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Problem solving and personality factors of two at -risk *college populations

Cory John Clark
West Virginia University

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Problem Solving and Personality Factors of Two At-Risk College Populations

Cory J. Clark, M.A.

Dissertation Submitted to the
College of Human Resources and Education of
West Virginia University
in partial fulfillment of the requirements
for the degree of

Doctor of Philosophy
In
Counseling Psychology

Roy H. Tunick, Ed.D., Chair
Richard T. Walls, Ph.D.
Michael T. Yura, Ph.D.
Lisa C. Hamilton, Ph.D.
Jeffery K. Messing, Ed.D.

Department of Counseling, Rehabilitation Counseling, and Counseling Psychology

Morgantown, West Virginia

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Abstract

Problem Solving and Personality Factors of Two At-Risk College Populations

Cory J. Clark, M.A.

This dissertation describes and compares three university populations: (a) students at-risk of alcohol related problems, (b) students academically-at-risk, and (c) non-at-risk students. These populations were given two self-report measures, the Problem Solving Inventory (Heppner, 1988) and the 16PF (Cattell, et al., 1993), to gather information on their problem solving abilities and their personality factors. The intent of the study is to find out what aspects of problem solving and personality differentiates these populations. This information will then be utilized to design and refine interventions for working with these struggling populations. One hundred and thirty-five students from a mid-eastern land-grant university participated in the study.

It was hypothesized that both the at-risk populations will have a less positive appraisal of their overall problem solving abilities, less trust and belief in their problem solving abilities, a more avoidant style to solving problems, and less belief in their control of behavior and emotions while solving problems. In addition, it was hypothesized that the at-risk groups will have various personality factors that allude to the reason they are at-risk. Multivariate analysis was used to analyze three sets of the data. Once multivariate significance was found, using the Wilk's Lambda test statistic, than the Tukey procedure was used to examine all pairwise group differences.

The academically-at-risk group was found to have a significantly different self-perception of their problem solving abilities in relation to the non-at-risk group. They perceived their overall problem solving abilities to be less effective than the non-at-risk group. They had a more avoidant style of approaching problems and less trust and belief in their problem solving confidence than the non-at-risk group.

There were significant differences between the standardized scores of the academically-at-risk and the non-at-risk group on three specific personality factors (a) Reasoning, (b) Emotional Stability, and (c) Abstractedness. There were significant differences between the standardized scores of the at-risk of alcohol related problems group and the non-at-risk group on two specific personality factors (a) Warmth and (b) Sensitivity.

Implications of the results, the limitations of the study, and suggestions for future research are included in the discussion.

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Chapter 1

Introduction

Due to social pressures, economic needs, and other factors, many institutions are admitting students who are not only academically ill-prepared, but they also lack the self-regulatory skills necessary for adjustment to campus life (Solomon & Rothblum, 1984; Tabolt, 1990; Thombs, 1995). These adjustment difficulties are often seen in students failing or withdrawing from courses, abusing alcohol and related problems, violating campus policies or community laws, depression, loneliness, and dropping out or transferring to another school (Thombs, 1995). Public Universities, in particular, are feeling the financial burden of less funding coming in and a push to enroll students with lower academic qualifications to get the numbers up. When considering institutions with over 15,000 students, 47.6% of counseling center directors reported concerns about alcohol problems being on the increase over the past five years (Gallagher, 2001).

Researchers argue for a preventative approach to help both students who are at-risk of having problems with alcohol and students who are placed on academic probation. Thombs (1995) reports that colleges and universities create developmental programs aimed at enhancing study skills, yet only scant evidence has supported the efficacy of these programs in improving academic performance and reducing student attrition. Marlatt et al. (1998) report that most colleges that do offer services for students with drinking problems focus on prevention as the goal. They go on to say that these prevention programs are most often in the form of educational programs designed to promote awareness of the risks of alcohol problems and to develop alternative recreational activities that do not involve drinking. Yet, overall the effectiveness of

primary prevention programs in reducing harmful drinking appears to be limited (Moskowitz, 1989). Therefore, it appears some type of new prevention or intervention approach is needed to assist these at-risk groups.

Two areas of research that appear to have some connection to academics, alcohol use, college adjustment, and psychological stress are studies on problem solving and personality factors (Aspinwall & Taylor, 1992; Brown & Munson, 1987; Elliot et al, 1990; Larson & Heppner, 1989; Nerviano & Gross, 1983; Robyak & Downey, 1979). However, these concepts have not been examined in a manner that specifically compares these at-risk groups with successful college student groups to determine if there are significant differences in problem solving and personality factors.

College drinkers are reported to be overwhelmingly uninterested in any type of alcohol prevention program regardless of the amount of time or effort required, and those who consume the most alcohol are the least interested in participating (Black & Coster, 1994). Offering new alternatives to alcohol prevention that may not directly address alcohol would be useful, for example, the use of problem solving training. With the advent of freshmen seminars designed to prepare incoming students for the challenges and demands of the college environment, it would certainly be beneficial to find a program topic that would assist in preventing a number of concerns.

This study utilizes theory and research from the areas of problem solving and personality to explain how these concepts might impact preventative measures for at-risk college students. This research describes how three student groups (academically-at-risk college students, students at-risk of alcohol-related problems, and students that have not been at-risk) perceive their problem solving while students at West Virginia University.

This study examined and compared each group's significant personality characteristics to each other. Each group was administered two inventories: the Problem Solving Inventory and the 16PF. This research examined the differences between the at-risk groups and the non-at-risk group in relation to their self-perceived problem solving techniques and their personality dimensions. College students, researchers, and administrators can use this information to develop a model for prevention and intervention programs for students at-risk. The study also examined significant correlations between both at-risk groups, thereby identifying common deficits worth attending to in both group and individual counseling as well as in prevention programming.

Statement of the Problem

Over the past two decades, colleges and universities have attempted to make higher education more accessible to diverse groups, although the pool of academically prepared freshman has decreased (American Council on Education, 1989; in Thombs, 1995). Due to social pressures, and other factors, many institutions are admitting students who are academically ill-prepared and lack the self-regulatory skills necessary for adjustment to campus life (Solomon & Rothblum, 1984; Tabolt, 1990; Thombs, 1995). These adjustment difficulties are often seen in students failing or withdrawing from courses, alcohol abuse and related problems, violation of campus policies or community laws, depression, loneliness, and dropping out or transferring to another school (Thombs, 1995). When considering institutions with over 15,000 students, 47.6% of counseling center directors reported concerns about alcohol problems being on the increase over the past five years (Gallagher, 2001). The problem of college students being at-risk of

academic failure or at-risk of alcohol related problems is great and the need for remediation of these problems is imminent.

It has been calculated that 4 out of every 10 students who enroll in 4-year colleges and universities leave without earning a degree (Tinto, 1993). A significant number of these students, who ultimately leave college, both voluntarily and involuntarily, are placed on academic probation during the course of their studies (Coleman & Freedman, 1996). As many as one fourth of undergraduate students are placed on academic probation at one or more times during their college years (Garnet, 1990).

Surveys of alcohol use at different colleges support a perception of an “epidemic” of heavy drinking (Engs & Hanson, 1988; O’Hare, 1990). Michael Pendergast (1994) reviewed research literature since 1980 and found that about 90% of college students use alcohol at least once a year. In his review he cites Globetti et al. (1988) who summarized various studies that reported the following percentage ranges for alcohol related problems among college students: drinking and driving, 33% to 41%; destruction of property, 6% to 7%; loss of friends, 7% to 8%; academic problems, 17% to 23%; problems with authorities, 3% to 15%; and student judiciary problems, 20% to 60% (Pendergast, 1994). In a survey of college presidents by the Carnegie Foundation for the Advancement of Teaching (1990), substance abuse, particularly alcohol abuse, was regarded as the most pressing problem on today’s college campuses. O’Hare (1990) reported that at least half of college students are moderate to heavy drinkers, and furthermore as the quantity and frequency of drinking increase, the risk of alcohol related problems also increases. Other research on college students indicates that heavy drinkers have been found to have poorer

grades, miss more classes, and to fall behind in schoolwork more often (Wechsler & Isaac, 1992; Presley et al., 1993; Wechsler et al., 1994).

Researchers argue for a preventative approach to help both students who are at-risk of having problems with alcohol and students who are placed on academic probation. For the academically-at-risk, Coleman and Freedman (1996) cite literature, which includes useful information on many strategies, approaches, and structural characteristics of treatments for academically-at-risk undergraduates. Yet, they mention there has been no research that explains what part or piece of the preventative programs is actually helping the students to succeed (Coleman & Freedman, 1996). One way to better understand these populations is to focus specifically on problem solving and personality factors of the at-risk.

In regards to those at-risk of alcohol related problems, Marlatt et al. (1998) explain that most prevention programs typically include educational sessions designed to increase students' awareness of the risks of alcohol problems and then try to offer alternative leisure activities that do not involve drinking. It is suggested that overall the effectiveness of primary or universal prevention programs in reducing harmful drinking appears to be limited (Moskowitz, 1989). College drinkers are also reported to be overwhelmingly uninterested in any type of alcohol prevention program regardless of the amount of time or effort required, and those who consume the most alcohol are the least interested in participating (Black & Coster, 1994). Therefore, offering new alternatives to alcohol prevention is an important area to research. To do this, researchers must have more information about the characteristics of this population.

Bliss & Meuller (1987) reported that many developmental programs focus narrowly on enhancing skills related to academic work and ignore students' other affective and behavioral dimensions. A focus on problem solving behaviors and personality factors could reveal important information necessary for the design of effective developmental programs.

Given the number of students experiencing problems related to alcohol and academics the need for help is evident. After reviewing the preventative measures that are presently being taken and those that have been employed in the past, it appears a new approach would be helpful. What direction do we turn for this new approach?

Conceptual Framework

Over the past two decades there has been a great deal of research and effort put into examining the role that problem solving plays in helping college students effectively deal with and adapt to stress. For example, research has found that problem solving is related to depression, suicidal ideation, physical health, help-seeking, alcohol use, and academic performance (see Neal & Heppner, 1986; Bonner & Rich, 1987; Larson & Heppner, 1989; Elliot et al, 1990; Elliot, 1992; Dixon et al, 1993; in Heppner & Baker, 1997). Research has also found that certain personality factors and individual differences are related to college adjustment, alcohol consumption, and academic performance or achievement (Nerviano & Gross, 1983; Talbot, 1990; Aspinwall & Taylor, 1992; Griffin & Salter, 1993; McDowell, 1995; Barrineau, 1997). Although some of these studies used college students, none have directly examined the self-perceived problem solving and personality dimensions of the at-risk students this study will investigate. These factors can be utilized to help at-risk groups in the university environment. Understanding the

way in which both at-risk groups problem solve the challenges and stressors associated with college life may help in formulating a plan for their success.

This study followed the assumption that the use of a particular type of self-perceived method of problem solving will reduce, minimize or prevent psychological stress by enabling a person to better manage daily problematic situations and their emotional effects.

The review of theory and research on problem solving is designed to uncover how problem solving might be utilized as a preventative measure for at-risk college students. The literature review will also cover what personality factors describe these and other similar at-risk groups. The focus of this study however, was on academically-at-risk college students, students at-risk of alcohol related problems, and students that are non-at-risk. Two inventories have been administered to each group: the Problem Solving Inventory and the 16PF. The descriptive results will then be utilized to hone in on treatment differences between the at-risk groups and the successful students. Such a design has not been used in the problem solving research literature to date.

Purpose of the Study

The purpose of conducting this study is to better understand students at-risk of alcohol-related problems and students' academically-at-risk. The results of this study are primarily descriptive. Although outcome studies regarding the effectiveness of prevention programs for these groups have been conducted, it is still not clear what part of these programs are actually helping. Comparing the at-risk group with a non-at-risk group will clarify the differences between these groups. This study will therefore generate new information in the field, as there has not been a study that specifically compares problem-

solving appraisal and personality traits across a group of successful academic students, a group of academically-at-risk students, and a group of student's at-risk of alcohol related problems.

The increased understanding of the differences between the at-risk groups and the non-at-risk group may allow for the development of new prevention programming at universities and/or add to information that determines freshman seminar topics. Uncovering differences in self-perceived problem solving between college students at-risk of alcohol related problems and those that have not been at-risk would strengthen the association between problem solving and alcohol use. It would also be helpful to add further support that connects problem solving with academic performance in a way that differentiates the successful from the at-risk. Heppner and Baker (1997) suggest that the PSI might be used to identify students at-risk of academic failure.

Significant correlations between the at-risk groups will identify factors to focus on in intervention and prevention programming. This information will also build on the research base in problem solving, at-risk groups, student retention, alcohol-related problems, and adjustment to college.

As expected, there was some overlap between the two at-risk groups being examined in this study. Participants that are both academically-at-risk and at-risk of alcohol related problems were not included in the study.

This study has generated new directions for future research. The significant results warrant the need for outcome research examining the effectiveness of problem solving education for both at-risk students and incoming freshman. Significant correlations between both at-risk groups will help to identify areas for a more detailed

investigation of the dynamics behind at-risk college students. It will also allow for outcome studies to be created that examine treatment effects on the correlating characteristics of the at-risk groups.

In conclusion, the intent of this study was to give greater clarification to both the study of academically-at-risk and alcohol-related at-risk college students in regards to their personalities and self appraised problem-solving abilities. Although there has been research done in the area of self-perceived problem solving, there are always different and more effective ways to demonstrate the need for problem solving skills in different groups. The method employed in this study will hopefully increase the knowledge base on at-risk college students as well as those non-at-risk. It will attempt to describe how each group perceives their problem solving and it will describe what each group's personality factors look like.

Key Terms

Academically-at-risk: Will use university standard for GPA that falls within probationary standards (below a 2.0).

At-risk for alcohol related problems: Students who have been referred to Student Assistance Program (SAP) for evaluation of alcohol abuse. These students have typically been required to visit SAP due to some violation of rules or implication of alcohol-related problems by a court, police agency, public safety officer, residential advisor, or counselor. Note that no true alcohol assessment was conducted to classify this group.

Coping and/or Personal problem-solving: Any goal directed sequence of cognitive and affective operations as well as behavioral responses for the purpose of adapting to internal and external demands or challenges (Heppner & Krauskopf, 1987).

Health compromising behaviors: Use of illicit drugs and tobacco, excessive use of alcohol, sedentary leisure activities (Godshall & Elliott, 1997).

Problem orientation: refers to the motivational component of the problem solving process, consisting of the generalized cognitive, emotional, and behavioral response sets that a person brings to new problem solving situations (D’Zurilla & Sheedy, 1991).

Problem solving skills: (a) problem definition and formulation, (b) generation of alternative solutions, (c) decision making, and (d) solution implementation and verification (i.e., the ability to effectively implement, monitor, and evaluate solutions or coping responses)(D’Zurilla & Sheedy, 1991).

Self-appraised problem solving: the individual self-report of personal problem solving ability (Elliott et al., 1990).

Chapter 2

Literature Review

Overview

This chapter will review literature on both academically-at-risk college students and college students at-risk of problems with alcohol. Each of these groups will then be described in terms of the research available on their problem-solving (including the Problem Solving Inventory) and their personality factors (including the 16PF). Summary tables of past research have been created for each at-risk group in relation to their problem solving and personality factors to help present the information. ‘A problem’ and ‘problem-solving’ will be defined and an example of a model of problem solving will be given. In conclusion, a connection will be made in relation to the utility and benefit of examining problem solving and personality factors within these at-risk college student groups.

At-risk Populations

It has been noted that approximately 4 out of every 10 students who enroll in 4-year colleges and universities leave without earning a degree (Tinto, 1993). The reasons behind this loss of students are many. Some may leave because of unclear individual goals, a lack of connectedness with the institution and environment, substance use and abuse, or some may leave due to academic underachievement. It is hard to say for sure what the cause is, but Tinto (1993) points out that the obvious results are the significant societal and financial consequences for both students and institutions. Although dropping out of school is not the only reason college students are placed at-risk, it is an important one. This study will examine two possible reasons for dropping out of school or being

considered at-risk: academics and alcohol related problems. A review of the academically-at-risk literature will be done first, then the at-risk of alcohol related problems literature. Both sections will describe specific articles related to the problem solving and personality factors of each population.

Academically-At-Risk College Students

As many as one fourth of undergraduate students are placed on academic probation one or more times during their college years (Garnett, 1990). Although much of the research available has examined the causes of undergraduate attrition after the fact. Some have argued for a preventative approach targeting students who are placed on academic probation. Tinto (1993) suggested that by examining the nature and causes of problems these students experience and by intervening quickly and appropriately, retention rates would increase with a corresponding decrease in attrition rates. To find the nature and causes of the problems it is important to focus specifically on describing the groups and the related constructs that affect their success.

Research indicates that there are a number of approaches and strategies regarding interventions for academically-at-risk undergraduates that are effective. These include programs emphasizing time management and study skills (Garfield & McHugh, 1978; Lipsky & Ender, 1990), career and goal-identification activities (Carver & Smart, 1985), a combination of academic and personal issues (Cooper & Robinson, 1987; Newton, 1990), and alternative approaches, including relaxation techniques and meditation (Decker, 1987). Regarding the structure of academically-at-risk interventions, Coleman & Freedman (1996) report that empirical evidence supports structured rather than unstructured interventions (Bednar & Weinberg, 1970; Hudesman, 1983); lengthy

treatments (10 hours or more) rather than brief ones (Bednar & Weinberg, 1970); voluntary rather than involuntary participation of students (Mitchell & Piatkowska, 1974; Romano & Young, 1981); and group rather than individual interventions (Treadwell, 1977). Although this literature may be quite useful information on strategies, approaches, and structural characteristics of treatment for academically-at-risk undergraduates, the role of theory in such interventions has rarely been noted (Coleman & Freedman, 1996). Finding some specific variables that differentiate academically-at-risk students from those that are successful in academics will enable better hypotheses to be drawn into theory for future interventions.

Academically-at-risk and problem solving.

There are a few studies that examine problem solving within the population of academically-at-risk college students. These studies however do not directly compare problem solving in academically successful students versus academically-at-risk students. Elliott, Godshall, Shrout, & Witty's (1990) article, "Problem solving appraisal, self-reported study habits, and performance of academically-at-risk college students" indicates that problem solving appraisal was significantly predictive of study habits and semester grade point averages in a class of academically unprepared college freshman. Fred Newton (1990) describes a program for students on academic probation that included a partial emphasis on problem solving which had positive results in a number of outcome areas. Coleman & Freedman's (1996) article, "The effects of a structured group intervention on the achievement of academically-at-risk undergraduates" indicates that an intervention using interpersonal problem solving as one of its three components was successful in increasing achievement in a number of ways. These articles support the

connection between problem solving and the academically-at-risk. They are described in further detail below and their findings are summarized in Table 1.

Elliott et al. (1990) examined the relationship among problem-solving appraisal, self-reported study habits, and academic performance of 63 college students in a developmental course for academically unprepared freshman. The students studied were identified as academically unprepared if they had a composite score on the American College Testing examination of 15 or below. The students were administered the Problem Solving Inventory (PSI; Heppner, 1988) and the Survey of Study Habits and Attitudes (SSHA; Brown & Holtzman, 1967) as part of a course designed to enhance the academic skills of unprepared students. Using regression analysis they found that self-appraised problem-solving was significantly predictive of more adaptive study habits and attitudes, as well as semester grade point average (Elliot et al., 1990). In their discussion they write, “It appears from the results of this study that a relation may exist between problem solving appraisal and academic achievement (Elliot et al., 1990, p. 206).” This appears to be important to study.

Coleman & Freedman (1996) used a multi-component structured group intervention to assist students on academic probation. The program utilized theories of goal attainment, interpersonal problem-solving, and social competence to formulate their intervention. A total of 154 students on academic probation were used to make-up the control (79) and treatment (75) groups. The treatment group was divided into smaller groups that each followed a structured 10-session treatment protocol, divided into three phases. The first phase involved assisting the students in developing clear goals. The second phase was designed to help students develop or improve the types of interpersonal

Table 1

Overview of Literature on Academically at-risk and Problem-Solving:

Reference	Population	Method	Inst/Treatment	Findings
Elliot et al., 1990	Unprepared Fresh.	Reg. Ananalysis	P.S.I., Survey of Study Habits	prob.-solving was predictive of more adaptive study habits, attitudes, and GPA
Coleman & Freedman, 1996	Acad. Probation/ Control	Group Intervention	tx.-dev career goals, interpersonal skills, Prob. –Solving,	tx grp.-increased GPA's, credit completion ratios, removal from probationary status
Newton, 1990	Acad. Probation/ Non-particiaption	Intervention	tx-prob.-solving, peer influence, skill building, Behavior change, Etc.	tx grp.-increased rate off probation, graduation rate/ decreased change in major

problem-solving skills that facilitate achieving both academic and social goals. The final phase focused on developing the types of social competence integral to academic as well as interpersonal success. The results supported all three of their research hypotheses. The students who completed the intervention demonstrated higher rates of removal from probationary status than did the non-intervention group, and the treatment group participants achieved significantly higher GPA's and credit completion ratios than the non-intervention group did (Coleman & Freedman, 1996). Although this study provided a successful avenue of intervention for academically-at-risk students, it did not differentiate which of the three phases or intervention components actually helped the students. It would certainly be useful to know what component of such a program contributed to the students' success.

Fred Newton (1990) also used problem solving as one of six components in a program for students placed on academic probation. The five other components he emphasized were involvement, personal issues, peer influence, behavior change, and skill building. The 114 student participants who were paired with non-participants demonstrated improvement over the non-participants on all indexes. When compared to the non-participants, participants got off probation at a 36% higher rate, maintained enrollment in the college at a 52% higher rate, withdrew from the university at a less than 51% rate, graduated at a 33% higher rate, and changed majors at a less than 37% rate (Newton, 1990). Again, no distinction could be made as to which part of the intervention was responsible for these changes. Further analysis of students on probation will help to clarify the areas in need of remediation.

These studies effectively illuminated the relationship between problem solving and academically-at-risk students, but they do not compare successful students to at-risk students. Therefore it is important to compare the at-risk from the non-at-risk on measures including problem solving and personality factors. The results will therefore continue to contribute knowledge about these populations and build support for the relationship between problem solving and academics. There have also been a number of studies that allude to achievement and its relationship to problem solving in the general college population. These articles are mentioned during the review of problem solving which is forth coming.

It is clear that some relationship has already been found between academics and problem solving, but none of the above studies have been able to demonstrate a difference between successful and academically-at-risk groups. Finding such a discrepancy would support the importance and significance of problem solving to academic success. The studies reviewed have also been unable to identify what part of successful intervention programming is helping. Therefore this study tested for a difference in self appraised problem solving between successful and at-risk groups.

Academically-at-risk and personality factors.

Various studies have been conducted to try to identify a personality type, which describes academically-at-risk college students. The studies described below have certainly begun to find characteristics that typify the less academically successful college student. Each study uses different personality measures and some have slightly different population parameters, but all report significant findings. Detailing the results from this study that coincide and those that do not will help to describe this sample in greater

detail. Simply knowing that this group can be differentiated from other groups by personality traits supports the utility of this research. A summary of these findings can be seen in Table 2.

Romine & Crowell (1981) investigated the differences in personality and motivational characteristics among three defined groupings of 45 under, 50 over, and 227 normal achieving university undergraduates. Normal achievers were defined as students whose actual undergraduate grade point averages were within ± 1.00 standard error of estimate of a multiple linear regression line developed from the entire sample and representing predicted achievement. ACT composite scores and high school grade point averages were used as predictors and cumulative university grade point averages served as criterion (Romine & Crowell, 1981). Six out of 18 personality variables from various measures correlated with discrepancy scores (the algebraic difference between obtained and predicted GPA) and were chosen for further analysis: the Achievement Motivation Scale, Extraversion, Motivated to Succeed, Plans Work Efficiently, Assumes Responsibility, and Is a Hard Worker. Following discriminant analysis, the Achievement Motivation Scale had the largest standardized discriminant function coefficient followed by Plans Work Efficiently. Overachievers therefore were found to reflect the following themes that correspond to the above stated variables: seriousness, hard working, consistent, self-starters with a clear need to excel academically. They were also planful, organized, responsible types who did not procrastinate. The underachieving group on the other hand formed a reverse image of the over achievers (Romine & Crowell, 1981).

Robyak & Downey (1979) compared underachieving and non-underachieving groups in a similar fashion using the Myers Briggs Type Indicator. Their population was

Table 2

Overview of Literature on Academically at-risk and Personality Factors:

Reference	Population	Method	Inst/Treatment	Findings
Romine & Crowell, 1981	Under, over, and normal achieving Undergraduates	Discriminate analysis	Ave. GPA's/ 6 personality factors	overachievers were serious, hard-working, consistent, organized... underachievers opposite (see pg. 22).
Robyak & Downey, 1979	Under-achievers vs. non-under-achievers	Discriminate analysis	Myers Briggs-Type Indicator (MBTI)	underachievers- direct actions externally non-underachievers interact w/introverted personality style.
White, 1986	Academic Probation		MMPI	In general, lower self-confidence, passive dependence, anger, non-conformity, and heterosexual conflicts.
Musgrave-Marquart, Et al., 1997	undergraduates	Correlation/Regression	NEO-PI, and GPA	Conscientiousness and openness correlated and predicted academic performance.

taken from a group of students who enrolled in a study-skills lab course at Kansas State University. They found that the two groups could be differentiated by their extraversion/introversion personality preference. The underachievers revealed a tendency to direct actions externally toward people and things, while the non-underachievers preferred to interact with an introverted personality style. In conclusion they write, “this study implies that student characteristics are important considerations when designing instructional approaches to use in study skills program and may be critical to the effectiveness of remediating deficiencies in study skills and academic performance” (Robyak & Downey, 1979, p 309).

Evelyn White (1986) focused her dissertation on “A Typological Analysis of Personality Characteristics in Underachieving College Students.” She surveyed students at Ohio State University who were referred by academic advisors for assistance with remediation of academic difficulties. The students were all on academic probation, performing below an academic average of 2.0 on a traditional 4.0 scale. Each student reported various demographics as well as completed a Minnesota Multiphasic Personality Inventory. The analysis of this data resulted in nine statistically different MMPI profile types and although describing these types would be lengthy here, some overall conclusions will be mentioned with respect to the entire sample. In general, the group of underachievers displayed low self-confidence, passive dependence, anger, non-conformity and heterosexual conflicts. Several also appeared to be failing due to an inability to concentrate or complete tasks (White, 1986). Given the number of personality types that emerged from this study it appears as though no one typology or personality

constellation will likely appear from examining underachievers. However, finding some common traits will allow for more focused interventions.

Another related study found conscientiousness, openness, and neuroticism as the best predictor of academic achievement (Musgrave-Marquart et al., 1997). In this study 161 undergraduates were administered three questionnaires, including the revised NEO Personality Inventory (NEO PI-R; Costa & McCrae, 1992). Using grade point average (GPA) as a measure for academic achievement the authors supported their hypothesis that conscientiousness and openness would correlate and predict academic performance. The additional component of neuroticism, however, was not hypothesized. These personality factors have been demonstrated to correlate positively with the 16PF's global factors of self-control, extraversion, and anxiety respectively. Although the sample studied by Musgrave-Marquart et al. (1997) did not use underachievers it does describe a relationship between personality and academic achievement. Finding similar results would support the notion that certain personality dimensions are related to academic achievement.

It appears as though a number of different personality traits emerge when comparing underachievers to overachievers or underachievers to nonunderachievers.

There also seem to be some personality factors related to academic achievement.

Students At-Risk of Problems with Alcohol

Heavy drinking among college students continues to be a concern of college administrators and counselors. Wechsler, Davenport, Dowdall, Moeykens, and Castillo, (1994) in their comprehensive national survey of over 17,000 college students, indicated that almost half the sample (44% overall; 50% of the men and 39% of the women)

engaged in binge drinking. Binge drinking is defined as the successive consumption of five or more drinks for men (four or more for women) on at least one occasion during the 2 weeks prior to the survey. The results further detailed that binge drinkers were 7 to 10 times more likely than non-binge drinkers to experience drinking related problems such as engaging in unplanned and unprotected sex, getting into arguments, getting injured, doing things that were later regretted, and getting into trouble with police. Other research on college students indicates heavy drinkers have been found to have poorer grades (Presley et al., 1993), miss more classes, and to fall behind in school work more often (Wechsler & Isaac, 1992; Wechsler et al., 1994).

Surveys of alcohol use at different colleges support a perception of an “epidemic” of heavy drinking (Wechsler and McFadden, 1979; Engs & Hanson, 1988; O’Hare, 1990). O’Hare (1990) reported at least 50% of college students are moderate to heavy drinkers, and furthermore, as the quantity and frequency of drinking increases, the risk of alcohol related problems also increases.

Past research examining college student-drinking behavior has resulted in the identification of various risk factors that cover both individual and socio-environmental levels of influence (Boyd, Howard, & Zucker, 1995). On the individual level, recent research has identified biobehavioral vulnerability factors such as: gender (Wechsler, Dowdall, Davenport, & Rimm, 1995), ethnic background (Wechsler & McFadden, 1979), history of alcohol problems in the family (Sher, 1994), lower perception of one’s sensitivity to alcohol’s intoxicating effects (Schuckit & Smith, 1996), and history of conduct disorder or delinquent behavior (Jessor, Donovan, & Costa, 1991). Baer (1994)

reports social and environmental factors, such as peers and their normative influence, also significantly impacts drinking in students.

Although some college campuses provide treatment for students with drinking problems, most college programs focus on prevention as their goal (Marlatt et al., 1998). These prevention programs typically include educational sessions designed to increase students' awareness of the risks of alcohol problems and try to offer alternative leisure activities that do not involve drinking. Moskowitz (1989) suggests that overall; the effectiveness of primary or universal prevention programs in reducing harmful drinking appears to be limited. Not to mention that college drinkers are reported to be overwhelmingly uninterested in any type of alcohol prevention program regardless of the amount of time or effort required, and those who consume the most alcohol are the least interested in participating (Black & Coster, 1994). Offering new alternatives to alcohol prevention therefore appears to be an important area to research.

Problem-solving in an alcoholic population.

There have been two studies that examine problem solving in relation to alcohol. The first study does not focus on college students, but it does make a connection between alcohol and possible problem solving 'immaturity' (Larson & Heppner, 1989). The second identifies correlates between problem solving skills and health-compromising behaviors (e.g. Alcohol intake) (Godshall & Elliott, 1997). A brief review of these studies follows below, and of summary of these findings can be seen in Table 3.

Larson & Heppner (1989) studied problem solving appraisal in a clinical population of inpatient recovering male alcoholics at a Veterans Administration Hospital. 78 veterans were administered the Problem Solving Inventory, the Mooney Problem Checklist,

Table 3

Overview of Literature on Students At-risk of Alcohol Related Problems and Problem-Solving:

Reference	Population	Method	Inst/Treatment	Findings
Larson & Heppner et al., 1989	Male inpatient. re- covering alcoholics at VA Hospital	Statistical analysis (t)	P.D.I., Problem checklist, diagnostic interview	Alcoholics reported problem solving appraisal similar to late adolescents.
Godshall & Elliot, 1997	Undergraduate students	Correlation	P.S.I. and Health related behaviors	Ineffective problem solving skills assoc. w/increased alcohol intake, and more sedentary leisure activity

and the Psychiatric Diagnostic Interview. The results followed their hypothesis that male alcoholics as a group would appraise their problem solving as less effective than the university and adult samples. More specifically they found that the inpatient male alcoholics reported their problem-solving appraisal as more similar to late adolescents than to adults whom they more closely resembled in age (Larson & Heppner, 1989). This is no surprise given that previous alcohol research has found that adult alcoholics are more similar in some ways to adolescents in their coping strategies than they are to adults in their age range (see Jones, 1968, in Larson & Heppner, 1989). The directionality of these results however remains unclear. For example, does alcoholism stunt or delay a person's emotional maturity and problem solving ability or is it the level of maturity and inability to problem solve that influences alcoholism (Larson & Heppner, 1989). Although this question of direction will not be addressed in this proposed study, finding out whether students at-risk of alcohol related problems cope and problem solve in a different way than their successful classmates will help to narrow in on a treatment approach.

Problem-solving and health-compromising behaviors.

Godshall & Elliott (1997) surveyed 96 (76 actually used) undergraduate students on their health related behaviors and then used correlational procedures to compare these results with their Problem Solving Inventories. They found that ineffective problem solving skills were associated with greater alcohol intake over a two-week period and with more sedentary leisure behavior. Perceived control over emotions was found to be predictive of health perceptions. Yet, elements of problem solving behavior were unrelated to tobacco use, illicit drug use, and exercise behaviors (Godshall & Elliott, 1997). These results

appear to coincide with this study's hypothesis that students at-risk of alcohol related problems will report more ineffective problem solving skills than their successful peers will.

These studies are beginning to make a connection between problem solving and alcohol that needs to be supported. Given that alcoholics appraise their problem solving as less effective (Larson & Heppner, 1989) and college students with less effective problem solving skills are associated with greater alcohol intake (Godshall & Elliott, 1997), one might inductively hypothesize a relationship exists between ineffective problem solving and alcohol use.

At-risk of alcohol-related problems and personality factors.

There are numerous studies to date that focus on uncovering personality traits that are associated with the amount of alcohol consumed, expectations or motives for consuming alcohol, and alcoholism (Nerviano & Gross, 1982; Brown & Munson, 1987; Cook, et al, 1998; Stewart & Devine, 2000). But there are only a limited number of studies that examine personality factors associated with alcohol-related problems or campus policy violators (Anchors & Dana, 1989; Griffin & Salter, 1993; McDowell, 1995; Barrineau, 1997). Those articles that are associated specifically with campus policy violations will be reviewed first then some additional studies that examine the different dimensions of alcohol use and abuse will be reviewed. These studies will demonstrate the significance of studying personality factors in regards to alcohol-related problems. A summary of some of these findings can be seen in Table 4.

Three studies used the Myers Briggs Type Indicator (MBTI; Myers & McCaulley, 1985) to examine the personality profiles of campus policy violators. The first study used

Table 4

Overview of Literature on Students At-risk of Alcohol Related Problems and Personality Factors:

Reference	Population	Method	Inst/Treatment	Findings
Barrineau, 1997.	undergrad alcohol policy violators	univariate- Analysis	MBTI	increase in P's, more spontaneous, adaptable, open to change, and impulsive.
Anchors & Dana, 1989.	conduct code violators	Chi-Square	MBTI	increase in ENTP's, more non-conforming, and daring spirit.
Griffin & Salter, 1993.	policy offenders	Config-freq- analysis	MBTI	increase in ETP's.
Berkowitz & Perkins, 1986	problem drinking	Literature review	Correlational	Poor impulse control, proneness to deviant behavior, lower expectation of academic success.
McDowell, 1995	campus policy violators under the influence		Edwards Personal Preference Schedule	gender differences; each with a number of significant differences in personality traits.

alcohol policy violators, the second and third examine campus policy offenders in general. Each study found significant profiles with common personality types.

Phil Barrineau (1997) examined the MBTI results for 49 undergraduate alcohol policy violators at a small southeastern university and then compared the findings to the base sample of 1,698 students at the same institution. He found that Ps were significantly over-represented in the alcohol policy violators group in comparison to the general population. The author cites a number of references that describe the P function as a preference for a lifestyle that may be characterized as spontaneous, adaptable, open to novelty, change, variety, and impulsive. Regarding personality type, ENTP was significantly over represented among the alcohol policy violators (Barrineau, 1997). ENTP accounted for 20% of the sample in comparison to the general population of which only 5% are ENTPs. Barrineau (1997) cites descriptions of this personality type as having a nonconforming attitude and daring spirit. This is not surprising given inclusion in an alcohol policy violators group would require the breaking of some form of regulation or conforming policy.

Using the MBTI, Anchors & Dana (1989) compared students that violated the university's conduct code and were required to attend a substance abuse workshop with the first year total resident population at the same school. They found ENTP's were statistically more frequent among the students with substance abuse referrals. These findings are very similar to the results found by Barrineau (1997) mentioned above. A third study by Griffin & Salter (1993) also compared MBTI results of campus policy offenders. They found that students guilty of behavioral misconduct were more likely to have the designation of E, T, and P (Griffin & Salter, 1993). It should be noted however,

that there is a degree of skepticism about the MBTI system's ability to provide an accurate or clear description of an individual's personality. This information will therefore be used in only a limited context of understanding that some student's having alcohol-related problems may have similar personality characteristics.

The above mentioned studies provide support for certain personality dimensions that describe the population of college student policy violators. Confirming these personality dimensions (E, N, T, P) through the administration of a different personality measure such as the 16PF will increase the validity and reliability of these findings. Certain global and primary factors of the 16PF have been found to be correlated with the MBTI types described above (Conn & Rieke, 1994)[in 16PF manual]. These correlations are as follows: extraversion with the global factor extraversion ($r = .68$), intuition with factor Openness to Change ($r = .54$), thinking with factor Apprehension ($r = -.33$), and perceiving with the global factor self-control ($r = -.57$).

McDowell (1995) focused her dissertation on examining the personality factors associated with a sample of university college students who had been referred to a time-out program for violating campus policy while under the influence of alcohol. The Edwards Personal Preference Schedule was used to compare the personality traits. Her results indicated significant personality differences for each gender between a random university sample and both policy violators overall and the three different sub-groups of policy violators labeled in low, high, and serious alcohol risk groups. The male sample group scored more toward the upper end of the distribution on deference, order, autonomy, succorance, endurance, exhibition, and abasement. The variables of achievement, affiliation, and intraception were placed on the center of the distribution

while dominance, change, heterosexuality, and nurturance were toward the lower end of the distribution. For the female group, differences were found toward the upper end on the scale of achievement, order, succorance, and aggression. The female group scored significantly toward the lower end of the distribution on affiliation, intraception and dominance. The serious, high, and low groups also had significant differences from the norm group, in relation to the previously mentioned differences (Jeanette McDowell, 1995). Confirmation of these typologies and personality traits will be discussed and examined in detail in the results section of this study.

Two literature reviews on personality factors and drinking found significant relationships. The first study investigated problem drinking among college students and found that problem drinking is associated with poor impulse control, greater proneness to deviant problem behavior, and lower expectations of academic success (Berkowitz and Perkins, 1986). The second review reported on 18 studies that surveyed the relationship between personality and college students' alcohol consumption. The authors indicated a positive relationship between heavy alcohol consumption and "sensation seeking," assertiveness, mood fluctuations, high trait anger, and trait anxiety (see Saltz and Elandt, 1986, in McDowell, 1995).

Studies examining other dimensions of personality have also made correlations with indices of alcohol use and abuse. In particular, it appears that a number of studies have reported significant findings of a positive relationship between extraversion and both alcohol use (Howse & Ghodse, 1997; Cook et al, 1998) and alcohol problems (Costa & McCrae, 1992). A negative relationship was found between alcohol use and

agreeableness and conscientiousness (Martin & Sher; 1994; Cook et al; 1998) and alcohol problems and agreeableness (Costa & McCrae; 1992).

In regards to the extraversion findings, Howse & Ghodse (1997) reported that medical students who score extravert on the Eysenck Personality Questionnaire are more likely to exceed the recommended levels of weekly alcohol consumption. Cook et al, (1998) also found that amount of alcohol consumed correlates with extraversion. These studies, although focusing on consumption rates instead of problems related to alcohol, coincide with the results of Barrineau (1997). They all allude to the non-conforming and extroverted nature of alcohol policy violators. In addition, Costa & McCrae (1992) found a positive correlation between extraversion and alcohol problems in a population of older adults. Therefore, it might be expected that those at-risk of alcohol related problems will report more non-conforming extroverted personalities than the non-at-risk sample.

Evidence of a negative relationship between conscientiousness or agreeableness and alcohol use has also been found. Martin & Sher (1994) reported that alcohol use disorders in young adults (primarily college students) were positively associated with neuroticism and negatively associated with agreeableness and conscientiousness. Costa & McCrae (1992) found a negative correlation between agreeableness and alcohol problems in their investigation of older adults. Cook et al, (1998) found that alcohol consumed correlates negatively with conscientiousness and willingness to conform. This study will examine the relationships between those at-risk of alcohol related problems and a lack of agreeableness or conscientiousness in the 16 PF factor Rule-Conscientiousness (factor G).

Patrick Johnson (1989) suggested yet another personality factor may be involved in the development of problem drinking in males and females. He found significant

differences in sensation seeking and fear of failure when comparing heavy and light drinking females along five personality dimensions. It was apparent that the heavy drinkers had more of each trait and they experienced significantly more alcohol related problems (Johnson, 1989). These results did not coincide with past research on males, which alludes to the importance of running a separate analysis between the males and females to identify any gender differences in personality.

The 16PF and alcohol studies.

Brown & Munson (1987) tested their hypothesis that personality characteristics are related to alcohol-effect expectancies. They divided 256 college students into groups based on their self-reported alcohol consumption and anxiety and extroversion scores from the 16PF. The results indicated that students characterized by higher 16PF Introversion-Extroversion scores expected significantly more social and physical pleasure, relaxation-tension reduction, and arousal with feelings of power as a consequence of alcohol consumption. Similarly, more anxious individuals obtained higher scores on the Alcohol Expectancy Questionnaire (AEQ; Brown et al., 1980) scales of global positive changes, social assertion, sexual enhancement, and arousal with feelings of power.

Although no studies have been found that administer the 16PF to the groups being investigated here, there are some studies that describe alcoholic populations. Lawlis and Rubin (1971) used cluster analysis and examined three sets of alcoholic populations resulting in three distinct personality types, two of which correlated fairly well across all three populations. The first type appears to describe an anxiety syndrome with specific dynamics that indicated low ego strength (factor C), suspiciousness (factor L),

apprehension (factor O), conservatism (factor Q1), perfectionism (factor Q3), and tenseness (factor Q4). The second type had only one disagreement among the combined three population profiles, which was factor Q1 (conservatism). The general dynamics of the second type indicated that they have less motivation to deal with abstract thinking (factor B), are quite emotional (factor C), and are assertive (factor E). This type may display expression with little inhibition from ego strength (factor G) or self-sentiment control (factor Q3). They also appear to have a great deal of guilt (factor O) and suspiciousness (factor L). The authors concluded that these two sub-groups of alcoholics express anxiety with one directing it inward while the other directs it outward (Lawlis & Rubin, 1971). The third group had less in common across the three populations and they will not be described herein. This study demonstrates that there is some utility in using the 16PF to identify certain populations. There may be one or two types of personalities that describe students at-risk of alcohol related problems.

Nerviano & Gross (1983) compared the personality profiles of alcoholics on three different objective inventories. Using the 16PF, they examined five studies and came up with one major personality type. This type had substantially similar deviations on the major markers for the global factors of anxiety (high) and introversion (high). These global factors involved the sub-scales (and direction) measuring emotional stability (C-), suspiciousness (L+), apprehension (O+), undisciplined Self-Conflict (Q3-) and tension (Q4+), as well as submissiveness (E-), timidity (H-), group dependency (Q2-), and conservative traditionality (Q1-). In summary they write, “the studies reviewed here suggest a viable role for studies that typologize personality in investigations of the etiology and treatment of alcohol misuse, but also encourage more generalized

typological investigations and comparisons with other data (pp.848, Nerviano & Gross, 1983)". This provides more support for one of the intentions of this study, to provide a typology of two at-risk college student groups.

The research reviewed above about the relationship of personality to various aspects of alcohol use and abuse has found significant results. A number of authors cited here have also suggested the benefit and utility of profiling personality characteristics with-in alcohol related populations (Nerviano & Gross, 1983; Johnson, 1989; Griffin & Salter, 1993). Using the 16PF to identify personality factors in and across the three groups being studied here will contribute to this growing literature and offer more descriptive information for treatment purposes.

Conclusion of At-risk Review

The prevalence of both academically-at-risk college students (Garnett, 1990; Tinto, 1993) and college students at-risk of alcohol related problems (O'Hare, 1990; Wechsler, & Isaac, 1992; Schuckit et al., 1994; Wechsler et al., 1994) is an indicator of the demand for research and better understanding of each population. Traversing the many challenges and demands of completing a degree in higher education requires effective problem solving abilities. The lack of appropriate problem solving may result in greater distress under routine conditions (Heppner, Kampa, & Brunning, 1987) and in times of stress (Nezu & Ronan, 1988). Some college students who believe they are ineffective problem solvers have been associated with greater alcohol intake (Godshall & Elliott, 1997) and lower academic performance (Elliott et al., 1990) than those who believe they are effective problem solvers. Some prevention studies have begun to reveal the benefit of training academically-at-risk groups in effective problem-solving

techniques (Newton, 1990; Coleman & Freedman, 1996) however; it remains unclear as to what specific part of these programs accounted for the improvement. Therefore it appears important to examine and compare self-perceived problem solving of at-risk college students and non-at-risk college students to enhance the understanding of the dynamics at play in each group.

The studies reviewed above have clearly indicated that certain personality traits or factors are associated with both the at-risk groups being examined. The analysis of the 16PF results of this study will identify personality factors of each sample that are different from the non-at-risk sample. These results can support prior research findings and offer new perspectives in personality profiling for these at-risk groups of students. Interventions can also be developed to help this population manage the challenges associated with entering and completing college.

Defining Problem Solving

There are different ways to define and measure problem solving. The following section will help to articulate the perspective in which this study has taken on problem solving. A review of some of the background info on the theory of problem solving will be described, and some models of problem solving will be discussed. This information will also help to develop a foundation for which the problem solving component of this research is being based upon.

Defining A Problem

There are numerous ways to define ‘a problem’. Horan (1979) points out that no universally accepted definition of a problem has yet been offered. He compares and contrasts the different definitions given over the years (e.g., Davis, 1966; Dewey, 1933;

Skinner, 1966). These past definitions argue whether a problem must be solved immediately or if it can wait, or if a problem has no solution or a number of possible solutions. This study will utilize more recent conceptualizations of defining a problem. Heppner & Krauskopf (1987) define a problem as a situation in which a person might respond in relation to his or her internal or external demands. His or her need to respond may vary in intensity from no perceived pressure to situations that demand a response (D’Zurilla, 1986). Previous writers have conceptualized problems as only those situations that were so difficult that the individual did not have the necessary performance available (D’Zurilla & Goldfried, 1971), or did not have a ‘ready response’ (Davis, 1973). On similar lines past research has defined a problem in terms of some sort of ‘obstacle’, ‘detour’, or lack of ‘clear route’ to a goal (Kohler, 1925; Vinacke, 1952; cited in Heppner & Krauskopf, 1987). These definitions, (a) eliminate the easier problems restricting the continuum to novel problem solving and (b) do not account for developmental differences, and how different age groups solve problems at differing difficulty levels (Heppner & Krauskopf, 1987).

It is important to note that problems may also take on different characteristics. For example, Anderson (1980) classifies problems along a routine-creative dimension. He defines routine problems (e.g. ordering from a menu, selecting and buying new clothes) as situations in which individuals typically have a ready response, and at the other end more difficult problems require very creative responses. Wickelgren (1973) adds to the dimensions that classify different problems by distinguishing between formal and informal problems. He states, “formal problems refer to those mathematical problems of the ‘to find’ or ‘to prove’ character, which contained specific ‘givens’ about the problem,

possible ‘operations’ to solve the problem, and goals.” Wickelgren (1973) describes informal problems as those involving real-life personal problems or decisions with poorly specified characteristics. Other researchers (Heppner, 1978; Horan, 1979) have made note of differences between real-life personal problems and hypothetical problems and in how these problems are solved. Awareness of the different possibilities that a problem may take will allow for clearer conceptualization of the many dynamic parts involved in the problem solving process.

Defining Problem Solving

There are different ways in which one can define ‘problem-solving’. In his manual of the Problem Solving Inventory, Heppner (1988) considers problem solving and coping as synonymous. Problem solving can be defined as any goal directed sequence of cognitive operations employed for the purpose of adapting to internal or external demands or challenges (Anderson, 1980; Sternberg & Salter, 1984). Heppner and Krauskopf (1987) also add affective operations and behavioral responses to the sequence of activities involved in problem solving. Problem solving refers to successful and unsuccessful activities, as well as conscious and unconscious activities aimed at approaching or avoiding a problem. Problem solving is not simply the rational, logical, cognitive processing of information, rather real-life problem solving is further conceptualized as being complex, dynamic, highly interactive, and an intermittent process (Heppner & Krauskopf, 1987). Other researchers examine problem solving through behavioral operations. For example, D’Zurilla & Goldfried (1971) define problem solving “as a behavioral process, whether overt or cognitive in nature, which makes available a variety of potentially effective response alternatives for dealing with

the problematic situation and increases the probability of selecting the most effective response from among these various alternatives” (p. 108). This definition divides problem solving into two behaviorally based steps including the operations of generating alternative responses and then selecting correctly from those alternatives.

Heppner and Krauskopf’s (1987) more comprehensive definition that includes both an affective component and a behavioral one will be utilized for the purpose of this study.

A Model of Problem Solving

The model of problem solving used for this study must also be determined. D’Zurilla & Goldfried (1971) state, “there has been a remarkable degree of agreement among various theorists and investigators working in different areas as to the general kinds of operations involved in effective problem solving” (p. 111). As a consensus viewpoint they distinguish five general stages that represent the problem solving process: (a) general orientation, (b) problem definition and formulation, (c) generation of alternatives, (d) decision making, and (e) verification. They further explain that these stages do not necessarily have to progress in the specific order given, but may vary, overlap, and interact with each other during the process. It is apparent that recent versions of the problem solving stages still have the same general progression or steps that D’Zurilla and Goldfried (1971) established (e.g., Heppner & Krauskopf, 1987).

Heppner and Krauskopf’s (1987) model leans heavily on the role of information processing in the appraisal of skills, problems, and the implementation of goal directed behaviors. They incorporate John Anderson’s (1983) model of how people process information, which he calls the Adaptive Control of Thought (ACT). Anderson’s ACT

model uses three memory systems: working, declarative, and procedural. In brief, working memory contains the information that the system can currently access, which is information from long-term declarative memory, temporary structures from encoding, and actions (Anderson, 1983). Declarative knowledge is basically pieces of information about events, such as propositions or spatial images that are represented in memory in a complex interconnected system. These pieces of knowledge can then be converted into a more automated form, or procedural knowledge. Procedural knowledge is knowledge about how to do things or perform. Heppner & Krauskopf (1987) explain that the use of these three knowledge bases and the assessment of what information is available in both the working and long-term memory is essential to evaluate how a person copes with personal problems.

Heppner & Krauskopf (1987) continue to integrate Anderson's ACT model to fit one's knowledge bases into a four-stage problem solving process. The stages are modeled after Anderson's (1983) labels: (1) encoding, (2) goal setting, (3) developing plans and pattern matching, and (4) action. Heppner & Krauskopf (1987) described these four steps of problem solving in extensive detail, however they will only be briefly touched upon here.

The encoding of a problem may include the collection of relevant information by assessing oneself (affect, behavior, cognition), one's environment (norms, expectancies, reinforcers), and the characteristics of the problem (obstacles, goals, behavior-environment interactions) (Heppner, 1978). At best, the functional outcome of encoding may be a working definition of the problem. At worst, the problem definition activities result in confusion and uncertainty as to what the problem is, or if the problem exists. An

important consequence of the encoding process is that the activities used serve as cues for future problem-solving processes. The effects of encoding therefore, may influence one's later self-evaluation of ability to effectively obtain problem-solving solutions to similar or new problems (Heppner & Krauskopf, 1987).

The second step, goal setting, is a way to organize behavior, aimed at facilitating the adaptation to internal and external environmental demands. Heppner & Krauskopf (1987) explained how the complexity, concreteness, and function of goals are important variables that may affect how a person copes with a particular problem. A positive result of goal setting is an organized, purposeful direction toward a solution with an adaptable consequence for the individual. A negative outcome of goal setting may be either a confusing or a purposeful set of behaviors leading to maladaptive outcomes. Once again, as with the other steps in this problem solving process, an important aspect of these activities is that they serve as healthy cues for other future problem-solving processes.

The developing plans and pattern matching stage involves the retrieval of information and its application to solving a problem. Heppner & Krauskopf (1987) pointed out, "the manner of information processing in which a person engages during the pattern-matching process is very important. It seems particularly important to assess the adequacy of the cognitive information processing (e.g., quantity and quality of alternatives, solution thinking, consequential thinking, means-end thinking) as well as how the person's affective responses influence the cognitive processing" (p. 409).

The final stage, action, includes a diverse range of cognitive, affective, and behavioral activities associated with the performance of problem solving responses that typically carry out one's plans. These activities are not randomly emitted, but rather are

cued by the previously discussed problem solving steps. The outcome of this action-oriented step can be examined on either an approach or an avoidance basis. Hopefully, the action will result in problem resolution. However, the action may make the problem situation even worse and confuse the person even more (Heppner & Krauskopf, 1987).

These stages are a useful and thorough way clarifying the steps to effective problem solving. Understanding how an individual encodes, sets goals, develops plans, and acts on those plans is the largest part of determining how they problem solve. It is important to realize that these stages may occur in different orders and may be recycled if they are unsuccessful the first time. Although it may appear these stages cover most of the problem solving process, Heppner and Krauskopf (1987) consider other factors as well.

Individual differences should also be an essential part of a model used to understand the problem solving process (Heppner & Krauskopf, 1987). All people are different and how individual differences effect problem solving can not be overlooked. Heppner and Krauskopf (1987) find it important to examine differences in introversion-extraversion, cognitive style, and social responsiveness as well as more complex differences in values, self-appraisal, and self-regulation when examining problem solving. These variables will be examined through the 16PF, a personality inventory.

Measuring Problem Solving

The way in which one measures problem-solving must also be determined. There are a few models that have been developed to examine problem solving from different angles (e.g., D’Zurilla & Nezu, 1990; Heppner & Krauskopf, 1987; Platt & Spivack, 1975). D’Zurilla & Nezu (1990) conceptualized social problem solving into the domains

of problem orientation and problem solving skills. This social problem-solving model emphasizes the utility of specific cognitive-behavioral skills in resolving problematic situations. In contrast, Heppner & Krauskopf's (1987) model described earlier uses the perception of problem-solving ability relying on a measure called the Problem-Solving Inventory (PSI; Heppner & Peterson, 1988). Platt & Spivack (1975) take yet another approach; they focus on assessing problem-solving deficits with objective assessment instruments, such as the Means-End Problem-Solving Measure (MEPS; Platt & Spivack, 1975). All three approaches are useful ways for examining problem solving, yet the significant amount of research that has been done using the PSI makes it the most attractive measure for examining problem-solving. The PSI will also be consistent with the previously selected definitions and theoretical model described above.

The Problem Solving Inventory has been used alone and in combination with other measures to identify connections between problem solving and: state and trait anxiety (Heppner, Hibbel, Neal, Weinstien, & Rabinowitz, 1982; Nezu, 1985), problem orientation and trait affectivity (Elliott, Herrick, MacNair, & Harkins, 1994), affective states and psychological distress (Elliott, Sherwin, Harkins, & Marmarosh, 1995), depression, hopelessness, and suicidal ideation (Nezu & Perri, 1989; Priester & Clum, 1993), stress appraisal and coping over time (MacNair & Elliott, 1992), study habits and academic performance (Elliott et al., 1990), physical and psychological health (Heppner, Kampa, & Brunning, 1987), health complaints and health related expectancies (Elliott & Marmarosh, 1994), health compromising behaviors (Godshall & Elliott, 1997), and overall psychological adjustment (Heppner & Anderson, 1985). Therefore, using the PSI

with the 16PF to better understand at-risk college students could provide new and useful information that covers a number of topic areas.

The above studies on problem solving all contribute to understanding the many dimensions of problem solving that exist in our every day lives. Examining the various ways the PSI has been studied will assist in understanding how this measure can be utilized more effectively with the at-risk groups in this study. The significant results it has found are clearly useful. The limited number of studies on alcohol and academics allows this research to fill a gap in this area of research. For a more detailed description of the PSI refer to Chapter 3, Methodology.

Conclusion

The literature for at-risk populations shows an increase in need for new interventions and a more refined identification of what these populations need. The problem solving process can certainly help us understand the way in which at-risk students enter, evaluate, and react to stress. Our own evaluations and perceptions of how we problem solve can be indicative of how we behaviorally and psychologically adjust and deal with problems. The personalities of college students are indicative of the way in which they interact with the world around them. Finding out how at-risk college students problem solve and interact within the college environment in comparison to students non-at-risk will help to identify areas for the helping profession to focus interventions. A problem solving definition and a model has been selected to provide a clear foundation of theory. A problem solving and a personality measure has been selected for this study, therefore the next section describes how this study was conducted.

Chapter 3

Methodology

This chapter will describe the procedures and methodology utilized in this study. A description of participants, measures, and procedures are explained herein. The statistical method and manner in which the data will be analyzed is also presented, followed by a brief summary.

This study will follow a descriptive study design, which will focus on establishing profiles that best describe the members of the student groups.

Participants and Population Parameters

College students from West Virginia University were used to form three groups. The at-risk for alcohol related problems group was generated from the university's Student Assistance Program (SAP). Students in this group are students from West Virginia University that have been referred to the SAP for reasons related to problems with alcohol. The academically-at-risk group was sampled from Orientation 2 Classes at West Virginia University. These students are required to take this 1 credit class due to their Grade point average's dropping below a 2.0 (on a 4.0 scale). The last group, a comparison or control group, have been sampled from Introduction to Psychology Classes at West Virginia University. These students have acknowledged that they have not been on academic probation (GPA fallen below a 2.0) and that they have not experienced any problems related to alcohol. Following data collection, all three groups GPA's were checked through West Virginia University's Academic Advising Center for verification of their appropriate group classification.

To assure proper group parameters each participant sampled from the above mentioned settings was asked to answer the following questions on the Demographic Sheet (appendix A): (a) whether or not they have ever experienced any problems related to alcohol, (b) if they have ever been diagnosed with a learning disability or emotional disability, and (c) if they have ever been on academic probation or enrolled at another university.

A total of 149 students from West Virginia University participated in the study. Out of the total, 14 of the participants were excused from the study because they fit criteria for both the at-risk of academic failure group and the at-risk of alcohol related problems groups. Analyses were conducted with these overlapping students in their originally designated groups and it did not change the significance of the results. The remaining 135 students used for the analysis fit into the groups in the following manner. 52 participants (38.5%) fit into the non-at-risk group, 52 participants (38.5%) fit into the at-risk of academic failure group, and 31 participants (23%) fit into the at-risk of alcohol related problems group.

The participants reported their ethnicity as the following: 117 (86.7%) individuals identified themselves as Caucasian, 10 (7.4%) identified themselves as African American, 2 (1.5%) as Asians, 1 (.7%) as Native American, 1 as Hispanic, and 4 (3.0%) identified themselves as other. This representation is very close to the student body estimates for West Virginia University given by The Princeton Review, which reports the following percentages: 90% Caucasian, 4% African American, 2% Asian, 1% Hispanic, and 2% International.

There are 71 female (52.6%) participants and 64 male (47.4%) participants. Each group did not have the same male to female ratio. The non-at-risk group has 18 males and 34 females. The at-risk of alcohol related problems group has 21 males and 10 females. The academically-at-risk group has 25 males and 27 females. The ages of the participants ranged from 17-32 years old with a mean of 18.9 and a mode of 18.

Learning disabilities were reported by 15 (11.1%) of the participants. They were distributed over the groups in the following manner: 2 students are from the non-at-risk group, 7 students are from the at-risk of alcohol related problems group, and 6 students are from the academically at-risk group. A summary of these overall demographics is listed in Table 5.

Participant Recruitment

Each of the three groups sampled were tested separately and recruited in similar non-discriminative manners. The selection of participants at the SAP was based on their referral to the program for alcohol related problems. Once data collection began, any student that presented to the SAP was offered the opportunity to participate in the study. No students declined from participation. The academically-at-risk groups were selected on the basis of enrollment. The sections that had the largest enrollment were utilized first in order to minimize the number of classes interfered with. There were no criteria that differentiated the sections; therefore randomization of class selection was not a priority. No academically-at-risk students declined to participate in the study. The control group (non-at-risk) was recruited via a posting on the subject recruitment board in the psychology building on campus. This posting is included in APPENDIX A.

Table 5

Overall Demographics Summary:

Characteristic	Sample Size	Percentage
<u>Group</u>		
At-risk of Academic Failure	52	38.5
At-risk of Alcohol Related Problems	31	23.0
Non At-risk	52	38.5
<u>Ethnicity</u>		
Caucasian American	117	86.7
African American	10	7.4
Asian American	2	1.5
Native American	1	.7
Hispanic	1	.7
Other	4	3.0
<u>Sex</u>		
Male	64	47.4
Female	71	52.6
<u>Age</u>		
17	1	.7
18	64	47.4
19	49	36.3
20	12	8.9
21	6	4.4
25,27,32	1 each	.7 each
<u>Learning Disability</u>		
No	120	88.9
Yes	15	11.1

Although there is a common incentive for all participants, each had some additional incentive related to their situation. All participants were informed prior to their participation that they are entitled to be entered into a raffle worth \$20.00 at the University Bookstore. In addition, the students at-risk of alcohol related problems also received credit for their participation in the form of one treatment visit counted towards

The number of visits they were required to do. The non-at-risk group also received extra credit from their introductory to psychology class for participation in a research study. The academically-at-risk students received credit for their class attendance. Participants, which meet criteria for both at-risk groups, were not included in the study.

Interviewer

All interviews were conducted by individuals with experience and training in the administration of psychological tests. However, no clinical experience is needed for the administration of the PSI or the 16PF inventories.

Setting

The at-risk of alcohol related problems group (Group 1) data was collected from a number of small group meetings in the group room of the University's Student Assistance Programs main office at the Robert C. Byrd Health Sciences Center during the months of February and March 2001. The academically-at-risk group (Group 2) data was collected from three sections of Orientation 2 in university classrooms located on the downtown campus during the month of February 2001. The control or non-at-risk group (Group 3) data was collected from two experiment participation times on the same day in

a classroom on the downtown campus during the month of February 2001. All areas used for testing were free from distractions and monitored by this researcher.

Procedure

Each participant in the study completed an informed consent form, an identification sheet, a demographics sheet, a PSI, and a 16PF. Each participant was informed of the purpose of the study and that their identity will remain confidential. A standard dialog was used for all data collection sessions.

No participants declined to participate. Two participants (Id #'s 242 & 224) from the Academically-at-risk group were excluded from the study and data file due to random responses to the questionnaires. Both students were seen darkening out answer sheet bubbles without following corresponding questions in the 16PF booklet. One student (Id # 234) did not complete the factor B questions (#'s 173-185) on the 16PF. However, he will be included in the study, because these questions were not used in the analysis.

Counterbalanced Order of Test Distribution

The two inventories used were alternately ordered prior to distribution to each of three groups. This alternate ordering was done to control for any effects of taking the inventories in any certain order.

Informed Consent

Each participant was given an informed consent sheet to read and sign prior to the administration of the inventories. The consent asked for permission to verify their GPA through admissions and records. The consent will also detail their right to confidentiality and the method that will be used to keep their identity confidential (See Appendix B).

Measures

Two measures were used to examine each group's problem solving and personality factors. These measures are the Problem Solving Inventory (Heppner, 1988) and the 16PF, fifth edition (Cattell, et al., 1993).

The Problem Solving Inventory

The Problem Solving Inventory (PSI) (Heppner, 1988) is a self-report instrument used to assess an individual's perception of his or her own problem solving behaviors and attitudes. The PSI measures an individual's perception of their problem-solving capabilities, and not their actual problem-solving skills.

The PSI consists of 35 statements. There are three items that are for research purposes and are not scored. This leaves 32 items from which the scaled scores are derived. The individual rates each item on a Likert scale that ranges from 1 (Strongly Agree) to 6 (Strongly Disagree). There are 15 items negatively worded in the inventory to prevent over-rater or under-rater response bias. Low scores are associated with positive self-appraisal of problem-solving skills.

A total score measuring the individual's perception of their general problem-solving ability is achieved by adding the scores of all responses. The PSI is comprised of three scales, (1) Problem-Solving Confidence (PSC), (2) Approach-Avoidance Style (AA), and (3) Personal Control (PC). There are 11, 16, and 5 items on each of these three scales, respectively. The individual scales were derived through factor analysis. A scoring key is provided to assist with hand scoring the instrument.

The first construct, Problem-Solving Confidence, is defined as self-assurance while engaging in problem-solving activities (Heppner, 1988). A low score on this scale

indicates that an individual believes and trusts in their problem-solving abilities. This factor is best conceptualized as a general measure of problem solving self-efficacy, or belief in one's ability to effectively cope with problems (Heppner & Baker, 1997).

The second construct, Approach-Avoidance Style, is defined as a general tendency of an individual to approach or avoid problem-solving activities (Heppner, 1988). Heppner and Baker (1997) write, "whether a person has a tendency to approach or avoid problems is very critical in the problem solving process because it effects subsequent problem-solving behaviors, such as attempts at defining the problem and trying to find solutions."

The third construct, Personal Control, indicates the extent to which an individual believes that they are in control of their emotions and behavior while solving problems (Heppner, 1988). Personal Control seems to reflect emotional over-reactivity and behavioral control (Heppner & Baker, 1997).

Adequate alpha coefficients have been reported, indicating that each factor has a reasonable degree of internal consistency (PSC, .85; AA, .84; PC, .72). The interscale correlations range from $r = .38$ to $.49$, which indicates the scales to some extent, are measuring related constructs.

The test manual suggests professionals who have expertise in tests and measurement and are familiar with the literature on coping and problem solving should administer the PSI. However, it should be noted that the test is self-reported and can be given in a group format. The actual test instrument is on a single 8 x 11-inch sheet of paper. It is covered on both sides with questions in relatively small print, which may present a problem for persons with visual impairment. Individuals with cognitive

impairments and/or low levels of education may also have a problem with the reading level of the instrument. The manual suggests that if two or more items are omitted in one scale, or three items are omitted in total, the test should be re-administered if possible.

An attempt to make the items easier to read resulted in the re-wording of 18 of the original item on the PSI. The re-worded items are present on the current form of the test. An examination of the new items and the original ones indicates that the contents of the two match, and that the rewording did make the items easier to read. However, one should take note that most or all of the psychometric data gathered on the PSI involve the originally worded items.

Test-retest reliability measures for the total PSI score range and for the three scales range from .83 to .89 across a two week period. These score ranges drop to .77 to .81 when tested with another sample over a three week period, and dropped to .44 to .65 for a third sample tested after a 2-year period. These data as well as most other statistical data have been collected from university students.

Discriminate validity should show that the PSI does not correlate with measures and variables that it is intended to differ from. This type of discriminant validity is supported by low correlations between the PSI and measures of aptitude or academic achievement and social desirability. None of the correlations between PSI and the Missouri College English Test scores, Missouri Mathematics Placement Test scores, and high school rank were found to be significant at the .05 level (Heppner & Petersen, 1982). DeClue (1983) also found no statistically significant relationship between PSI scores and WAIS-R scores. PSI scale and Total scores were also correlated with the Social Desirability Scale (Crowne & Marlow, 1964). The correlations were not statistically

significant, except for the Personal Control scale ($r = -.24, p < .05$). Therefore PSI scores do not seem to be strongly correlated with aptitude measures, academic achievement, or on a general measure of social desirability (Heppner, 1988).

Construct validity was demonstrated through comparisons with other measures and the use of two independent objective studies. Interviewers that were blind to subject's PSI scores correctly identified 83 percent of the students as either high or low scorers on the PSI (Heppner et al., 1982). External behavior rating on students participating in an assertiveness training program has also obtained by Larson (1984). Judges, blind to the subject's PSI scores, independently rated those scoring low on PSI as more assertive and as more effective problem solvers than those scoring high on the PSI. These two studies provide objective evidence of the validity of PSI scores (Heppner, 1988). A correlation with the Rotter Internal-External Locus of control scale for all PSI scores was significant, with individuals who appraise their problem-solving skills positively tending to report having an internal locus of control. Construct validity is further presented in the manual by a description of research in which PSI scores were related to measures of psychological health, marital adjustment, parenting behavior, career indecision, and attributions (Heppner, 1988).

Concurrent validity was demonstrated by significant correlations between PSI scale scores and self-rated evaluation of problem-solving skills and their perceived level of satisfaction with their skills. All correlations were statistically significant, with probabilities less than .0001 (Heppner & Petersen, 1982).

The strengths of the PSI are in the ease of administration (15-20 minutes), its connection with a research base, and the clarity of its manual. The weaknesses are in its

lack of machine scoring capabilities, the small type size on the test form, and the reading level required to understand some questions. Interpreting the PSI is also made difficult by the lack of specificity in what constitutes a “high or low” score. The fact that the three scales inter-correlation coefficients range from .38 to .49 makes the interpretation of independent scales less clear as to whether they are actually measuring different constructs.

In summary, the Problem Solving Inventory is a useful, self-administered inventory that is quick and can supply valuable information regarding perceived problem-solving abilities. It can be used in research dealing with affective, cognitive, and behavioral correlates of coping with real world problems. It appears that the test has sound psychometric qualities with the college student population. The next step may be to increase the population samples for the normative data using the new questions.

16PF

The 16PF Fifth Edition Questionnaire is a product of Dr. Raymond Cattell’s (1993) effort to identify the primary components of personality by factor analyzing all English-language adjectives describing human behavior. It measures 16 primary personality factor scales that were first identified by Cattell over 45 years ago. The 16PF also identifies five broad personality domains called Global Factors.

The 16PF Fifth Edition contains 185 items that comprise the 16 primary personality factor scales as well as an Impression Management (IM) index, which assess social desirability. Each scale contains approximately 10 to 15 items. Administered individually or in a group setting, the test takes 35 to 50 minutes to be complete by hand or 25 to 35 minutes to complete by computer. The test is written at the fifth-grade reading

level and is intended for adults' ages 16 and older. Separate male and female plus combined-sex norms are available. It can be hand-scored with a set of keys or computer-scored by the IPAT, the publisher.

The Fifth Edition represents a controlled, natural evolution of the 16PF Questionnaire. Continuing to assess the 16 personality factors the Fifth Edition measures levels of: Warmth, Reasoning, Emotional Stability, Dominance, Liveliness, Rule-Consciousness, Social Boldness, Sensitivity, Vigilance, Abstractedness, Privateness, Apprehension, Openness to Change, Self-Reliance, Perfectionism, and Tension. The Fifth Edition also includes five global factors: Extraversion, Anxiety, Tough-Mindedness, Independence, and Self-Control. Composite scores for creativity, adjustment, and numerous other criterion-related scales are also available. Detailed descriptions of these factors can be found in the Administrators Manual (Russell & Karol, 1994).

The 16PF is practically a self-administered test, although the administration manual advises the administrator to take time to establish a comfortable rapport with examinees, since a favorable test-taking attitude is helpful in the production of accurate data.

All test questions, except 15 from Factor B, have a three-choice response format [a. true, b. ? (a question mark), and c. false]. The 15 Factor B items, which assess reasoning ability, are grouped at the end of the test booklet following the personality items.

Test-Retest reliability was calculated for both a two-week and a two-month test-retest interval. Examinees were university undergraduate and graduate students. For the two-week interval the reliability coefficients for the 16 primary factors ranged from .69

(Reasoning, Factor B) to .86 (Self-Reliance, Factor Q2), with a mean of .80. The test-retest coefficients for the global factors were higher, ranging from .84 to .91, with a mean of .87. For the two-month interval the reliability coefficients for the 16 primary factors ranged from .56 (Vigilance, Factor L) to .79 (Social Boldness, Factor H), with a mean of .70. The test-retest coefficients for the global factors were again slightly higher, ranging from .70 to .82, with a mean of .78.

The Cronbach's alpha coefficient was used as a measure of scale internal consistency. Using a general population norm sample of 2,500 adults, the values ranged from .64 (Openness to Change, Factor Q1) to .85 (Social Boldness, Factor H), with an average of .74.

Construct validity is demonstrated through the identification of all 16 primary factors and 5 Global factors during its development using factor analysis. To provide evidence of convergent and discriminant validity, the 16PF Fifth Edition was compared to several tests of personality: the Personality Research Form (PRF; Jackson), the California Psychological Inventory (CPI; Gough), the NEO PI-R (Costa & McCrae), and the Myers-Briggs Type Indicator (MBTI; Briggs & Myers). Criterion validity for the 16PF Fifth Edition is presented in the administration manual. Correlations of the global and primary factors with scales of instruments that measure self-esteem, adjustment, social skill, empathy, creative potential, and leadership potential are described in detail. Full and more detailed reports of both construct and criterion validity are included in the 16PF Fifth Edition Technical Manual (Conn & Rieke, 1994).

Hypothesis

This study will examine the self-appraised problem solving and personality factors of three college student populations: students at-risk of academic failure, students at-risk of alcohol-related problems, and successful students that have not been included in the above categories.

Drawing from literature on problem solving and personality factors of the populations listed the research hypothesis are stated below.

Research Hypotheses Regarding the Problem Solving Inventory

- 1). Both at-risk groups will score higher on Problem Solving Total Score than the non-at-risk group (low scores indicate positive appraisal of problem solving abilities).
- 2). Both at-risk groups will score higher on Approach-Avoidance Style than the non-at-risk group (high scores indicate an avoidant style of problem solving).
- 3). Both at-risk groups will score higher on Problem Solving Confidence than the non-at-risk group (low scores indicate trust and belief in problem solving confidence).
- 4). Both at-risk groups will score higher on their Personal Control Factor than the non-at-risk group (low scores indicate belief in one's control of behavior and emotions while solving problems).

Research Hypotheses Regarding the 16PF

- 5). The at-risk groups will score lower on the global personality factor of Self-Control than the non-at-risk group.
- 6.) The at-risk groups will score higher on the global personality factors of Anxiety and Extraversion than the non-at-risk group.

7.) The at-risk groups will score lower on the specific personality factor Rule-Consciousness (G), than the non-at-risk group.

8). The at-risk groups will score lower on the specific personality factors Apprehension (O), and Perfectionism (Q3), and higher on the specific personality factor Openness to Change (Q1), than the non-at-risk group.

Research Questions:

9). Are there differences in any personality factors between each of the three groups of subjects?

10). Are there differences in demographic characteristics between each of the three groups of subjects?

Design and Analysis

As described, the independent variable is Student Group (at-risk of alcohol related problems, at-risk of academic failure, and non-at-risk). The dependent variables are (a) Problem Solving Inventory with a total score and three sub-scales, (b) the 16PF with five global factors and 16 specific factors, and (c) the demographic variables. These variables are listed in Table (6) with the item scores and ranges.

Power Analysis

In order to determine if there is clinical significance in the findings it is important to establish a sample size that gives enough power to make appropriate inferences about the findings. As an alpha level of .05 gives us the confidence level as it relates to a Type I Error, so then Power can give us the parameter with which to make judgements about a Type II Error.

Table 6

Design of the Research, Including Independent Variables and Dependent VariablesIndependent Variables

Student Groups	<u>N</u>
(1) At-risk of alcohol related problems	31
(2) At-risk of academic failure	52
(3) Non-at-risk	52

Dependent Variables

Problem Solving Inventory	<u># of Items</u>	<u>Item Score</u>	<u>Range</u>
(1) Total Score	32	1-6	32-192
(2) Problem Solving Confidence	11	1-6	11-66
(3) Approach-Avoidance Style	16	1-6	16-96
(4) Personal Control	5	1-6	5-30

16PF

Five Global Factors	<u># of Items</u>	<u>STEN Range</u>
(1) Extraversion	51	1-10
(2) Anxiety	40	1-10
(3) Tough-Mindedness	47	1-10
(4) Independence	44	1-10
(5) Self-Control.	42	1-10

16 Specific Factors

(1) Warmth	11	1-10
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(2) Reasoning	15	1-10
(3) Emotional Stability	10	1-10
(4) Dominance	10	1-10
(5) Liveliness	10	1-10
(6) Rule-Consciousness	11	1-10
(7) Social Boldness	10	1-10
(8) Sensitivity	11	1-10
(9) Vigilance	10	1-10
(10) Abstractedness	11	1-10
(11) Privateness	10	1-10
(12) Apprehension	10	1-10
(13) Openness to Change	14	1-10
(14) Self-Reliance	10	1-10
(15) Perfectionism	10	1-10
(16) Tension.	10	1-10

Demographics

Scale of measurement

(1) Age in years	Interval
(2) Gender	Nominal
(3) Number of College Credits Completed	Interval
(4) Major of Study	Nominal
(5) High School GPA (0 - 4.0)	Interval
(6) Present GPA (0 – 4.0)	Interval
(7) Highest level of Education by a Parent	Ordinal

[High School (1), GED (2), High School (3), Some College (4),
Undergraduate Degree (5), Graduate Degree (6)]

Note. Each factor of the 16PF will be converted into a scaled ten (STEN) score before analysis.

A guideline that is often used to establish a desired level of power is setting the probability of a Type II Error at four times the rate of making a Type I Error. This study will use a .05 alpha level. Beta would then be set at four times that or .20. The power estimate is found by subtracting Beta from 1, which gives us .80. Having established .80 as the Power estimate, the necessary sample size to achieve this power level can be estimated. With an expected effect labeled “medium” in a three-group study, 30 participants in each group should be sufficient to determine if significant differences at .01 or .05 exist (Cohen, 1977).

Data Analysis

This study has been designed to describe and compare three groups of participants using the dependent variables of (a) self-perceived problem solving, (b) personality factors, and (c) demographic factors. These variables were analyzed using a version of multivariate analysis (MANOVA). Three sets of MANOVA analyses examine the potential differences ($p < .05$ and $p < .01$) among the three groups (at-risk of alcohol related problems, at-risk of academic failure, and non-at-risk) on sets of dependent measures.

Using three sets of dependent variables and their corresponding MANOVAs will assert that the multivariate assumption of ‘homogeneity of variances’ will be satisfied. By grouping the dependent variables into global, specific, and demographic groups they will be freer to vary independently of one another. MANOVA (Set 1) includes the global dependent variables (a) Problem Solving Inventory Total Score and (b) the five global factors from the 16PF. MANOVA (Set 2) includes the specific dependent variables, (a) the three sub-scales from the PSI and (b) the 16 specific personality factors from the

16PF. MANOVA (Set 3) includes the dependent variables associated with the demographic information. The break down of each MANOVA Set and its subsequent analyses are described in detail below.

MANOVA (Set 1) used the PSI Total and the five 16 PF Global Factors as dependent measures. If a significant overall F value is obtained, the component F tests (one-way analyses of variance) will identify the significant contributors to the overall F . To identify particular group differences for a given significant finding (significant F value), multiple comparisons among groups were computed using the Tukey Test. For example, if (a) the overall MANOVA (Set 1) yielded a significant F value and (b) Problem Solving Inventory Total yielded a significant F value as a component of the MANOVA (Set 1), then (c) the Tukey Test would reveal whether differences in Problem Solving Inventory Total existed between Group 1 verses Group 2, Group 1 verses Group 3, and/or Group 2 verses Group 3.

The second MANOVA (Set 2) used the three scales from the Problem Solving Inventory (Problem-Solving Confidence, Approach-Avoidance Style, and Personal Control) and the 16 specific factors from the 16PF (Warmth, Reasoning, etc., listed previously in Table 6) as dependent measures. If a significant overall F value is obtained, the component F tests (one-way analyses of variance) will identify the significant contributors to the overall F . To identify particular group differences for a given significant finding (significant F value), multiple comparisons among groups were computed using the Tukey Test. For example, if (a) the overall MANOVA (Set 2) yielded a significant F value and (b) Problem Solving Confidence yielded a significant F value as a component of the MANOVA (Set 2), then (c) the Tukey Test would reveal whether

differences in Problem Solving Confidence existed between Group 1 verses Group 2, Group 1 verses Group 3, and/or Group 2 verses Group 3.

The third MANOVA (Set 3) used the Demographic variables (age, gender, number of college credits completed, high school GPA, present GPA, ethnicity, and parent's highest level of education) as dependent measures. Gender is a nominal variable but it has been coded as 1 or 2 (dummy coded) for this analysis. If a significant overall F value is obtained, the component F tests (one-way analyses of variance) will identify the significant contributors to the overall F . To identify particular group differences for a given significant finding (significant F value), multiple comparisons among groups will be computed by the Tukey Test. For example, if (a) the overall MANOVA (Set 3) yielded a significant F value and (b) age yielded a significant F value as a component of the MANOVA (Set 3), then (c) the Tukey Test would reveal whether differences in age existed between Group 1 verses Group 2, Group 1 verses Group 3, and/or Group 2 verses Group 3.

Accordingly, these analyses have been used to determine the relevance of the results of this investigation in relation to the research questions and hypotheses to follow.

Research hypotheses regarding the problem solving inventory:

Research hypothesis #1 that both at-risk groups will score higher on Problem Solving Total Score than the non-at-risk (low scores indicate positive appraisal of problem solving abilities) will be answered by the MANOVA (Set 1) and the subsequent component analysis.

Research hypotheses #2, #3, #4 that both at-risk groups will score higher on (a) Approach-Avoidant Style (high scores indicate an avoidant style of problem solving), (b)

Problem Solving Confidence (low scores indicate trust and belief in problem solving confidence), and (c) Personal Control Factor (low scores indicate belief in ones control of behavior and emotions while solving problems) than the non-at-risk group will be answered by the MANOVA (Set 2) and the subsequent component analysis.

Research hypothesis regarding the 16PF

Research hypotheses #5 & #6 that both at-risk groups will score lower on the global personality factor of Self-Control and that the at-risk of alcohol related problems group will score higher on the global personality factors of Anxiety and Extraversion than the non-at-risk group will be answered by the MANOVA (Set 1) and subsequent component analysis.

Research hypotheses #7 and #8 that both at-risk groups will score lower on the specific personality factor Rule-Consciousness (G), than the non-at-risk group will be answered by the MANOVA (Set 2) and subsequent component analysis.

The research hypotheses that the at-risk of alcohol related problems group will score lower on the specific personality factors Apprehension (O), and Perfectionism (Q3), and higher on the specific personality factor Openness to Change (Q1), than the non-at-risk group will be answered by the MANOVA (Set 2) and subsequent component analysis.

Research question #1 of whether or not there are any personality or problem solving differences between the three groups will be answered by MANOVA (Set 1 and Set 2) and subsequent component analysis. Research question #2 of whether or not there are any differences between the demographics of the three groups will be answered by the MANOVA (Set 3) and subsequent component analysis.

Chapter 4

Results

This chapter will describe in detail the results of the study. The test statistics that were used will be reviewed first. Each MANOVA (Multivariate Analysis of Variance) Set utilized will be described and each hypothesis that corresponds to it will follow. Tables have been included in this section to highlight the details about each group's scores on each of the dependent variables. There is a brief summary at the end, which focuses on the significant findings of the results.

The dependent variables were separated into three sets (global, specific, and demographic) to reduce the number of variables compared in each analysis. These three sets of variables were examined across the three groups (at-risk of alcohol related problems, at-risk of academic failure, and never at-risk control) of subjects. A MANOVA was used to check for overall multivariate significance, and the Tukey procedure was used to compare each at-risk group with the non-at-risk group to check for differences on each of the specific dependent variables.

MANOVA's are used when a researcher would like to compare two or more groups of subjects on several dependent variables simultaneously. The most widely known multivariate test statistic is called the Wilks' Lambda (Stevens, 1996). It is used to identify significant differences among the groups of subjects being compared in the same manner that the F statistic is used in univariate analysis. Once multivariate significance is found, then a more specific test statistic like the Tukey procedure can be used. The Tukey procedure enables one to examine all pairwise group differences on a variable with the experimentwise error rate held in check (Stevens, 1996).

The results of each MANOVA set will be reviewed independently within this section. For each MANOVA set the assumption of homogeneity of variance was satisfied using the Box Test of Equality of Covariance Matrices. When the Box Test is not significant, the null hypothesis that the observed covariance matrices of the dependent variables are equal across groups is rejected. The Wilks' Lambda test statistic was used with each MANOVA set to determine if there was overall multivariate significance. If multivariate significance was established, then the Tukey procedure was used to determine any particular differences among the groups on the dependent variables. The hypotheses that coincide with each MANOVA set have been commented on following these findings. All the results have been integrated into a discussion in the next chapter.

MANOVA Set 1

MANOVA Set 1 includes the global dependent variables (a) Problem Solving Inventory Total Score and (b) the five global factors from the 16PF (Extraversion, Anxiety, Tough-mindedness, Independence, and Self-control). Multivariate significance was established for MANOVA Set 1 using the Wilks' Lambda test statistic, $F(12,254)=1.95$, $p<.029$. The Tukey procedure identified significant differences on the dependent measure of Problem Solving Inventory Total Score between the at-risk of academic failure group and the non-at-risk control group, $p=.003$ (see Table 7). None of the five global factors were found to be significantly different between the groups.

Hypothesis 1 states that both at-risk groups will score higher on Problem Solving Total Score than the non-at-risk group (low scores indicate positive appraisal of problem solving abilities). MANOVA Set 1 and the corresponding Tukey procedure identified that the at-risk of academic failure group ($M=96.29$) scored significantly higher than the non-

Table 7

Descriptive Statistics for MANOVA Set 1:

Factor	F<	Group	Mean	Std. Deviation	N
PSI Total	.004	Non-at-risk	84.79	18.16	52
		Alcohol-risk	87.29	15.55	31
		Academic-risk*	96.29	19.18	52
		Total	89.79	18.63	135
Extraversion	.057	Non-at-risk	68.71	15.35	52
		Alcohol-risk	59.97	17.89	31
		Academic-risk	63.17	14.37	52
		Total	89.79	18.63	135
Anxiety	.411	Non-at-risk	59.35	18.67	52
		Alcohol-risk	56.77	20.62	31
		Academic-risk	62.44	18.67	52
		Total	59.95	19.12	135
Tough-minded	.338	Non-at-risk	51.48	20.84	52
		Alcohol-risk	56.97	19.67	31
		Academic-risk	55.98	16.00	52
		Total	54.47	18.85	135
Independence	.936	Non-at-risk	63.00	18.39	52
		Alcohol-risk	62.48	18.23	31
		Academic-risk	61.61	21.46	52
		Total	62.35	19.46	135

Descriptive Statistics for MANOVA Set 1 Continued:

Factor	F<	Group	Mean	Std. Deviation	N
Self-control	.224	Non-at-risk	42.61	18.19	52
		Alcohol-risk	38.74	13.96	31
		Academic-risk	37.67	12.58	52
		Total	39.75	15.33	135

Note. * Tukey procedure identified statistical difference from non-at-risk group, $p < .05$ *

at-risk group ($M=84.79$), $p=.003$. This supports part of hypothesis 1. The at-risk of alcohol related problem group ($M=87.29$) also scored higher than the non-at-risk group, however a significant difference was not established, $p=.071$ (see Table 7). Both at-risk groups therefore did score higher on the Problem Solving Total Score, which supports hypothesis 1. However, only the academically-at-risk group was significantly different than the non-at-risk.

Hypothesis 5 states that the at-risk groups will score lower on the global personality factor Self-Control than the non-at-risk group. No significant difference was found among the groups regarding Self-Control by using MANOVA Set 1 and the corresponding Tukey procedure. However, both the academically-at-risk ($M=37.67$), $p=.225$, and the at-risk of alcohol related problem ($M=38.42$), $p=.447$, groups' mean scores are lower than the non-at-risk control ($M=42.61$) group. This shows support for hypothesis 5, however no significant difference was established.

Hypothesis 6 states that the at-risk groups will score higher on the global personality factors of Anxiety and Extraversion than the non-at-risk group. No significant difference was found among the groups regarding Anxiety and Extraversion by using MANOVA Set 1 and the corresponding Tukey Procedure (see Table 7 for mean scores), which rejects hypothesis 6.

MANOVA Set 2

MANOVA Set 2 includes the three scales from the Problem Solving Inventory (Problem Solving Confidence, Approach-Avoidance Style, and Personal Control) and the 16 specific factors of the 16PF (Warmth, Reasoning, etc., listed in Table 6) as dependent

measures. Multivariate significance was established for MANOVA Set 2 using the Wilks' Lambda test statistic, $F(38,228)=2.27$, $p<.001$. The Tukey procedure identified significant differences on the following dependent measures and corresponding groups: Problem Solving Confidence between academically-at-risk and the non-at-risk groups, $p=.015$; Approach-Avoidance between academically-at-risk and the non-at-risk groups, $p=.021$; Warmth between at-risk of alcohol related problems and the non-at-risk groups, $p=.038$; Reasoning between academically-at-risk and the non-at-risk groups, $p=.008$, and between academically-at-risk and the at-risk of alcohol related problems groups, $p=.005$; Emotional Stability between academically-at-risk and the non-at-risk groups, $p=.012$; Sensitivity between at-risk of alcohol related problems and the non-at-risk groups, $p=.008$; Abstractedness between academically-at-risk and the non-at-risk groups, $p=.005$ (see Table 8, for mean scores).

Hypothesis 2 states that both at-risk groups will score higher on the Approach-Avoidance Style than the non-at-risk group (high scores indicate an avoidant style of problem solving). MANOVA Set 2 and the corresponding Tukey procedure identified that the at-risk of academic failure group scored significantly higher ($M=50.19$) than the non-at-risk group ($M=44.44$), $p=.021$. This supports part of hypothesis 2. The at-risk of alcohol related problems group ($M=45.80$) also scored higher than the non-at-risk group, however a significant difference was not established, $p=.848$. Both at-risk groups therefore did score higher on the Approach-Avoidance Style, which supports hypothesis 2. However, only the academically-at-risk group was significantly different than the non-at-risk.

Table 8

Descriptive Statistics for MANOVA Set 2:

Factor	F<	Group	Mean	Std. Deviation	N
Confidence	.013	Non-at-risk	23.77	5.73	52
		Alcohol-risk	24.06	6.89	31
		Academic-risk*	27.54	7.91	52
		Total	25.29	7.08	135
Approach-Avoidance	.025	Non-at-risk	44.44	11.99	52
		Alcohol-risk	45.81	8.87	31
		Academic-risk*	50.19	11.03	52
		Total	46.97	11.20	135
Personal Control	.113	Non-at-risk	16.58	4.97	52
		Alcohol-risk	17.52	4.81	31
		Academic-risk	18.56	4.64	52
		Total	17.53	4.85	135
Warmth	.033	Non-at-risk	6.06	1.81	52
		Alcohol-risk*	5.10	1.74	31
		Academic-risk	5.38	1.65	52
		Total	5.58	1.76	135
Reasoning	.002	Non-at-risk	6.06	1.83	52
		Alcohol-risk	6.26	1.48	31
		Academic-risk*	5.11	1.46	52
		Total	5.74	1.68	135

Descriptive Statistics for MANOVA Set 2 Continued:

Factor	F<	Group	Mean	Std. Deviation	N
Emotional Stability	.017	Non-at-risk	5.90	1.84	52
		Alcohol-risk	5.55	2.19	31
		Academic-risk*	4.81	1.91	52
		Total	5.40	2.00	135
Dominance	.863	Non-at-risk	5.92	1.99	52
		Alcohol-risk	5.68	2.29	31
		Academic-risk	5.92	2.37	52
		Total	5.87	2.19	135
Liveliness	.792	Non-at-risk	7.17	1.58	52
		Alcohol-risk	7.00	1.26	31
		Academic-risk	7.21	1.29	52
		Total	7.15	1.40	135
Rule-Consciousness	.263	Non-at-risk	4.50	1.96	52
		Alcohol-risk	3.87	1.63	31
		Academic-risk	4.19	1.46	52
		Total	4.24	1.71	135
Social Boldness	.552	Non-at-risk	6.40	1.55	52
		Alcohol-risk	6.29	1.85	31
		Academic-risk	6.04	1.84	52
		Total	6.24	1.73	135

Descriptive Statistics for MANOVA Set 2 Continued:

Factor	F<	Group	Mean	Std. Deviation	N
Sensitivity	.008	Non-at-risk	5.71	2.17	52
		Alcohol-risk*	4.35	2.11	31
		Academic-risk	4.81	1.78	52
		Total	5.05	2.07	135
Vigilance	.416	Non-at-risk	6.73	1.73	52
		Alcohol-risk	6.97	1.74	31
		Academic-risk	7.17	1.64	52
		Total	6.96	1.70	135
Abstractedness	.009	Non-at-risk	5.90	2.08	52
		Alcohol-risk	6.55	1.91	31
		Academic-risk*	7.00	1.34	52
		Total	6.47	1.84	135
Privateness	.172	Non-at-risk	4.88	2.08	52
		Alcohol-risk	5.68	1.89	31
		Academic-risk	5.25	1.59	52
		Total	5.21	1.87	135
Apprehension	.073	Non-at-risk	5.75	2.01	52
		Alcohol-risk	4.81	1.78	31
		Academic-risk	5.46	1.60	52
		Total	5.42	1.83	135

Descriptive Statistics for MANOVA Set 2 Continued:

Factor	F<	Group	Mean	Std. Deviation	N
Openness to Change	.307	Non-at-risk	5.60	1.98	52
		Alcohol-risk	5.87	1.73	31
		Academic-risk	5.25	1.70	52
		Total	5.53	1.82	135
Self-Reliance	.137	Non-at-risk	4.56	1.50	52
		Alcohol-risk	5.29	2.15	31
		Academic-risk	4.98	1.47	52
		Total	4.89	1.67	135
Perfectionism	.976	Non-at-risk	4.65	1.86	52
		Alcohol-risk	4.61	1.91	31
		Academic-risk	4.58	1.66	52
		Total	4.61	1.78	135
Tension	.521	Non-at-risk	5.94	1.66	52
		Alcohol-risk	5.71	1.66	31
		Academic-risk	5.58	1.61	52
		Total	5.75	1.64	135

Note. * Tukey procedure identified statistical difference from non-at-risk group, $p < .05$

Hypothesis 3 states that both at-risk groups will score higher on Problem Solving Confidence than the non-at-risk group (low scores indicate trust and belief in problem solving confidence). MANOVA Set 2 and the corresponding Tukey procedure identified that the at-risk of academic failure group scored significantly higher ($M=27.54$) than the non-at-risk group ($M=23.77$), $p=.015$. This supports part of hypothesis 3. The at-risk of alcohol related problem group ($M=24.06$) also scored higher than the non-at-risk group, however a significant difference was not established, $p=.981$. Both at-risk groups therefore did score higher on the Problem Solving Confidence, which supports hypothesis 3. However, only the academically-at-risk group was significantly different than the non-at-risk.

Hypothesis 4 states that both at-risk groups will score higher on Personal Control than the non-at-risk group (low scores indicate belief in one's control of behavior and emotions while solving problems). No significant difference was found among the groups regarding the Personal Control Factor by using MANOVA Set 2 and the corresponding Tukey procedure. However, both the academically-at-risk ($M=18.56$), $p=.090$, and the at-risk of alcohol related problems ($M=17.42$), $p=.720$, groups' mean scores are higher than the non-at-risk control ($M=16.58$) group. This shows some support for hypothesis 4. However, no significant difference was established.

Hypothesis 7 states that the at-risk groups will score lower on the specific personality factor Rule-Consciousness, than the non-at-risk group. No significant difference was found among the groups regarding the specific personality factor Rule-Consciousness by using MANOVA Set 2 and the corresponding Tukey procedure. However, both the academically-at-risk ($M=4.19$), $p=.628$, and the at-risk of alcohol

related problem ($M=3.87$), $p=.235$, groups' mean scores are lower than the non-at-risk control ($M=4.5$) group. This shows some support for hypothesis 7. However, no significant difference was established.

Hypothesis 8 states that the at-risk groups will score lower on the specific personality factors Apprehension, and Perfectionism, and higher on the specific personality factor Openness to Change, than the non-at-risk group. No significant difference was found among the groups regarding the specific personality factors Apprehension, Perfectionism, or Openness to Change by using MANOVA Set 2 and the corresponding Tukey Procedure (see Table 8, for mean scores). However, in regards to the specific personality factor Apprehension, both the academically-at-risk ($M=5.46$), $p=.695$, and the at-risk of alcohol related problem ($M=4.81$), $p=.056$, groups' mean scores are lower than the non-at-risk control ($M=5.75$) group. This shows some support for hypothesis 8. However, no significant difference was established.

Research question #9 asks, are there differences in any personality factors between each of the three groups of subjects? MANOVA Set 2 and the corresponding Tukey procedure were used to identify the differences in specific personality factors in a pairwise fashion across the three groups. Beyond the specific personality factors already mentioned in the above hypotheses: Warmth, Reasoning, Emotional Stability, Sensitivity, and Abstractedness were all found to have some significant difference among the three groups. Regarding the personality factor Warmth, the non-at-risk group scores ($M=6.06$) are significantly higher than the at-risk of alcohol related problems group scores ($M=5.10$), $p=.038$. Regarding the personality factor Reasoning, the non-at-risk group scores ($M=6.06$) are significantly higher than the at-risk of academic failure group scores

($M=5.11$), $p=.008$, and the at-risk of alcohol related problems group scores ($M=6.26$) are significantly higher than the at-risk of academic failure group scores ($M=5.11$), $p=.005$. Regarding the personality factor Emotional Stability, the non-at-risk group scores ($M=5.90$) are significantly higher than the at-risk of academic failure group scores ($M=4.81$), $p=.012$. Regarding the personality factor Sensitivity, the non-at-risk group scores ($M=5.71$) are significantly higher than the at-risk of alcohol related problems group scores ($M=4.35$), $p=.008$. Regarding the personality factor Abstractedness, the at-risk of academic failure group scores ($M=7.00$) are significantly higher than the non-at-risk group scores ($M=5.90$), $p=.005$. The relevance of these differences will be elaborated on in the discussion chapter.

MANOVA Set 3

MANOVA Set 3 includes the demographic variables (age, gender, number of college credits completed, high school GPA, present GPA, and parent's highest education level) as dependent measures. The results of these demographic comparisons can best be illustrated in table form, therefore please refer to Table 9 for the results from this MANOVA Set. A description of the demographics of the groups used has been given in Chapter 3. The differences that were found regarding research question #10 are described below.

Research question #10 asks, are there differences in demographic characteristics between each of the three groups of subjects? As expected some of the differences between the groups are in regards to the selection criteria for group inclusion. Both at-risk groups have significantly lower grade point averages than the non-at-risk groups. The academically at-risk group is required to be below a 2.0, but the at-risk of alcohol

Table 9

Descriptive Statistics for MANOVA Set 3:

Factor	F<	Group	Mean	Std. Deviation	N
Age	.090	Non-at-risk	19.07	2.31	45
		Alcohol-risk	19.03	.89	30
		Academic-risk	18.45	.61	51
		Total	18.81	1.52	126
Sex	.007	Non-at-risk	.67	.48	45
		Alcohol-risk	.30	.47	30
		Academic-risk	.51	.50	51
		Total	.52	.50	126
Credits	.001	Non-at-risk	27.82	22.40	45
		Alcohol-risk	30.53	22.93	30
		Academic-risk*	12.33	4.02	51
		Total	22.20	19.31	126
GPA	.001	Non-at-risk	3.05	.64	45
		Alcohol-risk*	2.74	.40	30
		Academic-risk*	1.35	.48	51
		Total	2.29	.94	126
HSGPA	.009	Non-at-risk	3.33	.63	45
		Alcohol-risk*	2.93	.64	30
		Academic-risk	3.10	.46	51
		Total	3.13	.59	126

Descriptive Statistics for MANOVA Set 3 Continued:

Factor	F<	Group	Mean	Std. Deviation	N
Parent ED	.534	Non-at-risk	4.87	1.22	45
		Alcohol-risk	5.07	1.17	30
		Academic-risk	4.74	1.31	51
		Total	4.86	1.24	126

Note. * Tukey procedure identified statistical difference from non-at-risk group, $p < .05$

related problems group did not have to meet this criteria. One may conclude that this difference is more related to how this group is struggling in additional areas other than just alcohol related problems. As stated earlier, 14 participants met criteria for both academically at-risk and at-risk of alcohol related problems. These overlapping students were eliminated from the study.

There is a difference in the gender between the groups. A Chi-Square analysis was conducted to examine whether or not there is a significant difference between the three groups of subjects on gender. The results indicated a significant difference with 2 degrees of freedom, Chi square = 8.56 ($p < .025$). Therefore, one should keep in mind that the differences in gender between the groups may have some effect on the results. In particular, a greater number of females than males were involved in the study than expected with the cell contributing the greatest variance being females that are non-at-risk.

The only other demographic differences worth noting are that: the academically at-risk group had a significantly lower number of credit hours, and the at-risk of alcohol related problems groups had a significantly lower high school grade point average than the non-at-risk group (see Table 9). These differences can be viewed in a number of ways. The academically at-risk group may have done so poorly their first semester in school that they withdrew or dropped classes from their schedules. They also may have not participated in high school classes, which allowed for credits to transfer to college. However, these reasons are speculative and one might consider future studies ask questions to help clarify these differences. The differences in high school grade point averages should also be interpreted with caution. The demographic questionnaire (see

Appendix C) did not specify using a 4 or 5 point scale, and therefore some of the reported scores may not be on the same scale. Parents' education level was not statistically different between any of the three groups sampled.

Summary

A number of the hypotheses are supported with statistical significance and some are directionally supported, but without significance. The first three hypotheses were supported with significant differences between the non-at-risk group and the academically at-risk group. The at-risk of alcohol related problems group had mean differences in the same hypothesized direction, but they did not meet significance. None of the remaining hypotheses reached statistical significance, although the directions of the hypothesized differences were correct for all but 2 of the 8 specific hypotheses. In addition, research question 9 led to the finding that there were some personality factors that were found to be significantly different between the at-risk groups and the non-at-risk group.

The academically-at-risk group was found to have a significantly different self-perception of their problem solving abilities in relation to the non-at-risk group. They perceived their overall problem solving abilities to be less effective than the non-at-risk group. They had a more avoidant style of approaching problems and less trust and belief in their problem solving confidence than the non-at-risk group. The at-risk of alcohol related problem group also perceived the above stated problem solving factors in the same negative direction, however these differences did not meet statistical significance. The differences in the perception of problem solving abilities support the notion that problem solving training should be a required part of interventions with the at-risk

groups. Further discussion of the above mentioned results are in the discussion chapter that follows.

Some statistically different personality factors were found between the at-risk groups and the non-at-risk. There were statistically significant differences between the standardized scores of the academically-at-risk and the non-at-risk group on three specific personality factors (a) Reasoning, (b) Emotional Stability, and (c) Abstractedness. There were also significant differences between the standardized scores of the at-risk of alcohol related problems group and the non-at-risk group on two specific personality factors (a) Warmth and (b) Sensitivity. These differences do not coincide with any of the hypotheses made regarding the 16PF, but they do have implications for working with each group. Further discussion and integration of past research in this area will follow in the next chapter.

Chapter 5

Discussion

Over the past two decades colleges and universities have attempted to make higher education more accessible to diverse groups, although the pool of academically prepared freshman has decreased (American Council on Education, 1989; in Thombs, 1995). Many institutions are admitting students who are academically ill-prepared and lack the self-regulatory skills necessary for adjustment to campus life (Solomon & Rothblum, 1984; Tabolt, 1990; Thombs, 1995). These adjustment difficulties are often seen in students failing or withdrawing from courses, abusing alcohol and related problems, violation of campus policies or community laws, depression, loneliness, and dropping out or transferring to another school (Thombs, 1995). It has been calculated that 4 out of every 10 students who enroll in 4-year colleges and universities leave without earning a degree (Tinto, 1993). As many as one fourth of undergraduate students are placed on academic probation at one or more times during their college years (Garnet, 1990). When considering institutions with over 15,000 students, 47.6% of counseling center directors reported concerns about alcohol problems being on the increase over the past five years (Gallagher, 2001). Students entering college appear to be more at-risk than in previous years, and something must be done to help this situation. This study has found evidence from surveying university students that are at-risk and university students that are not at-risk, that supports past research, implicates new areas of research, and gives clarity to a direction for intervention.

Students at-risk of academic failure and students at-risk of alcohol related problems were compared to a non-at-risk group on the Problem Solving Inventory and

the 16PF. It appears that at-risk students may not have the problem solving skills that non-at-risk students have. In addition, at-risk students appear to have some particular personality characteristics that are different from their non-at-risk peers. The implications of these findings can be utilized not only to help those students already at-risk, but they can be used to help other students from ever becoming at-risk.

The following discussion has been divided into sections for easier reading. The first section looks at the results from the Problem Solving Inventory, and the second section looks at the results from the 16PF. A section on the limitations of the study follows, and the discussion ends with a brief look at some areas for future research.

The Problem Solving Inventory

This study provides descriptive evidence that supports the hypothesis that students at-risk of academic failure perceive their problem solving abilities less positively than do non-at-risk students with statistical significance. The students at-risk of alcohol related problems also appear to perceive their problem solving abilities less positively than do non-at-risk students, however, these differences were approaching significance. Since this is an initial investigation, the statistical results were deemed close enough to include in the discussion. This less positive perception of problem solving skills was demonstrated using the Problem Solving Inventory (PSI) Total Score and its three constructs: Problem-Solving Confidence (PSC), Approach-Avoidance Style (AA), and Personal Control (PC). The PSI Total Score represents a measure of a person's overall perception of their problem solving abilities. Heppner (1988) defines the constructs as follows: PSC is a self-assurance in problem solving activities; AA is a general tendency of an individual to approach or avoid problem-solving activities; and PC indicates the extent to which the

individual believes they are in control of their emotions and behavior while solving problems. Statistically significant differences were found between the academically-at-risk group and the non-at-risk group on PSI Total Score, and the constructs AA and PSC. In addition, non-significant differences were found between both the at-risk groups and the non-at-risk group across the PSI Total Score and all the PSI constructs in the directions hypothesized.

The non-at-risk students' general belief in their problem solving abilities was more positive than both at-risk groups. The non-at-risk students believe and trust in their problem solving abilities more than both at-risk groups. The non-at-risk students are more likely to approach problem-solving activities than the at-risk groups. And the non-at-risk students believe more in their abilities to control their emotion and behavior while solving problems. These findings support past research, identify target areas for treatment, and help to clarify one reason for past treatment efficacies of at-risk groups.

When considering the development of new interventions one might want to keep in mind that the Problem Solving Inventory is a measure of self-perceived problem solving ability. Although it has been shown through independent studies to be a valid measure of problem solving ability, one's perception does not always coincide with one's performance. Working towards helping at-risk students more specifically with their perception of their skills, in addition to the building and development of these skills, would be suggested. The following two sections will detail the implications on each at-risk group while referencing past related research.

Academically-at-risk.

The relationship found in this study between academic achievement and problem solving appraisal confirms past research hypotheses and alludes to future areas of treatment. Elliot et al. (1990) hypothesized that “a relation may exist between problem solving appraisal and academic achievement.” The results from this study provide some support by showing that students academically-at-risk (GPA below 2.0) do perceive their problem solving abilities as less positive than students non-at-risk. This information supports the use of a problem solving training component in the prevention and remediation of academically-at-risk students.

A number of researchers have already utilized problem solving as a component in their successful treatment protocols for working with academically-at-risk students (Newton, 1990; Coleman & Freedman, 1996). However, these researchers were unable to distinguish what part or phase of their treatment was mediating the success of the participants. This study provides support that one difference between students that have never been academically-at-risk and students that are academically-at-risk is their problem solving appraisal. It would therefore be beneficial to continue to assist and train at-risk students in problem solving skills. It may also be beneficial to assess the efficacy of training academically-at-risk students on problem solving alone. One might even consider using problem solving training as a freshman seminar topic to prevent students from becoming at-risk. Heppner & Baker (1997) suggest the PSI may be helpful in identifying students at-risk of academic failure. This research supports this hypothesis and extends this suggestion to new areas of intervention. It may be beneficial and more

proactive for high school counselors to use a problem solving assessment to check a student's possible risk of academic failure, before entry into the college environment.

At-risk of alcohol related problems.

The low self-appraisal of problem solving ability that accompanies the students' at-risk of alcohol related problems in this study continues to shed light on a relationship between problem solving and alcohol use. Larson & Heppner (1989) found that inpatient male alcoholics reported their problem solving as more similar to late adolescents than to adults whom they more closely resemble in age. Godshall & Elliot (1997) found a correlation between ineffective problem solving skills and a greater alcohol intake over a two-week period. As hypothesized in this study, the students at-risk of alcohol related problems perceived their problem solving abilities as less positive than non-at-risk students. Although these three studies differ in significant ways, they all shed light on a relationship between alcohol and problem solving. This can be interpreted in a number of ways, but the descriptive results of this study indicates that students at-risk of alcohol related problems do not believe a great deal in their ability to problem solve. One might hypothesize that training these students in problem solving skills would be beneficial. One might also hypothesize that students who believe they can effectively deal with problems would be less likely to use alcohol to avoid their problems. Continued investigation of the problem solving abilities of students at-risk of alcohol related problems as well as the effectiveness of training these students in problem solving techniques appears to be warranted.

The 16PF

The ability to understand groups of students in regard to their personality constructs is a technical challenge. Attempts to describe or classify any group of individuals as all having some distinguishing personality trait is inherently limiting. Given there are numerous ways of interpreting the data; it is best to view these results with some degree of flexibility. One may look at the group results in relation to the norms for each personality factor or one may compare each group's personality scores against each other with the use of the group's mean standardized (STEN) scores. In an effort to best understand the differences between the at-risk groups and the non-at-risk group this study will describe the significant differences between each group's mean standardized (STEN) scores.

A difference that is considered statistically significant between two group's standardized (STEN) scores was designated by the use of the Tukey procedure, $p < .05$. Multivariate Significance was found using Wilks' Lambda for the two MANOVA sets used in the analysis of the personality factors. Therefore, the Tukey procedure was used to allow for a more detailed comparison between each group on the standardized personality factor scores.

The 16PF provides five global factors and 16 specific personality factors. No statistically significant differences were found between the at-risk groups and the non-at-risk group on all five of the global factors (Extraversion, Anxiety, Tough-mindedness, Independence, and Self-Control). There were statistically significant differences between the standardized scores of the academically-at-risk and the non-at-risk group on three specific personality factors (a) Reasoning, (b) Emotional Stability, and (c)

Abstractedness. There were also significant differences between the standardized scores of the at-risk of alcohol related problems group and the non-at-risk group on two specific personality factors (a) Warmth and (b) Sensitivity. These differences do not coincide with any of the hypotheses made regarding the 16PF. However, the implications of these findings and the findings related to the hypotheses made are discussed briefly.

The global personality factors of the 16PF had mixed results in relation to the hypotheses. From examining past research, it was hypothesized that both at-risk groups will score lower in the global personality factor of Self-Control. White (1986) found that students on academic probation had lower self-control in general. A number of empirical investigations and a literature review found that populations similar to the alcohol at-risk group (individuals with problem drinking, campus alcohol policy violators) tended to have poor impulse control (Berkowitz & Perkins, 1986; Anchors & Dana, 1989; Griffin & Salter, 1993; Barrineau, 1997). The two at-risk groups in this study did produce lower mean scores on the 16PF factor of Self-Control than the non-at-risk group (see Table 2). However, these mean scores were not significantly different in regards to the Tukey procedure. The fact that the mean scores were lower is some indication that the at-risk groups do perceive themselves as more unrestrained than the non-at-risk group. This means that the at-risk group may find it difficult to retrain themselves in situations that call for self-control. They may therefore be perceived as more self-indulgent, disorganized, or irresponsible. The fact that the scores were not significantly different could be related to the fact that even the non-at-risk group has some doubt in their ability to control themselves. Considering the mean age for all participants was around 19, it seems appropriate that young college students would have some feelings of being more

self-indulgent, disorganized and irresponsible. Further research is needed to be certain Self Control is a concern with students at-risk of alcohol related problems. Some self-control dynamic however does appear to be indicated with students' at-risk of alcohol related problems.

The at-risk groups were hypothesized to have higher scores on the 16PF global factors of Anxiety and Extraversion than the non-at-risk group. Robyak & Downey (1979) found that underachievers directed their actions externally and that non-underachievers interacted with an introverted personality style. The results for this study however, did not indicate any trend or significant difference worth noting on these global personality factors. It may require a larger sample to identify these differences.

The specific personality factors that were hypothesized to be different were not. The at-risk groups were hypothesized to have lower scores on the 16PF personality factor of Rule-Consciousness than the non-at-risk group. This hypothesis follows the similar vein of research pertaining to Self-Control. Past research has found a non-conforming and impulsive component to both academically-at-risk and alcohol policy offending students (White, 1986; Berkowitz & Perkins, 1986; Anchors & Dana, 1989; Barrineau, 1997). The other hypothesized personality factors (Apprehension, Perfectionism, and Openness to Change) did not prove to be on target either. However there are a few other personality factors for which the significant differences are worth noting.

There are significant differences among some of the specific personality factors that were not previously hypothesized to be important. The factors that had significant differences are Warmth, Reasoning, Emotional Stability, Sensitivity, and Abstractedness. The at-risk of alcohol related problems group differed significantly from the non-at-risk

group on Warmth and Sensitivity. The academically-at-risk group differed significantly from the non-at-risk group on Reasoning, Emotional-Stability, and Abstractedness. These group differences may have implications for working with each group.

Considering the at-risk of alcohol problems groups scored significantly lower on both Warmth and Sensitivity than the non-at-risk, one might ask how does this help describe the group? A lower score on Warmth indicates that the at-risk of alcohol related problems group has a tendency to be more reserved socially and interpersonally (Russell & Karol, 1994). One might hypothesize from this finding that these socially reserved students are using alcohol to help feel more comfortable and socially accepted by their peers. Their use of alcohol however, may be causing problems in their lives. The at-risk group's lower scores on Sensitivity may indicate they tend to have a more utilitarian based focus on their judgments (Russell & Karol, 1994). This less sensitive and more operational view of things may indicate how this at-risk group is in some ways less in tune with their emotions. These results begin to form an impression that the at-risk of alcohol related problems group might indicate some deficit in their ability to cope with emotions or emotionally laden situations. Helping this at-risk group to process and understand their emotions may be useful information for counseling centers and alcohol treatment programs.

The academically at-risk group scored significantly lower on Reasoning and Emotional Stability and higher on Abstractedness, than the non-at-risk group. Russell & Karol (1994) indicate that there are correlations between Reasoning and Emotional Stability on the 16PF. Reasoning is described as a brief measure of intelligence that concerns the ability to solve problems using reasoning (Russell & Karol, 1994). This

corresponds with the finding that academically-at-risk students perceive their problem solving to also be lower than the non-at-risk. Emotional Stability concerns feelings about coping with day-to-day life and its challenges (Russell & Karol, 1994). The at-risk group therefore may tend to feel a certain lack of control in their life in comparison to a more adaptive and proactive approach taken by the non-at-risk. These two personality factors combined with the previous findings about total problem solving ability indicate a pattern of how this group may be impaired in their abilities to rationally work through problems with stability and confidence. The significantly higher score on Abstractedness implies the at-risk group is more oriented to internal mental processes and ideas rather than to practicalities (Russell & Karol, 1994). Using Russell & Karol's (1994) interpretation of this factor, one might say the more grounded non-at-risk group likely focuses on their senses, observable data, and the outer realities of their environment in forming their perceptions. They also report Abstracted individuals have been associated with people who are less self-controlled. This brings us back to the research on Self Control which has found a non-conforming and impulsive component to both academically-at-risk and alcohol policy offending students (White, 1986; Berkowitz & Perkins, 1986; Anchors & Dana, 1989; Barrineau, 1997). The indication that academically-at-risk students are then less reasonable, emotionally stable, and self controlled than their non-at-risk peers gives support for using interventions that strengthen these areas.

The differences between the findings for the academically-at-risk group and the at-risk of alcohol related problems group are directionally appropriate for all but one of the personality factors. Although significant differences were not found on the same factors for both at-risk groups, Warmth, Emotional Stability, Sensitivity, and

Abstractedness all had the same directional difference for the two groups in regards to their mean scores (see Table 8). The at-risk of alcohol related problem group however, scored slightly higher than the non-at-risk group and significantly higher than the academically at-risk group on Reasoning. One possible explanation for this difference may be related to this group's cognitive style. The at-risk of alcohol related problems group may have learned to defend their position on a more regular basis than the other two groups. There is some evidence that the Reasoning factor of the 16PF is related to cognitive style (Russell & Karol, 1994).

Summary

The findings of this study support a number of the hypotheses made, give support for some past research, highlight some of the needs of at-risk groups, and support new directions for research. We now know that there are differences in the way at-risk groups at West Virginia University perceive their problem solving abilities compared to non-at-risk students. It would therefore be important to investigate these findings with different university populations as well. It also seems logical to train at-risk students in effective problem solving techniques and test how they respond. The personality factors found to be significantly different is another area that needs more attention. Working to identify similarities in at-risk personalities at other universities will strengthen the association with personality types and at-risk groups. This can assist counselors, professors, resident advisors, and campus police to understand the best way to work with these groups. It appears that there may be some implication with the age of these at-risk students and their overall development as adults. The groups examined here are typically from the younger age group and this may indicate that some of the students (non-at-risk) are

maturer in regards to their personality development and problem solving ability. A clearer understanding of how this developmental piece fits in may be warranted. The number of at-risk students is on the increase. Knowing that at-risk groups may be less emotionally equipped to deal with the challenges of college life can help focus interventions and resources towards meeting these needs. The discrepancies in the hypothesized differences and those that were found indicates a need to do further testing of at-risk groups in larger numbers. The number of personality factors investigated in this study likely warrants a larger sample of students. The implications of this research are promising and the utilization of problem solving as an intervention for students at-risk is indicated. Now it is time to continue the research necessary to prove the benefits from training those at-risk in more effective problem solving techniques. In closing, additional limitations and suggestions for research are given.

Limitations of Study

There are a number of limitations that have already been identified above, however this section will review the limitations already mentioned and expand on any additional limitations worth noting. Some of the limitations are due to the nature of using self-report measures, and others have to do with the sample that was used. The nature of self-report measures leaves open the opportunity for the participants to respond dishonestly or randomly, despite the efforts that were made to control for this by using motivators (helping others at-risk) and incentives (raffle). The Problem Solving Inventory is a self-perceived method of evaluating an individuals problem solving; it may not actually represent each person's or group's actual problem solving ability. Although this measure has been estimated to be a good representation of problem solving ability, it still

does not actually measure problem solving ability. This sampling of students is from one Mid-eastern university campus, and therefore the ability of the results to be generalized to other student populations is limited. The demographics of the groups sampled do not have the same representation of the diversity as all Mid-eastern universities, which takes away from the generalizability of the study. The gender ratios of each group were different, and this may have affected the analysis. The students who were classified as at-risk of alcohol related problems may not be truly at-risk. Future studies might consider doing more extensive assessment of alcohol-related problems or alcohol dependence. The last limitation that was apparent is that a larger N may have produced a more accurate method of comparison for the large number of personality factors examined in MANOVA Set 2. Despite these limitations the results of this study have contributed useful descriptive evidence about two important at-risk groups.

Suggestions for Future Research

The limitations and the implications both lead to a number of suggestions for future research some of which have already been mentioned. When considering the generalizability of the study, it would be helpful to examine other universities to see if the at-risk students from different areas also indicate a lower perception of problem solving ability. It may also be useful to examine the problem solving ability of different cultures. The low number of minority students in this study does not offer the opportunity to examine possible cultural implications that may be effecting problem solving abilities. Future studies using a more culturally diverse group may be useful. Keeping the gender balanced for each group may also be helpful, especially when using a personality measure. The use of an objective problem solving measure may be helpful to allow a

more specific analysis of the type and method of problem solving that are utilized by the at-risk groups. It would be helpful to see what type and degree of problem solving skills new college students have when they enter a university. This would allow for a better picture of how freshman stand in their ability to problem solve. Testing at-risk groups success following a problem solving skills training intervention would help support the effectiveness of utilizing problem solving training for incoming students as a freshman seminar. An investigation of how problem solving skills develop across a student's college years would be useful to see if students pick up these problem solving skills while learning to manage the stressors associated with college life. Testing the problem solving abilities of other struggling populations such as students with mental disorders, learning disabilities, and drug abuse problems may also indicate a new area for intervention. University counseling centers can study the problem solving abilities of various mental health populations to see if deficits in problem solving are effecting their ability to cope with college life. Academic success programs could also test their participants and utilize this information to support their implementation of a problem solving training component to their interventions. Continuing to understand and distinguish what factors differentiate at-risk students from non-at-risk students will allow us to know how to best help this struggling population.

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Appendix A

Subject Recruitment Sign-Up

Problem Solving and Personality Factors of Two At-Risk College Student Populations

Study # _____

NOTE: All participants must have Grade Point Average above 2.0 (and never dropped below 2.0) and all participants must have no record of alcohol related problems (i.e., never been in trouble for drinking or activities related to drinking).

By writing your name in a time slot below, you are saying that you will show up at the location indicated. Treat this as an appointment, and remember that someone will be there waiting for you – Please be considerate of their time and you must BE ON TIME to participate. Call Cory Clark at 293-2000 ext. 821 if you can not make your appointment. Thank You.

Approximate time to complete study is 45 – 75 minutes.

Location and Time of 2 Study Sessions:

#1 Thursday February 8th at 11:30 A.M. in Room 302 of Ogelbay

#2 Thursday February 8th at 1:00 P.M. in Room 302 of Ogelbay

<u>Session Start Time</u>	<u>Name</u>	<u>Your Phone #</u>
1. _____	_____	_____
2. _____	_____	_____
3. _____	_____	_____
4. _____	_____	_____
5. _____	_____	_____
6. _____	_____	_____
7. _____	_____	_____
8. _____	_____	_____

Appendix B

CONSENT and INFORMATION FORM

Title: Problem Solving and Personality Factors of Two At-risk College Student Populations

Introduction: I, _____, have been invited to participate in this research study, which has been explained to me by Cory Clark. I have been informed that this research is being conducted to fulfill the requirements for Cory Clark's Doctoral Dissertation in the Department of Counseling Psychology at West Virginia. Cory Clark, MA, will conduct this research under the supervision of Roy Tunick, Ph.D.

Purpose of the Study: The purpose of this study is to better understand the problem solving and personality factors of academically at-risk and at-risk of alcohol related problems groups as well as a comparison group of non at-risk students.

Description of Procedures: This study involves completing two questionnaires and a demographics sheet during the offered time period. This will take approximately 60 minutes to complete. Approximately 150 subjects will be entered into this study. I understand that I do not have to answer all the questions and that I may withdraw my participation at any time without penalty. I will have the opportunity to see the questionnaires before signing this consent form, and I can review all of the items before I decide if I want to participate. I give permission to the investigator to access my current grades and credits completed from the West Virginia University Academic Advising Office for the one time purpose of this study to identify whether I have ever been on academic probation.

Risks and Discomforts: There are no known or expected risks from participating in this study, except for the mild frustration associated with the completion of the questionnaires and the time involved.

Alternatives: I understand that I have the alternative not to participate in this study.

Financial Considerations: I understand that by participating and completing the 2 questionnaires and the demographics sheet I will be qualified to be entered into a raffle to win a \$20.00 gift certificate to the University Bookstore at the end of the data collection period. I understand that 15 of 150 participants will be randomly selected to receive the \$20.00 prize.

Participant's Initials

Date

Title: Problem Solving and Personality Factors of Two At-risk College Student

Populations

Benefits: I understand that this study is not expected to be of direct benefit to me, but the knowledge gained may be of benefit to others. If I am in an Introduction to Psychology class I am also eligible to receive two hours worth of extra credit, but I understand that there are other opportunities in which I may earn extra credit. I am aware these opportunities are listed on the Subject Recruitment Board near the main office in Oglebay Hall and that my instructor can offer even more opportunities.

Contact Person: For more information about this research, I can contact Cory Clark at (304) 293-3807, or his supervisor, Dr. Roy Tunick also at (304) 293-3807. For information regarding my rights as a research subject, I may contact the Executive Secretary of the Institutional Review Board for the Protection of Human Services Research at 293-7073.

Confidentiality: I understand that any information about me obtained as a result of my participation in this research will be kept as confidential as legally possible. I understand also that my research records, just like hospital records, may be subpoenaed by court order or may be inspected by federal regulatory authorities. In any publications that result from this research, neither my name nor any information from which I might be identified will be published without my consent.

Voluntary Participation: Participation in this study is voluntary. I understand that I am free to withdraw my consent to participate in this study at any time. Refusal to participate or withdrawal will involve no penalty or loss of benefits and will not affect my grades, class standing, or status on an athletic team. I have been given the opportunity to ask questions about the research, and I have received answers concerning areas I did not understand.

Upon signing this form, I will receive a copy.

I willingly consent to participate in this research.

_____	_____	_____
Signature of Subject	Date	Time
_____	_____	_____
Signature of Investigator	Date	Time

Appendix C

Demographics Sheet

Age: _____

ID # _____

Gender: Male or Female

Number of College Credits Completed: _____

Major of study: _____

Present GPA _____

High School GPA _____

Ethnicity: _____ Caucasian, (White)
 _____ African American, (Black)
 _____ Asian
 _____ Native American
 _____ Hispanic
 _____ Other

Parents Highest Level of Education: _____ 1) Less than High School,
(Select highest of either parent) _____ 2) General Education Diploma (GED),
 _____ 3) High School,
 _____ 4) Some College,
 _____ 5) Undergraduate Degree,
 _____ 6) Graduate Degree

Please Circle the Appropriate Answer:

Have you ever been on academic probation? Yes or No

Has your GPA ever fallen below a 2.0? Yes or No

Have you ever been referred for help or counseling due to any problems related to alcohol drinking? Yes or No

Have you ever been diagnosed with a learning disability or emotional disability?
Yes or No

Have you ever been enrolled at another university? Yes or No

If Yes, did you carry your credits over to West Virginia University? Yes or No