oahu Youth Services: This facility provides inpatient treatment for adolescents with school/behavioral problems and/or substance use problems. There were 21 adolescents (mean age=14.58) who participated in the study.

Store Front School: This facility, managed by the Central Oahu Youth Services, offers outpatient serves for runaways, child abuse, problem substance use and school/behavioral problems. There were 28 adolescents (mean age=15.46) who participated in the study.

Palama Settlement In-Community Treatment Center: This facility is an alterative learning center primarily for court ordered adolescents with a substance use problem. There were 16 adolescents (mean age=15) who participated in the study.

Roosevelt High School: There were 212 students (mean age=15.75) from this high school, located in the Honolulu district, who participated in the study.
First Cross Validation Study  
(N=323)

Kailua High School: There were 78 students (mean age=15.53) from this high school, located on the Windward side of Oahu, who participated in the study.

Kalaheo High School: There were 83 students (mean age=15.93) from this high school, located on the Windward side of Oahu, who participated in the study.

Maryknoll High School: There were 22 students (mean age=17.17) from this private high school, located in the Honolulu district, who participated in the study.

Waialua High School: There were 98 students (mean age=15.65) from this high school, located in Central Oahu, who participated in the study.

Olomana School: There were 11 students (mean age=15.36) from this alternative learning center who participated in the study.
Youth Correctional Facility: There were 31 court detained residents (mean age=16) from this facility who participated in the study.

Second Cross Validation Study (N=368)

Castle High School: There were 309 students (mean age=15.51) from this high school, located on Windward Oahu, who participated in the study.

Hale Kipa: This facility treats adolescents, on an inpatient basis, with coping problems, physical and/or sexual abuse problems, substance use problems and problems related to running away. There were 29 adolescents (mean age=15.07) from this facility who participated in the study.

Detention Home: There were 30 adolescents (mean age=15.38) from this temporary lockup facility who participated in the study.
Table 15

APT-A Standard Score (Problem Use Group Mean=10) Scale Profiles with Average Standard Score for 6 High Schools and 9 Treatment Facilities

<table>
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<tr>
<th>Scales</th>
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Fam=family Sch=School Emot=Emotion ProbS=Problem Solving Phy=Physical Int=Interact Avg=Average Scale Score

ATF=Addiction Treatment Facility
COYSA=Central Oahu Youth Services
RFCY=Residential Facilities for Child and Youth
YCF=Youth Correctional Facility
REFERENCES


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