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# Evaluation of an alcohol expectancy typology : group differences in psychosocial functioning and developmental history in a treatment sample of adolescents

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FLORIDA INTERNATIONAL UNIVERSITY

Miami, Florida

EVALUATION OF AN ALCOHOL EXPECTANCY TYPOLOGY: GROUP  
DIFFERENCES IN PSYCHOSOCIAL FUNCTIONING AND DEVELOPMENTAL  
HISTORY IN A TREATMENT SAMPLE OF ADOLESCENTS

A thesis submitted in partial fulfillment of the

requirements for the degree of

MASTER OF SCIENCE

in

PSYCHOLOGY

by

Sabrina E. Des Rosiers

2006

To: Interim Dean Mark D. Szuchman  
College of Arts and Sciences

This thesis, written by Sabrina E. Des Rosiers, and entitled Evaluation of an Alcohol Expectancy Typology: Group Differences in Psychosocial Functioning and Developmental History in a Treatment Sample of Adolescents, having been approved in respect to style and intellectual content, is referred to you for judgment.

We have read this thesis and recommend that it be approved.

Marilyn Montgomery

Eric Wagner

Jonathan G. Tubman, Major Professor

Date of Defense: March 17, 2006

The thesis of Sabrina E. Des Rosiers is approved.

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Florida International University, 2006

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## ABSTRACT OF THE THESIS

# EVALUATION OF AN ALCOHOL EXPECTANCY TYPOLOGY: GROUP DIFFERENCES IN PSYCHOSOCIAL FUNCTIONING AND DEVELOPMENTAL HISTORY IN A TREATMENT SAMPLE OF ADOLESCENTS

by

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The goals of the present study were (a) to identify distinct and meaningful groups of adolescents on the basis of their self-reported alcohol expectancies and, (b) to document multivariate group differences between alcohol expectancy clusters and specific adjustment outcomes. Six distinct homogenous subgroups were identified via Cluster Analysis. Subsequent validation analyses involving between-cluster comparisons of psychosocial adjustment outcomes identified significant group differences. Clusters with stronger endorsement of positive alcohol expectancies were more likely to receive a lifetime diagnosis of conduct disorder, engage in negative social interactions, have higher ratings of perceived stress, and reckless behaviors. Between-cluster differences were also identified for age, school grade, family structure and ethnicity. The results of this study supported the merit of using a person-centered analytic strategy to describe heterogeneity in patterns of alcohol expectancies and their relations with specific adjustment outcomes among high-risk samples of adolescents.

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## CHAPTER 1

### Statement of the Problem

Alcohol and other drug (AOD) use is a serious public health issue that has been linked to adverse consequences in various populations, including adolescents. Consequently, understanding factors that place adolescents at risk for AOD-related problems is essential. This chapter first provides a historical overview to place in context the evolution of the study of consequences related to AOD use. Second, it presents a summary about the prevalence of AOD use among adolescents. Third, this chapter introduces a brief discussion regarding a conceptual model that has guided this research area. Lastly, the significance of the current study for the development of prevention and intervention programs targeting high-risk samples of adolescents is discussed.

#### *Historical Perspective*

Alcohol and other drug (AOD) use and related consequences have had profound impacts on society (SAMHSA, 2004). However, AOD use and misuse are not new phenomena. Early attempts to describe maladaptive drinking patterns were often moralistic in tone. For many centuries, alcohol use and related problems were perceived as reflecting character defects or moral weaknesses that were subjects of religious concern and social action. In the late 19th century, Dr. Benjamin Rush published an article in which he revolutionized notions of alcohol-related behaviors by stating that maladaptive patterns of drinking or alcoholism were a disease (Blum, 1991). Much later, Jellinek (1960) advanced a theory in which he presented a disease model of alcoholism. He contended that alcoholism is a disease that, if left untreated, could be fatal or cause

serious medical and psychological complications to both the drinking individual and to his or her family.

The conceptualization of maladaptive drinking patterns as a disease entity has stimulated the research community to investigate the etiology of maladaptive patterns of AOD use. For example, several conceptual frameworks including developmental psychopathology have been used to illustrate the multivariate patterns of risk and protective factors associated with the onset and progression of AOD-related problems (e.g., Dishion, Patterson, Stoolmiller, & Skinner, 1991; Windle & Wiesner, 2004). To date, many scientists agree that significant influences upon maladaptive patterns of alcohol and other drug use are numerous, and their onset, as well as escalation into problem use are dependent upon a combination of interacting biopsychosocial correlates [National Institute on Alcoholism and Alcohol Abuse (NIAAA, 2002)].

During the last two decades, alcohol expectancies have been identified among the set of correlates thought to be vulnerability factors for AOD use behaviors (Christiansen & Goldman, 1983; Cruz & Dunn, 2003; Scheier, Botvin, & Baker, 1997; Sher, Walitzer, Wood, & Brent, 1991). Alcohol expectancies are defined as anticipated beliefs about the effects of alcohol (Brown, Christiansen, & Goldman, 1987). Alcohol expectancies have been shown to be significant putative risks factors associated with AOD use behaviors among adolescents (Brown, Tate, Vik, Haas, & Aarons, 1999; Christiansen, Goldman, & Inn, 1982; Fromme & D'Amico, 2000). AOD use among adolescents continues to be a serious contemporary public health concern. During adolescence, AOD use behavior becomes increasingly normative and has been associated with a number of significant health and psychosocial problems (Simons-Morton et al., 1999).

## *AOD Prevalence among Youth*

Among adolescents, the prevalence of AOD use and related problems has been shown to be of considerable magnitude. Findings from Monitoring the Future Study indicate that in the United States, about half of adolescents (43.9%) have experimented with alcohol use by 8th grade and the majority of adolescents (76.6%) have consumed alcohol by the end of high school. In addition, about one fifth (19.9%) of 8th graders and more than half (61.1%) of 12th graders reported one or more episodes of drunkenness during their lifetime (Johnson, O'Malley, Bachman, & Schulenberg, 2005). Parallel trends have been observed for illicit drug use, where more than half of adolescents (51.1%) report experimentation with an illicit drug by the end of secondary school. While findings from the Monitoring the Future Study suggest some recent modest decreases (i.e., from 2003 to 2004) in overall alcohol and illicit drug use among youth, there were some notable increases in the prevalence of past 30-day use, and in particular for inhalants, cocaine, and tranquilizers (Johnston et al., 2005). These findings clearly suggest that experimental AOD use is normative among contemporary youth and continued research is necessary to understand factors that are associated with AOD use and AOD-related problems in adolescence.

## *Conceptual Perspective*

The last several decades of research that have examined patterns of initiation, escalation and persistence of AOD use consistently report that early experimentation with alcohol and other drugs (a) increases lifetime risk for subsequent problem use; and, (b) is associated with deleterious psychosocial outcomes (Chen & Kandel, 1995; Dishion et al., 1991; Flory, Lynam, Milich, Leukefeld, & Clayton, 2004; Gruber, DiClemente, &

Lodico, 1996). Also, longitudinal studies of AOD use have indicated that the highest period of risk for initiation and escalation of AOD use is during adolescence and that substance use tended to increase over time concurrently with adjustment problems (Bryant, Schulenberg, O'Malley, Bachman, & Johnston, 2003). While research suggests that developmental outcomes are consistently least favorable for early onset users (Windle & Wiesner, 2004), findings from current investigations show considerable diversity and variation in AOD use patterns and the psychosocial correlates of maladaptive AOD behaviors among adolescents (Ellickson, Martino, & Collins, 2004; Hill, White, Chung, Hawkins, & Catalano, 2000).

As stated above, longitudinal studies of adolescent development have been instrumental in explicating the role of specific psychosocial correlates (i.e., specific risk and protective factors) associated with the onset and acceleration of AOD use patterns. Furthermore, these studies have been helpful in identifying putative risk factors associated with AOD use problems among adolescents. A complementary body of research during the last two decades has suggested that alcohol-related expectancies are strong predictors and correlates of maladaptive patterns of AOD use (Brown et al., 1987; Darkes & Goldman, 1993; Goldman, Darkes, & Del Boca 1999). The conceptualization of expectancies emanates from major theories of human development, such as social learning theories, which contend that expectancies are an important individual-level construct that are learned directly or vicariously (Goldman, 1991, 1998, 2001). The expanding body of research findings regarding relations between alcohol expectancies and AOD outcomes is consistent with the notion that expectancies are risk factors associated with the initiation and persistence of AOD use (Christiansen, Smith, Roehling,

& Goldman, 1989; Rohsenow, Colby, Martin, & Monti, 2005; Stacy, Newcomb, & Bentler, 1991).

*Relations between Expectancies and Other Correlates of Alcohol and other Drug Use*

Most models of the development of AOD use and related problems during adolescence posit that AOD use is related to variables specified in many different conceptual models, including those derived from social learning and cognitive-affective theories (Petraitis, Flay, & Miller, 1995). Major influences identified have included contextual correlates such as peer relations, background characteristics such as age, race/ethnicity, and family structure, as well as individual-level characteristics such as perceived stress, coping styles, social skills and substance-specific cognitions such as alcohol expectancies, as risk or protective factors for the use of alcohol and other drugs (Walton, Blow, Bingham, & Chermack, 2003). In some conceptualizations, it has been suggested that because expectancies act as mediators of AOD behavior, they influence the multiple pathways (i.e., involving different set of correlates of AOD use) related to the onset and maintenance of AOD use, as well as related problems among high-risk and low-risk adolescents (Shen, Locke-Wellman, & Hill, 2001; Smith, Goldman, Greenbaum, & Christiansen, 1995).

While it is believed that expectancies about AOD use among high-risk and low risk adolescents show divergent expectancy pathways (Smith et al., 1995), little research has considered within-group variability and individual differences in expectancy endorsement patterns (Reich & Goldman, 2005). Therefore, the current literature is limited in this regard, in that it has not addressed differential multivariate patterning of expectancies that may be associated with AOD outcomes or related measures of

adjustment. Consequently, the primary purpose of the present study was to evaluate within-group variations in patterns of alcohol expectancies that may be associated with specific adjustment outcomes in a sample of adolescents at elevated risk for the development of AOD problems.

### *The Current Study*

The current study focuses on alcohol expectancies among a school-based sample of adolescents receiving treatment services for alcohol and other drug (AOD) problems. Based on the conceptual framework used to explicate the contribution of expectancies to AOD use behavior, this study was directed toward describing heterogeneity in the patterning of alcohol expectancies in a school-based, clinical sample of adolescents and between-group differences in self-reported ratings of psychosocial adjustment. A person-centered approach (e.g., Bergman, 2001) to data analysis was used to guide the methodology of the current study. Within-group heterogeneity in patterns of endorsements of alcohol expectancies among substance-using adolescents was described, as well as the degree to which these patterns were associated with adolescents' adjustment ratings. Accordingly, this study reflected both the social learning conceptualization of alcohol expectancies (Scheier, 2001) and the problem behavior syndrome model of substance use (Jessor & Jessor, 1977), while taking into account a developmental perspective acknowledging that there is substantial heterogeneity among adolescents in specific domain of functioning (Loeber et al., 1988), to address the above-noted gap in AOD use research. Variables from an archived data set were analyzed using a person-centered approach in order to achieve the aims of the current study.

### *Study Aims*

The first aim of the current study was to describe heterogeneity in patterns of self-reported alcohol expectancies to identify empirically distinct and meaningful subgroups of adolescents using scores on the Alcohol Expectancy Questionnaire-Adolescent Version (AEQ-A; Christiansen, 1987). Participants were grouped via Ward's Method (Ward, 1963) cluster analysis. The second aim of the study was to document between-group differences among alcohol expectancy clusters in self-rated psychosocial adjustment variables. Specific indicators of psychosocial adjustment included peer social relations, stress-coping variables, reckless behavior, psychiatric symptomatology, and multiple measures of AOD use. Discussion of the study's findings evaluated their importance for the assessment and treatment of adolescent populations reporting the initial stages of AOD-related problems.

### *Significance of the Current Study*

The current study is significant because it expands the existing knowledge base regarding relations between multivariate patterns of alcohol expectancies and relevant adjustment outcomes among adolescents at risk for clinically significant AOD use problems. This study used a methodology and analytic approach that highlights individual differences and meaningful within-group heterogeneity among high-risk adolescents. By documenting relations between expectancy endorsement patterns and ratings of psychosocial adjustment, this study has provided important data that may be related directly to the clinical utility of alcohol expectancies as potential targets in selective prevention efforts or as amenability to treatment factors.

## CHAPTER II

### Literature Review

The following review of the literature draws upon two distinct lines of research that have reported important findings with regard to the development of alcohol and other drug (AOD) use, as well as AOD-related consequences among adolescents. First, based upon advances that have been made in alcohol expectancy research, this chapter will highlight the conceptual notion that substance-specific cognitions, such as alcohol expectancies, are important correlates of AOD use behaviors. Consequently, this chapter will review alcohol expectancy theory and its relation to AOD use behaviors in adolescence. Second, given that AOD use in adolescence has been conceptualized as a normative developmental risk behavior, often identified as a component of a problem behavior syndrome (Jessor & Jessor, 1977), the current literature review will also summarize other psychosocial correlates and predictors associated with adolescent AOD use behaviors. Third, this chapter will address within-group variability associated with patterns of AOD use among adolescents. The focus of this section will be to integrate a person-centered framework to data analysis with the existing aforementioned lines of research regarding AOD use in adolescence (e.g., Bergman, 2001; Magnusson & Stattin, 1998; Steinman & Schulenberg, 2003).

The rationale for the current study builds upon the premise that heterogeneity in alcohol expectancy endorsements (i.e., within-group variability) may be associated with patterns of AOD use and related consequences in high-risk samples of adolescents. Consequently, the use of a person-centered analytic approach permits investigators to



identify empirically distinct and meaningful subgroups of adolescents in order to describe different patterns of AOD use and related indices of psychosocial adjustment. Such an approach provides a useful tool to depict potential amenability to treatment factors that may be associated with the prevention and treatment of AOD use and related consequences in at-risk samples of adolescents.

### *Conceptual Background*

To date, many conceptual models have provided a platform for the description and explanation of AOD use and related problems or consequences. Such a vast conceptual landscape has posited the notion that AOD use behavior is multi-faceted and is associated with multivariate developmental processes (Hawkins, Catalano, & Miller, 1992). Such complex multivariate patterns of distal and proximal influences are described in personality, genetic and neurobiological, tension reduction, developmental, social learning, as well as cognitive theories (Petraitis, Flay, & Miller, 1995; Scheier, 2001). During the last two decades, an important line of research that evolved from cognitive-affective and social learning conceptualizations of AOD use has identified alcohol and other drug-related expectancies as predictors and correlates of subsequent AOD use behavior (Greenbaum et al., 2005; Newcomb, Chou, & Huba, 1988; Scheier & Botvin, 1997).

### *Alcohol Expectancy Theory*

Alcohol expectancies, defined as cognitive representations or anticipated beliefs about the effects of alcohol use, have been shown to act as mediators for the multiple pathways to alcohol use and abuse (Goldman, 1994). Alcohol expectancies are based on the relation between the physiological effects of alcohol and an individual's learning

history (Goldman, Del Boca, & Darkes, 1999). While research examining substance-specific cognitions such as alcohol expectancies is relatively recent, the notion of expectancy began to emerge at a time when Psychology was primarily behavioristic in orientation. Tolman (1928) defined an expectancy as a purposeful objective that occurs as a result of a stimulus-response interaction. He further described this mechanism as being the cognitive expectation that an organism would retrieve in the face of a particular stimulus. Other expectancy theorists (e.g., MacCorquodale & Meehl, 1953) have offered quantitative models to organize the S-R reinforcement approach of expectancy theory proposed by earlier theorists. Another approach in the development of the expectancy concept was articulated by Rotter (1954) who thought of expectancies as representing probable relationships between reinforcement and behavior. That is, a behavior is more likely to be repeated depending on the degree to which the organism considers it to be reinforcing.

Bandura (1977) proposed a theory of personal efficacy in which higher-order expectations allow individuals to adapt to their environment and provide them with the ability to perform a particular behavior. Within this framework, drinking behavior is more likely to occur when an individual's expectations of personal competence in a social situation are associated with their consumption of alcohol and other drugs. Thus, as the expected benefits of alcohol or other drug (AOD) use increases, the more likely the individual's AOD-related behavior will be repeated. In addition to these early behavioral/social learning theories of the expectancy concept, cognitive theories have also been instrumental in explicating the application of expectancy operations for alcohol and other drug use behaviors (Marlatt & Rohensow, 1980).

In order to understand how expectancies operate, it is important to describe the memory systems that are involved in relevant processes. As delineated by Goldman and colleagues (1999), alcohol expectancies are dynamic templates stored in memory that prepare an individual for future responses. Memory connections or templates provide the foundation for which information is represented in memory. Thus, all knowledge is represented in memory via an arrangement of templates or nodes that form a set of associations or an associative network (Collins & Loftus, 1975). A node is activated when it processes information from a stimulus. The intensity of activation triggers a series of events. This process, known as spreading activation, allows for activation to travel from node to node to create associative links (Collins & Loftus, 1975). For example, when one is confronted with the word “shoe”, the node or elementary characteristic of shoe is activated. This activation travels through other nodes (e.g., lace, tie, socks) to form a concept.

Similarly, when the word “alcohol” is presented as a stimulus, the semantic network, as well as the alcohol expectancy network is stimulated. Rather and Goldman (1994) proposed that the organization of alcohol expectancies in memory is analogous to the aforementioned semantic network model. Using Individual Differences Scaling (INDSCAL) and Preference Mapping (PREFMAP), Rather and Goldman (1994) found that the alcohol expectancy structure was arranged differently for light and heavy drinkers. Heavy drinkers form concepts related to the positive-social and arousing effects of alcohol. Light drinkers, however, form concepts that emphasize less positive, more negative and sedating effects of alcohol. Subsequent studies have provided support for the existence of a memory-based structure for alcohol-related concepts. For example,

Stacy (1997) showed that alcohol expectancies are memory processes that can be accessed via verbal cues. In this study, participants were asked to respond to a list of words in which meanings were context dependent. Heavier drinkers were more likely to generate alcohol-related words in response to homographs such as “tap”. Another study by Roehrich and Goldman (1995) showed that exposure to expectancy words (e.g., happy, social), even without an alcohol context, mediated drinking behavior.

#### *Function of Alcohol Expectancies in AOD Use Behavior*

Although there is no single causal factor that leads to alcohol misuse and substance abuse (NIAAA, 2002), researchers who have examined alcohol expectancies consistently report that expectancies are reliable predictors of both the onset of drinking and problem drinking behaviors (e.g., Botvin & Scheier, 2001; Christiansen, Smith, Reohling, & Goldman, 1989). During the last two decades, a substantial number of researchers have directed their investigations toward understanding the mechanism by which alcohol expectancies play a causal role in a range of drinking behaviors. For instance, longitudinal analyses of alcohol expectancies from adolescence to young adulthood have provided evidence regarding prospective relations between alcohol- and other drug-related expectancies and AOD outcomes (Stacy, Newcomb, & Bentler, 1991). Alcohol expectancies not only predicted subsequent use of alcohol but were also associated with later AOD-related problems. To date, the measurement of alcohol expectancies has largely included traditional variable-centered approaches to data analysis.

## *Research Methodologies in Expectancy Research*

The balanced placebo design has been employed extensively as a way to distinguish the physiological effects of alcohol from potential psychosocial influences. It generally incorporates a two-way factorial design, in which half of the participants are assigned to an alcohol use condition and the other half are assigned to a non-alcohol use condition. In the latter condition, the participants are served a placebo beverage. Furthermore, half of the participants in each condition are told they are being served alcohol when they are not. This experimental design commonly has been used in studies to differentiate the potential pharmacological effects of alcohol from the expected outcomes of alcohol or the “expectancy effect” (Darkes & Goldman, 1998, 2000, 2002; Dunn, 1999, 2001, 2003). An early study by Wilson and Lawson (1976) using the balanced placebo design tested whether alcohol enhanced sexuality and sexual interest. Four groups of male college students, randomized into a balanced placebo design as described above, were presented sexually explicit materials after consuming alcoholic and non-alcoholic beverages. They found that sexual arousal was nearly as intense in the participant groups that received alcoholic beverages compared to those in the placebo conditions. These findings suggest that physiological arousal is not merely a function of the pharmacological properties of alcohol but also a function of alcohol expectancies.

A second type of investigation that has been used to describe the patterns of, and the organization of alcohol expectancies involves free association methodologies. Commonly used in cognitive experiments to catalog prior concepts in memory, the free association task has been shown to be an accurate measure of alcohol expectancies (Nelson, McEvoy, & Schreiber, 1998, 2000). This procedure consists of asking

participants to produce the first word that comes to mind in response to a word or sentence stem. The advantage of this task is that it yields accurately information about repetitive behaviors and it also predicts word association responses (Nelson, McEvoy & Dennis, 2000). Consistent with this view, alcohol researchers have found that alcohol concepts, serve as “cognitive facilitators” operating in a similar fashion to other memory associations (Scheier, 2001). That is, alcohol expectancies influence drinking behavior through comparable cognitive processes (Stacy, Leigh & Weingardt, 1997). For example, a study done by Noll, Steinberg, Del Boca, Darkes, and Goldman (1999) used a free association memory paradigm to study alcohol expectancies. In this study, undergraduate students who reported drinking socially were asked to complete the sentence “Alcohol makes one \_\_\_\_.” Participants were instructed to give the first response that came to mind to complete the sentence stem. The researchers found that the students readily generated alcohol expectancies in response to the alcohol-related cue. Students who reported heavier drinking patterns more often gave positive words such as “happy,” whereas students reporting lower levels of drinking tended to give more often negative and sedating words such as “ sick “ and “drowsy”.

Studies using the free association task have helped to identify the most commonly generated alcohol expectancies (e.g., feeling happy, loose, drowsy, sick). Alcohol expectancies can be represented along semantic dimensions such as positive/negative and sedation/arousal. In an innovative study, Rather, Goldman, Roehrich, and Brannick (1992) used multidimensional scaling techniques to place alcohol expectancies along these dimensions. The quadrant bordered by high positive ratings and high arousal ratings consisted of themes related to social facilitation, power and disinhibition.

Participants who reported patterns of heavy drinking tended to endorse these alcohol expectancies more often than people who drank at lower levels and did so more often than they reported other types of alcohol-related expectancies. The opposite quadrant, framed by negative ratings and sedation, contained the alcohol expectancies of calmness, tension reduction and cognitive impairment. These expectancies were more often endorsed by people who drank at low levels (Rather et al., 1992). Alcohol expectancies have been measured in children and adolescents before the onset of drinking and are thought to predict drinking prospectively (Dunn & Goldman, 1996, 1998, 2001; Smith, Goldman, Greenbaum, & Christiansen, 1995).

A third method of measuring alcohol expectancies is with self-report scales. These scales are typically binary (e.g., agree-disagree) or Likert-type scales that ask participants to endorse items that represent their beliefs about the effects of alcohol. This type of measurement has been validated by numerous factor analytic techniques (Brown, Goldman, Inn, & Anderson, 1980; Leigh & Stacy, 1991). To examine the validity and utility of expectancy scales, Leigh and Stacy (1993) constructed a scale representing the positive and negative consequences of drinking. Using factor analysis and other analytical techniques, they found a significant relation between positive and negative alcohol expectancies and self-reported drinking. In this study, negative expectancies were positively related to alcohol consumption, but positive expectancies were a stronger predictor of subsequent drinking behavior. A study by Grube and Agostinelli (1999) showed similar linear trends with regard to relations between negative expectancies and subsequent drinking behavior. The use of self-report scales has been particularly useful to

researchers in the measurement of alcohol expectancies, and in particular, among adolescents.

### *Alcohol-Related Expectancies among Adolescence*

An initial study regarding the development of alcohol expectancies among adolescents was conducted by Christiansen, Goldman and Inn (1982). Using the Alcohol Expectancy Questionnaire (AEQ-A), developed by Christiansen et al.(1982), researchers have measured specific domains of alcohol expectancies among adolescent populations. Different types of expectancies were identified among adolescents. These include themes of arousal, social facilitation, sexual enhancement, cognitive impairment, tension reduction, cognitive enhancement, and global positive transformation. Dunn and Goldman (1998) found in a sample of elementary and high school children that expectancies develop at an early age, prior to the onset of alcohol use. They also found that children's expectancies tended to be within the negative/sedation quadrant of the alcohol expectancy network and, that these expectancies changed systematically with age.

As the age of initiation of drinking approached, children's alcohol expectancies tended to become more positive (Dunn & Goldman, 1998, 2001). In a longitudinal study, Smith, Goldman, Greenbaum, and Christiansen (1995) showed that adolescents who endorsed positive expectancies for alcohol's role in social facilitation were those who reported higher levels of subsequent drinking. Furthermore, a number of researchers have shown that adolescents differ with respect to both drinking motives and patterns (Scheier & Botvin, 1997). That is, alcohol expectancies are thought to be associated with a range of psychosocial factors that influence both the motivation to drink alcohol and the



effects of drinking (Smith et al., 1995). Therefore, it is essential to document whether a broader range of psychosocial adjustment characteristics are associated with within-group differences in adolescent AOD use patterns, as well as variations in alcohol expectancy endorsement patterns.

### *Conceptualization of Alcohol and Other Drug Use in Adolescence*

Alcohol and other drug (AOD) use is a developmentally normative risk behavior during adolescence for a significant proportion of adolescents. AOD use behaviors increase in prevalence during the normative transition from dependence on parental influence to increasingly autonomous socialization within peer group contexts (Jessor & Jessor, 1977). Another important research issue regarding the developmental course of AOD use during adolescence suggests that it is characterized by maturing out processes (Miller–Tutzauer, Leonard, & Windle, 1991). The notion of “maturing out” proposes that for many late adolescents, the trajectory of AOD involvement is marked by normative declines in AOD use during the transition from adolescence to adulthood (Kerr, Fillmore, & Bostrom, 2002). Alcohol and other drug use is adolescence-limited for a large proportion of adolescents (Windle, Mun, & Windle, 2005). However, a sub-group of adolescents progress to a life course-persistent pattern of AOD use and related problems in young adulthood (Chassin, Pitts, & Prost, 2002; Tubman, Vicary, von Eye, & Lerner, 1990). Findings regarding AOD use behaviors among adolescents suggest that there is considerable within-group variability in AOD use patterns among adolescents (e.g., Steinman & Schulenberg, 2003).

While a number of findings regarding the developmental course of AOD-related problems are well-documented, there is less convergence in findings with regard to

within-group variability in behavior patterns associated with AOD consumption during adolescence. In support of this point, a number of longitudinal studies regarding AOD use in early to middle adolescence have found that there are a range of distinguishing factors that appear to promote alcohol and other drug use (Li, Duncan, & Hops, 2001). Windle and Davies (1999) suggest that heterogeneity in AOD use patterns among adolescents may be indicative of the multiple pathways related to alcohol and drug use behaviors in adolescence. In addition, adolescence is a developmental period that presents increasing temporal variations with regard to the acquisition of developmental milestones, thus broadening the spectrum of potential psychosocial adjustment pathways. For example, Newcomb (1996) suggests that the premature acquisition of specific developmental tasks may hinder the mastery of psychosocial skills, thus contributing to maladaptive transitions such as acquisition of deviant behaviors, including alcohol and drug use.

Consequently, the full range of processes that contribute to within-group variations (i.e., heterogeneity) in substance use outcomes is not entirely mapped out (Zucker, 1992). Although continuous high levels of AOD use are a strong correlate of poor adjustment (e.g., Schulenberg et al., 1996a), many at-risk (i.e., AOD-using) adolescents end up on developmental trajectories that are more adaptive. However, other adolescents identified with similar levels of risk exhibit more continuity in patterns of maladjustment (Aseltine & Gore, 1993). Such within-group heterogeneity permits investigators to raise questions as to whether specific risk factors that have been identified as significantly associated with AOD use, such as alcohol expectancies, may show similar heterogeneous patterns among adolescents. Therefore, it is necessary to

examine relations between alcohol expectancies and other indices of psychosocial adjustment among adolescents who use alcohol and other drugs.

*Relations between Alcohol Expectancies and Broader Indicators of Psychosocial Adjustment*

Developmental research regarding alcohol and other drug-related problems has used the conceptual perspective advanced by Jessor and Jessor (1977) to conceptualize maladaptive AOD use behaviors among adolescents (Zucker, Fitzgerald, & Moses, 1995). Problem Behavior Theory stipulates that substance use is part of a broader problem behavior syndrome that includes a number of deviant behaviors including: AOD use, conduct problems, and poor social relationships (Jessor & Jessor, 1977). Consistent with the general deviance syndrome associated with more involvement with drugs and alcohol, as well as poor psychosocial and developmental outcomes (Wills et al., 2003), some studies have examined relations between alcohol expectancies and broader indicators of psychosocial adjustment. In general, these studies found that alcohol expectancies constitute another psychosocial risk factor associated with AOD use outcomes (Callas, Flynn, & Worden, 2004; Finn, Bobova, Wehner, Fargo, & Rickert, 2005). Other research findings suggest that alcohol expectancies serve as mediators of relationships between distal risk factors such as personality characteristics and broader indices of psychosocial adjustment (Griffin, Botvin, Epstein, Doyle, & Diaz, 2000). For example, Goldman (1999) suggests that alcohol expectancies are memory templates that take into account distal factors such as family history of AOD use, negative affectivity (i.e., risk and protective factors involved in AOD use) to predict within group differences in AOD outcomes.

Given the links that have been established between alcohol expectancies and psychosocial adjustment, some research has specifically examined the contribution of alcohol expectancies to AOD use behaviors among adolescents (Botvin et al., 1997; Brown et al., 2002). In particular, psychosocial skills such as coping styles (Cooper, 1992), or competent peer interactions (Scheier & Botvin, 1997) were found to be related to subsequent alcohol and drug use, as well as to the formation and reinforcement of expectancies (Smith & Goldman, 1995). Consistent with the notion that multivariate patterns of psychosocial adjustment ratings are associated with AOD use, in this study, specific indicators of psychosocial adjustment were used to document whether within-group variations in alcohol expectancy endorsement patterns would generalize to specific indicators of psychosocial adjustment, such as stress-coping patterns, reckless behaviors, and peer relations.

Studies that have examined relations between alcohol expectancies and stress-coping patterns propose that adolescents with maladaptive coping styles are more likely to use alcohol and other drug in order to dampen tension and overcome affective challenges (e.g., Cooper, 1992; Wills et al., 1997). Longitudinal analyses regarding tension reduction expectancies with regard to stress-coping have shown that stressful life events elicit alcohol and other drug use. The significant statistical interactions between coping strategies and stress levels showed that drinking to cope expectancies are related to deficits in adaptive coping skills (Cooper, 1988; Galaif et al., 2003; Wills et al., 2001).

With regard to relations between alcohol expectancies and peer norms, Scheier, Botvin, and Baker (1997) suggested that associations with deviant peer groups predicted initiation as well as persistence of AOD use trajectories among adolescents. As

previously mentioned, AOD use is a normative risk behavior among adolescents.

Therefore, the modeling of drug use by peers and the perceived prevalence of AOD use among peers are both related to the initiation and experimentation stages of AOD use. A longitudinal study regarding the role of alcohol expectancies on AOD use and perceived peer influences found that alcohol expectancies were related to perceived peer attitudes, as well as peers' AOD involvement (Scheier, 2001).

The multivariate factors associated with the heterogeneity of AOD use outcomes among adolescents include a spectrum of processes that occur at several levels of analysis. In this review of the literature, alcohol expectancies were described as important contributors to AOD use behaviors. Furthermore, the reviewed literatures suggest clear links between alcohol expectancies and specific indices of psychosocial adjustment that have been shown to be correlates of AOD use behaviors. As noted above, AOD use and related problems are the result of commonly related clusters of events, behaviors, and substance-specific cognitions that constitute transactional processes between the individual and his or her ecology (Cicchetti & Rogosh, 1999; Rutter & Sroufe, 2000). Such complexity has been shown to be related to the heterogeneity of AOD use outcomes, as well as AOD use-related consequences among adolescents (Loeber et al., 1988; Steinman & Schulenberg, 2003). Consequently, the study of risk for AOD use and related problems needs to include an examination of alcohol expectancies, as well as specific indicators of psychosocial adjustment that capture heterogeneity in both alcohol expectancies and psychosocial adjustment. A person-centered approach to data analysis permits investigators to (a) capture potential heterogeneity of AOD use and related

problems, and (b) describe homogeneous subgroups of adolescents of AOD-using adolescents.

#### *Limitations of Current Research regarding AOD use in High-Risk Adolescents*

Research on AOD use among youth has shown that adolescents' involvement with AOD use has a number of significant biopsychosocial correlates including genetic markers, early childhood behaviors, psychiatric disorders, parenting processes, family and peer environments, as well as expectancies (Petraitis et al., 1995). As noted above, alcohol expectancies have been shown to be strong correlates of AOD use (Goldman et al., 1999). Among adolescents, expectancies that appeared to be more predictive of subsequent drinking were expectancies of cognitive enhancement and social facilitation (Christiansen et al., 1982). Positive alcohol expectancies have been identified as risk factors for subsequent drinking among adolescents. Alcohol expectancies have been found to increase with age and to predict the onset of drinking and problem drinking among adolescents (Smith & Goldman, 1995). Results from studies that have attempted to explore issues related to individual differences in alcohol expectancies have proposed that variations in alcohol expectancy endorsement patterns were associated with subsequent drinking behaviors (Greenbaum et al., 1999; Smith et al., 1995). While findings from these studies have been useful for broadening knowledge of the influences of alcohol expectancies on AOD use behaviors, very little is known about how distinct multivariate patterns of expectancy endorsements are related to within-group variations in broader patterns of psychosocial adjustment. The identification of such relations in clinical samples of adolescents may provide important information for the provision of prevention and treatment services to vulnerable youth populations.

## *Application of a Person-Centered Framework to the Study of Alcohol Expectancies*

There is clear evidence regarding the contribution of expectancies as risk factors for subsequent AOD use among adolescents. Since most expectancy research has used a variable-centered approach to study relations between expectancies and AOD outcomes, there may be distinct and meaningful patterns of expectancy endorsements that are masked by the use of variable-centered analytic strategies. In fact, some research has found that the modeling of specific expectancy pathways was related to specific antecedents of AOD use that were not observed in previous research (Darkes, Greenbaum, & Goldman, 2004). This research finding suggests that there may be qualitatively distinct patterns of alcohol expectancy endorsements associated with AOD use outcomes that may be undetected by variable-centered analytic strategies. Therefore, the study of alcohol expectancy endorsement patterns via a person-centered analytic approach may allow for more comprehensive descriptions of heterogeneity in alcohol expectancy endorsements and their association with broader patterns of psychosocial adjustment. Furthermore, the use of a person-centered analytic approach is particularly useful for the study of complex multivariate patterns, such as AOD use behaviors or related sets of variables (Bergman & Stattin, 1988).

Consistent with developmental research literatures, person-centered analytic approaches permit the examination of heterogeneity at multiple levels of analysis and provide more information about unique patterns associated with homogenous subgroups (Bergman, 2001; Loeber, 1988). In addition, developmental studies of adolescent AOD use have indicated that AOD use during this period is characterized by multi-level processes (i.e., involving multiple risk and protective factors) that show distinct patterns

among subgroups of adolescents (Loeber, 1988; Nagin & Tremblay, 1999). Given the potential for heterogeneous development of AOD-related problems in adolescence (Li, Duncan, & Hops, 2001), new knowledge regarding heterogeneity in expectancy endorsement patterns offers additional data for devising efficacious prevention and intervention programs sensitive to within-group differences among vulnerable adolescent populations (Gil et al., 2004; Li et al., 2001). The conceptual issue (i.e., heterogeneous development in AOD involvement) used to structure the rationale for the current study was based on this integrative review of the literature. This chapter outlined evidence with regard to alcohol expectancies and AOD use outcomes. Relations between specific psychosocial adjustment correlates of AOD use behaviors and alcohol expectancies were summarized. Finally, given the gaps noted in relevant research, the significance of using a person-centered analytic approach to study heterogeneity in alcohol expectancies among adolescents was underscored.

### *The Current Study*

In the present study, a school-based sample of adolescents receiving substance use treatment services was classified into homogeneous subgroups via cluster analysis using their scores on subscales from the Alcohol Expectancy Questionnaire-Adolescent version (AEQ-A). The purpose of using a person-centered analytic strategy was to identify distinct and meaningful patterns of alcohol expectancies and between-cluster differences in specific psychosocial and demographic characteristics. The classification of a clinical sample of adolescents using a person-centered analytic approach facilitated the identification of heterogeneous patterns of alcohol expectancies that were then used to



describe their relations with indices of psychosocial adjustment and specific background characteristics (e.g., risk factors for AOD use and AOD-related problems).

The overall purpose of the study was two-fold. The first goal of the study was to identify via cluster analysis, group differences in multivariate patterns of alcohol expectancy endorsements among adolescents in the early stages of experiencing problems related to AOD use. The second goal of the study was to document associations between cluster membership and specific indices of psychosocial adjustment in this sample of adolescents. It was expected that adolescents' patterns of self-reported alcohol expectancies (i.e., alcohol expectancy profiles) would be associated significantly with indices of psychosocial adjustment such as coping styles, social interactions, reckless behaviors, psychiatric diagnoses, and involvement with drug and alcohol use. These relations were hypothesized to reflect the salience of between-cluster differences in participants' endorsements of alcohol-related expectancies regarding cognitive enhancement, social facilitation, and global positive transformation.

*Specific Research Questions and Hypotheses:*

Question #1 Is it possible to classify adolescents receiving AOD treatment services on the basis of their self-reported alcohol expectancies into distinct and meaningful groups?

Question #2 Is cluster membership associated with between-group differences in mean scores for specific indices of psychosocial adjustment?

Hypothesis #1 Adolescents receiving AOD treatment services can be classified into distinct and meaningful subgroups on the basis of their self-reported AEQ-A scores.

Hypothesis #2 Cluster membership is associated significantly with between-group differences in mean scores for specific indices of psychosocial adjustment.

## Chapter III

### Methods

#### *Description of Database*

The current study used archival data from a randomized clinical trial, the Teen Intervention Project (TIP) that examined the efficacy of a school-based group intervention modeled after the Westchester Student Assistance Program. The Westchester Student Assistance Program (SAP) is modeled after employee assistance programs commonly used by employers to identify employees at risk for consequences related to AOD use. The SAP model focuses on the delivery of school-based group counseling sessions that are organized by problem area. The SAP model was developed in Westchester County, Michigan and has been shown to be effective in reducing substance use among some adolescents (Wagner, Kortlander, & Morris, 2001). As the larger study (the TIP evaluation) has already ended, contact with the participants did not occur in the current study. During the active data collection for the TIP study, participants were debriefed after each data collection. That is, they were thanked for their participation and were provided a brief overview of the schedule for the next data collection point. The current study used data obtained from baseline assessments.

#### *Participants*

Data were collected from students attending public middle and high schools. They were either mandated to participate or identified by a referral source that included guidance counselors, school instructional or administrative staff, family members or peer group members as having substance abuse, academic and/or conduct problems. They

were assessed five times over a 1-year period. The data collection schedule included a baseline assessment, a post- intervention assessment, as well as 1-month, 3-month, and 1-year follow-ups. Participants ranged in age from 13 to 19 years; 61% were male and 39% were female. The sample was predominantly composed of White adolescents (61.3%). The remaining students were primarily Hispanic (19.9%), Black (13.6%), and 4.5% described themselves as “Other ethnicity.” Participants’ parents represented a broad range of occupations and socio-economic statuses. Although this sample of adolescents is unevenly distributed across ethnic groups and socio-economic statuses, it was representative of the population of adolescents that are typically identified at risk for developing alcohol and other drug use-related problems (Johnson et al., 2003).

### *Measures*

*Demographics Questionnaire.* This questionnaire was only administered at Time 1 of data collection. It was used to record each student’s age, school grade, gender, ethnic background, referral source, drug of choice, parental educational attainment, socio-economic status and the student’s involvement with other counseling services, as well as self-help and support groups. These variables have been found to be associated with adolescent drinking behavior (Laird, Pettit, Dodge, & Bates, 2005). Table 1 summarizes the ethnic and demographic composition of the sample of participants.

*Alcohol Expectancy Questionnaire-Adolescent Version (AEQ-A).* The AEQ-A was administered at the baseline assessment. This 90-item instrument uses a binary (*true-false*) response format. It was developed by Christiansen, Goldman and Inn (1982) and has been used in numerous studies to investigate the role of expectancies in drinking behavior (Botvin et al., 1997; Brown, Aarons, McCarthy, et al., 1995; Greenbaum et al.,

1999). Previous reports indicate that this instrument has adequate internal consistency reliability, with coefficient alphas ranging from .77 to .86 (Brown et al., 1987; Fromme & D'Amico, 2000). The AEQ-A contains seven expectancy subscales: Alcohol is a powerful agent that makes global positive transformation of experiences (Scale 1); Alcohol enhances or impedes social behavior (Scale 2); Alcohol improves cognitive and motor functioning (Scale 3); Alcohol enhances sexuality (Scale 4); Alcohol leads to impairment of cognitive and behavioral functioning (Scale 5); Alcohol increases arousal (Scale 6); and, Alcohol promotes relaxation (Scale 7). Several studies have shown the AEQ-A scales to predict prospectively alcohol use and to correlate with a number of drinking-related problems and drinking patterns (Reese, Chassin, & Molina, 1994; Scheier & Botvin, 1997; Simons-Morton et al., 1999). Positive expectancies of social facilitation tend to be associated with higher levels of drinking while negative expectancies of cognitive impairment are related to lower levels of drinking (Brown et al. 1999; Christiansen et al., 1989). In the current study, AEQ-A scales were used as component variables in cluster analyses, and AEQ-A scale scores were employed in the validation procedure of the retained cluster solution.

*Composite International Diagnostic Interview-Brief Form (CIDI).* The CIDI is a structured interview developed by the World Health Organization (WHO, 1990) partly based on the Diagnostic Interview Schedule (DIS; Robins et al., 1981). This instrument was used to determine lifetime and past year DSM-IV psychiatric diagnoses. These included: affective disorders (major depression and dysthymia), anxiety and phobic disorders (generalized anxiety disorder, panic disorder, specific phobia, social phobia), substance use disorders (alcohol abuse and dependence, drug abuse and dependence),

externalizing disorders (ADHD inattentive, hyperactive or combined, conduct disorder, oppositional defiant disorder) and eating disorders (anorexia and bulimia). Data generated via the CIDI was used to examine associations between psychiatric diagnoses and alcohol expectancy cluster membership. Psychiatric diagnoses have been identified as significant correlates of adolescent drinking (Greenbaum et al., 1999) and are likely to be significantly associated with alcohol expectancy patterns in the present study. CIDI diagnoses were used as conceptually relevant external variables in analyses to validate the cluster solution that generated the alcohol expectancy profiles in the current study of adolescents reporting AOD-related problems and consequences.

*Drug Use Screening Inventory – Revised (DUSI-R).* The DUSI-R was administered at all data collection periods. This instrument assesses the frequency of alcohol and other drug involvement during the past month. It is a comprehensive assessment instrument measuring drug use including: alcohol, illegal drugs, over-the-counter drugs, prescription drugs, as well as tobacco. The DUSI-R uses a dichotomous, *yes–no* response format, while another section of the DUSI-R measures features of substance use dependence, such as the inability to stop using drugs, withdrawal symptoms, and negative consequences related to drug use. This instrument was developed by Tarter (1990). Tarter’s investigations, as well as those of others, have shown that the DUSI-R has adequate discriminative power and it reliably identifies individuals who have received a diagnosis of substance use disorder (Tarter, Laird, Bukstein, & Kammer 1992). In this study, the DUSI-R was used to describe the severity and chronicity of alcohol and other drug use. In addition, between-cluster differences in

DUSI-R scores were examined as part of the strategy to validate the alcohol expectancy cluster profiles.

*Perceived Stress Scale.* The Perceived Stress Scale (PSS) is a 14-item measure developed by Cohen, Karmarch and Mermelstein (1983) that measures the degree to which life events are perceived as stressful. This instrument is designed to evaluate the degree to which adolescents perceived their lives to be overwhelming, unpredictable, and uncontrollable. Psychometric properties suggest adequate internal consistency and reliability when used to measure perceived stress among adolescents (Cohen & Williamson, 1988). The reliability for this inventory has been reported to be .85 (Cohen et al., 1983). The perception of stress has been shown to be a correlate of involvement with alcohol and other drugs among adolescents (Catanzaro & Laurent, 2004). In the current study, perceived stress was used as indicator of psychosocial adjustment. The inclusion of this measure allowed the current study to evaluate associations between alcohol expectancy clusters and indices of psychosocial adjustment in this sample of adolescents receiving treatment for alcohol and other drug use-related problems.

*Ways of Coping Checklist – Revised.* The Ways of Coping Checklist (RWCCCL; Vitaliano, Russo, Carr, Maiuro, & Becker, 1985). The Ways of Coping Questionnaire is a 42-item instrument that uses a 4-point response format ranging from 1 (*never used*) to 4 (*regularly used*). The measure is designed to assess the coping strategies individuals employ when dealing with stress. The psychometric characteristics of this measure suggest good reliability. The alpha coefficients range from .74 to .88 for all scales (Vitaliano et al., 1985; Wagner, 1993). The assumption underlying the use of this measure is that coping strategies are more important in dealing with stress than the stress

itself. This instrument was developed by Folkman and Lazarus (1976). The instrument measures eight domains of coping styles: Confrontive Coping, "I expressed anger to the person(s) who caused the problem;" Distancing, "Went on as if nothing had happened;," Self-Controlling, "I tried to keep my feelings to myself;," Seeking Social Support, "Talked to someone to find out more about the situation;" Accepting Responsibility, "Criticized or lectured myself;" Escape-Avoidance "Hoped a miracle would happen;" Problem-Solving, "I made a plan of action and followed it;" and Positive Reappraisal; "Changed or grew as a person in a good way." In the current study, coping strategies was one of the sets of external variables used to evaluate associations between alcohol expectancy profile clusters and psychosocial adjustment.

*Reckless Behavior Questionnaire.* The Reckless Behavior Questionnaire (RBQ; Shaw, Wagner, Arnett, & Aber, 1991) assessed the frequency of problem behaviors on a five-point response format ranging from 1 (*none*) to 5 (*more than 10 times*). This measure showed evidence of concurrent validity, and the alpha coefficient for the entire scale was .80 (Shaw et al., 1991). The RBQ was developed by Arnett (1989) using a college sample. The test-retest reliability for the RBQ in a college sample was .80. The RBQ assessed reckless behaviors, in particular, risk-taking behaviors, sexual risk behaviors and AOD use behaviors. Behaviors assessed include: driving under the influence of alcohol, use of illicit drugs (i.e., marijuana, cocaine and other drugs), driving over the speed limit, sexual activity without protection, sexual activity with strangers, vandalism and shoplifting. Participants were asked to indicate how many times they have participated in specific risk behaviors over the past year. In the current study, the scores on the Reckless



Behavior Questionnaire were used as one of the external variables to assess associations between alcohol expectancy profile clusters and psychosocial adjustment.

*Teenage Inventory of Social Skills (TISS)*. This 40-item instrument contains two subscales that measure prosocial and asocial behavior interactions. The TISS assesses the frequency of prosocial and asocial behaviors on a six-point response format ranging from 1 (*not all*) to 6 (*totally*). The TISS has been shown to reliably measure social skills in adolescents (Inderbitzen & Foster, 1992). There is evidence of good internal consistency reliability (alpha coefficient = .88) for both the asocial behavior and prosocial behavior subscales. Coefficients for test-retest reliability after two weeks were .90 for the prosocial behavior scale and .72 for the asocial behavior scale (Inderbitzen & Foster, 1992). The TISS was used as one of the external variables to assess associations between alcohol expectancy clusters and psychosocial adjustment.

*Timeline Follow Back Calendar (TLFB)*. The timeline follow back calendar is an interviewing technique that asks participants to reconstruct their daily drinking for a specific previous time period using a calendar with specific anchoring points. This technique was developed by Sobell, Maisto, Sobell, and Cooper (1979) to obtain information about the quantity and frequency of use among problem drinkers. Studies that have examined the reliability of this data gathering technique indicated that self-reports about drinking were reliable over 6-week intervals ( $r = .79$ ). In the larger study (TIP), a similar technique was used to measure drinking frequency and quantity retrospectively over the previous 90-day period at baseline. The TLFB technique was again used at subsequent data gathering period (post-intervention, 1-month, 3-month and 1-year follow-ups) to collect information regarding drinking frequency and quantity. In

the current study, TLFB summaries of maximum drinks per drinking day, number of past 30 days used, and total number of drinks over the past 30 days at baseline were used. In order to minimize errors of calculation, a standardized metric was utilized where a 1-ounce mixed drink, one 5-ounce glass of wine, a 12-ounce beer or a 12-ounce wine cooler were defined as one standard drink. The TLFB was also used to gather information about frequency of use of the participant's drug of choice, i.e., number of days used. In the current study, summary data from the TLFB were used as external variables to validate the cluster solutions and to evaluate relations between alcohol expectancy profile clusters and psychosocial adjustment.

#### *Procedure*

*Informed Consent.* In the larger study (i.e., TIP), after obtaining parental consent, the student was called for a baseline assessment. The project staff administered paper-based assessment measures that were coded with identification numbers. The questionnaires were administered individually. Prior to the administration of the questionnaire packets, the project staff provided a description of the study and assurance of confidentiality, and the limitations of confidentiality were addressed. Since the current study did not have additional contact with the study participants, new procedures to obtain either parental consent or student assent were not employed.

*Data Collection.* The baseline assessment lasted about one hour and follow-up assessments lasted about 20 minutes. The assessments were conducted by bachelors-level or graduate student interviewers who were trained on how to conduct paper-based assessments with adolescents receiving school-based treatment. The interviewers were supervised weekly by study investigators and/or project coordinators.

## Chapter IV

### Results

The analyses for this cross-sectional study were conducted in four steps. First, descriptive statistics were computed for all background (i.e., gender, age, and ethnicity), component (i.e., AEQ-A subscales) and external variables (i.e., AOD use involvement, psychiatric and psychosocial adjustment indices). Bivariate analyses were conducted in the second step to assess relations between component and external variables. In the third step, Ward's Method cluster analysis was used to classify participants on the basis of similarity with regard to the seven standardized AEQ-A subscales. The cluster solution was validated using Chi Square analyses and MANOVAs of external variable sets, including psychiatric (CIDI) diagnoses, and AOD use indices (TLFB, DUSI-R). In the fourth step, univariate analyses were conducted to examine the generalizability of group differences with regard to mean levels of psychosocial adjustment variables (e.g., alcohol and other drug use severity, perceived stress, coping styles) by cluster membership. Chi Square analyses were also performed to document associations between cluster membership and important demographic characteristics (e.g., ethnicity, family structure, school grade). Effect sizes (i.e., eta-squared ( $\eta^2$ ) and phi coefficients ( $\phi$ ) are presented for ANOVA's and Chi square analyses.

#### *Preliminary Analyses*

*Descriptive Results.* This study was conducted using a sample of 287 public middle and high school students. The mean age of the sample was 15.26 years (SD = 1.6 years). The gender distribution was unequal, and included 188 (66.7%) males and 94

(33.3%) females. Gender data was missing for five participants. The sample was diverse, composed of 105 (36.6%) White, 29 (10.1%) Black, 21 (7.3%) Hispanic and 7 participants (2.4%) who identified themselves as Other. Racial and ethnic data were missing for 125 (43.6%) of the participants. The sample was also diverse in terms of familial composition and socio-economic statuses. Additional background information is presented in Table 1.

Table 1. *Family Structure and Socio-economic Characteristics.*

	<i>N</i>	%
<b>Living Arrangement</b>		
Nuclear family	88	36.1
Lives w/Mother	119	48.8
Lives w/Father	27	11.1
Other	10	4.1
<b>Parental Occupation*</b>		
Professional	51	33.6
Skilled Trade	75	49.3
Unskilled	6	17.1
<b>Parental Educational Attainment</b>		
Graduate/Professional Training	5	3.2
College Education	70	45.5
High School Graduate	67	43.5
Some High School	12	7.8

\* Professional occupations included higher executives, major professions, business managers and administrative personnel. Skilled trade workers included clerical sales workers, technicians and skilled manual workers.

Table 2 describes measures of central tendency for the component variables (i.e., AEQ-A subscales) used to classify this sample of adolescents. Consistent with previous findings, this sample of adolescents endorsed negative expectancies of cognitive impairment (Christiansen et al., 1987; Smith et al., 1995). The mean score for cognitive impairment in this sample was 21.1( $SD = 3.29$ ). Higher mean scores in negative expectancies of cognitive impairment have been associated with lower levels of AOD use (Dunn et al., 1999; Scheier, 2000). The second highest mean score was noted for positive expectancies of relaxation. In this sample, adolescents also tended to endorse positive expectancies of social facilitation and global positive transformation. Positive expectancies among adolescents have been shown to be significant risk factors for higher levels of AOD use and related consequences among adolescents (Reese, Chassin, & Molina, 1994). Table 2 shows means and standard deviations for all AEQ-A subscales.

Table 2.

*Means and Standard Deviations for AEQ-A Subscales.*

AEQ-A Subscales	<i>N</i>	<i>M</i>	<i>SD</i>
I. Global Positive Transformation (15 items)	287	7.38	3.98
II. Social Facilitation* (17 items)	287	8.40	3.70
III. Cognitive Enhancement (10 items)	287	1.59	1.76
IV. Sexual Enhancement (7 items)	287	4.29	2.16
V. Cognitive Impairment (24 items)	287	21.10	3.29
VI. Arousal (4 items)	287	2.67	1.21
VII. Relaxation and Tension Reduction (13 items)	287	9.82	3.12

Note: True/False Response Format. True = 1, False = 0.\* The Social Facilitation Scale is bi-directional, 10 were positive items, 7 were negative items; True = 1, False = 1.

Table 3 shows descriptive summaries for alcohol and other drug use variables. The Timeline Follow Back (TLFB) and the Drug Use Screening Inventory-Revised (DUSI-R) were used to assess alcohol and other drug use involvement. Both drinkers and non-drinkers were included in the analysis of these data. Because most participants in the TIP intervention program were self-identified as polydrug users (i.e., use of alcohol and other drugs), inclusion criteria for the current study were broadened to include adolescents who used alcohol or/and other illicit drugs. As noted above, alcohol expectancies have been shown to be significant predictors of subsequent drinking among adolescents (Smith, 1995). Moreover, studies that have examined AOD involvement among adolescents showed that alcohol expectancies were “cognitive motivations” that were generalizable constructs that predicted subsequent alcohol, as well as other drug use (Scheier, 2001; Stacy, Newcomb, & Bentler, 1991). Therefore, in the current study multiple measures of AOD use were used to assess AOD use behaviors.

Alcohol and other drug use involvement were recorded for the past 30 days. Alcohol involvement was obtained using the TLFB. These data were summarized by computing the number of days alcohol was consumed during the past 30 days. Also, data summaries included the maximum number of drinks consumed in one day, the total number of drinks consumed over the past 30 days and the average number of drinks per drinking day (See Table 3). Specifically, the mean for the maximum number of drinks in one day was 3.65 ( $SD = 5.14$ ). The distribution of alcohol use variables tended to be positively skewed.

The average number of days of drug use was also obtained using the DUSI-R (see Table 3). As aforementioned, participants reported drug use over the past month. During

the past month, the mean number of drug used was 3.76 ( $SD = 6.04$ ). Specifically, smoking tobacco, ( $M = 2.86$ ,  $SD = 1.79$ ), marijuana, ( $M = 2.48$ ,  $SD = 1.48$ ) and alcohol ( $M = 2.14$ ,  $SD = 1.06$ ) were the most frequently used substances over the past month.

AOD-related problems were also measured using the DUSI-R. These summary data showed that all participants consumed alcohol or/and other drugs and about half of participants endorsed one or more AOD use related-problems. Over one quarter (25.6%) of participants reported that alcohol caused them the most problems, while 34.3% of participants reported that marijuana caused them the most problems. Specifically, 47.1% of participants reported breaking the law while high on alcohol or drugs, 45.6% reported loss of memory, 22.5% reported subjective dependence on alcohol and other drugs, 20.6% experienced withdrawal symptoms and 26.2 % admitted inadequate refusal skills or the inability to decrease AOD use.

The measurement of heavy drinking episodes in late adolescence has been conceptualized as involving the relations between the quantity of alcohol consumed and the occurrence of alcohol-related problems (Wechsler, Dowdall, Davenport, & Rimm, 1995). Furthermore, it has been found that male heavy drinkers defined as consuming 5 drinks or more per occasion are as likely to experience alcohol-related problems as female heavy drinkers consuming 4 or more drinks per occasion (Wechsler et al., 1995). Thus, the findings presented above regarding AOD use and AOD-related problems in this sample of adolescents are consistent with individuals characterized as beginning to experience significant negative consequences related to their alcohol and other drug use (Griffin, Botvin, Epstein, Doyle, & Diaz, 2000; Gruber, DiClemente, Anderson, & Lodico, 1996).

Table 3.

*Sample Sizes, Means and Standard Deviations for Involvement with Alcohol and other Drugs.*

AOD Use Variables	N	M	SD
Alcohol use in the past month			
Past 30 days use	285	2.13	3.26
Maximum # of drinks per day	285	3.03	4.35
Total # of drinks over past 30 days	285	8.44	7.09
Average drinks per drinking day	285	2.13	2.88
Drug use in the past month			
Stimulants	287	1.16	.54
Cocaine/Crack	286	1.05	.32
Prescription diet pills	285	1.03	.26
OTC diet pills	285	1.07	.40
Heroin/morphine	287	1.02	.19
Methadone	284	1.01	.12
Prescription pain killers	286	1.30	.72
Barbiturates	286	1.03	.26
Quaaludes	286	1.01	.13
Tranquilizers	287	1.14	.44
Hallucinogens	285	1.21	.60
Ecstasy	285	1.09	.35
PCP	283	1.03	.19
Marijuana	287	2.48	1.48
Glue	284	1.01	1.06
Gasoline or other fumes	285	1.06	.38
Smoking tobacco	285	2.86	1.79
Chewing tobacco	283	1.08	.42
Anabolic steroids	285	1.00	.00

Note: 1= 0 times; 2 = 1-2 times; 3 = 3-9 times; 4 = 10-20 times; 5 = more than 20 times;

Another key variable domain assessed was psychological functioning. The Composite International Diagnostic Interview-Brief Form (CIDI) served to assess psychological functioning with regard to psychiatric symptomatology. More than half of the participants (59.8%) received a diagnosis of conduct disorder. About 21.2 % were diagnosed with Major Depression and 20.3% of the participants received a diagnosis of



Attention Deficit Hyperactivity Disorder. These findings are consistent with findings from studies that highlight the comorbidity of psychiatric disorders with AOD problems among adolescents (e.g., Rohde, Lewinsohn, Kahler, Seeley, & Brown, 2001). With respect to psychosocial functioning, other key indices of adjustment were also evaluated.

Table 4 provides measures of central tendency for other psychosocial adjustment variables. These included measures assessing stress-coping constructs (i.e., Perceived Stress Scale and Revised Ways of Coping Checklist), social functioning (i.e., Teenage Inventory of Social Skills, and the Reckless Behavior Questionnaire). The Revised Ways of Coping Checklist was used to assess participants' coping styles. Participants reported highest scores on problem-focused coping, ( $M = 36.56, SD = 9.02$ ) and the lowest scores on blamed self coping, ( $M = 6.35, SD = 2.16$ ). Composite scores from the Perceived Stress Scale reflected overall high levels of perceived stress ( $M = 35.60, SD = 7.46$ ). Relationship skills were measured by the Teenage Inventory of Social Skills. Higher scores were reported on the positive behavior scale ( $M = 78.56, SD = 16.81$ ) than for the negative behavior scale ( $M = 56.59, SD = 19.0$ ). The frequency of problem behaviors was measured by the Reckless Behavior Questionnaire. Involvement in delinquent behavior (e.g., damaged or destroyed property) over the past year was on the lower end of the scale ( $M = 18.37, SD = 6.26$ ) given the range of the frequency of problem behaviors in this sample was between 10 and 45 of a maximum possible score of 60.

Table 4.

*Sample Sizes, Means and Standard Deviations for Psychosocial Adjustment Variables.*

Psychosocial Adjustment Variables	N	M	SD
Coping Dimensions			
Problem-Focused	255	36.56	9.03
Social Support	255	13.91	3.94
Blames Self	255	6.35	2.16
Wishful Thinking	255	20.53	6.05
Avoidance	255	22.96	5.65
Perceived Stress			
Overall Perceived Stress	288	35.59	7.46
Feeling Out of Control	288	15.15	5.12
Feeling in Control	288	20.42	5.38
Relationship Skills			
Positive Social Skills	311	78.56	16.81
Negative Social Skills	311	56.59	19.01
Total Involvement in Problem Behavior	287	18.37	6.27

In summary, these descriptive results describe demographic, substance use and adjustment-related variables among of this sample of adolescents. Taken together, results from alcohol and other drug use variables and indices of psychosocial adjustment suggest that the overall adjustment of this sample of adolescents is reflective of youth beginning to experience significant consequences of alcohol and other drug use, with the potential for further escalation of problem behaviors (Jessor & Jessor, 1977). Preliminary bivariate analyses were also conducted to describe further relations among specific variables

included in this study. While it was noted a priori that sets of component and external variables would be correlated, the next step of analyses assessed the magnitude of intercorrelations among component variables (i.e., AEQ-A subscales), as well as between component and external variables (i.e., psychosocial adjustment indices).

*Bivariate Analyses.*

Table 5 summarizes intercorrelations among component variables, i.e., AEQ-A subscales. Results documented significant intercorrelations among subscales for this measure. The majority of subscales were significantly positively correlated,  $p < .01$ . However, no significant correlation was observed between cognitive enhancement (Scale 5) and social facilitation (Scale 2). As expected, there was no significant relation between cognitive enhancement and cognitive impairment. While intercorrelations were largely significant and robust among component variables, the relation between social facilitation (Scale 2) and cognitive enhancement (Scale 3), while significant, was more modest in magnitude. Similar significant medium-sized correlations were observed between cognitive impairment and global positive transformation (Scale 1), as well as between cognitive enhancement and tension reduction (Scale 7).

Bivariate analyses were also conducted between component variables (AEQ-A subscales) and sets of external variables that were used to validate cluster solutions, i.e., psychosocial adjustment indices. Table 6 presents bivariate correlations between AEQ-A subscales and coping domains. Small to moderate magnitude ( $r = .10$  to  $.30$ ) correlations were observed between specific coping domains and several AEQ-A subscales. While most observed correlations between coping dimensions and AEQ-A subscales were positive in direction, problem-focused and seeking social support coping were

significantly negatively correlated with the cognitive enhancement AEQ-A subscale. However, many bivariate correlations in this analysis were not statistically significant. For example, problem-focused coping was not significantly correlated with global positive transformation (Scale 1), social facilitation (Scale 2), sexual enhancement (Scale 4), cognitive impairment (Scale 5), Arousal (Scale 6) or tension reduction (Scale 7). A similar pattern was observed for seeking social support coping. A different yet consistent pattern of bivariate correlations was noted for the wishful thinking, blames self and avoidance coping domains. These coping subscales were significantly correlated, although with coefficients of small to moderate magnitude, with all AEQ-A subscales except cognitive enhancement (Scale 3) and cognitive impairment (Scale 5).

Table 7 summarizes bivariate correlations of small to medium magnitude between AEQ-A subscales and perceived stress variables. Overall, perceived stress was only significantly correlated with cognitive enhancement. Other AEQ-A subscales were not significantly correlated with overall perceived stress. Feeling out of control, a subscale of the perceived stress scale (PSS) was not significantly correlated with the cognitive enhancement, sexual enhancement, cognitive impairment, arousal or tension reduction subscales of the AEQ-A. However, small but significant correlations were observed for global positive transformation and social facilitation. Feeling in control was significantly correlated with the cognitive enhancement and relaxation/tension reduction subscales of the AEQ-A. No other significant bivariate correlations were noted between feeling in control and other AEQ-A subscales.

Table 5

*Intercorrelations among AEQ-A Subscales*

Subscales	1	2	3	4	5	6	7
1. Global Positive Transformation	—	.57**	.43**	.63**	.28**	.53**	.73**
2. Social Facilitation			—	.48**	.03	.42**	.54**
3. Cognitive Enhancement				—	.30**	.32**	.27**
4. Sexual Enhancement					—	.33**	.57**
5. Cognitive Impairment						—	.45**
6. Arousal							—
7. Relaxation & Tension Reduction							—

Note:  $n = 287$ ;  $p < .01$ ; 2-tailed tests

Table 6

*Correlations between AEQ-A Subscales and Coping Dimensions*

AEQ-A Subscales	Coping Domains				
	Problem-Focused	Seeking Social Support	Blaming	Wishful Thinking	Avoidance
	Adolescents ( <i>n</i> = 252)				
Global Positive	.02	-.01	.16*	.14*	.17*
Social Facilitation	.10	.02	.26**	.24**	.32**
Cognitive Enhancement	-.16*	-.13*	-.01	-.04	.01
Sexual Enhancement	.09	.05	.20**	.22**	.22**
Cognitive Impairment	.06	-.00	-.04	.04	.01
Arousal	.11	.05	.15*	.15*	.19**
Relaxation	.08	.06	.16*	.16*	.18**

*Note:* \*  $p < .05$ ; \*\*  $p < .01$ ; 2-tailed tests

Table 7 also shows bivariate correlations between social skills and the AEQ-A subscales. Social interactions were measured by the TISS or Teenage Inventory of Social Skills (Inderbitzen & Foster, 1992). The TISS contains two subscales of 20 items each. The first subscale, positive social skills was significantly negatively correlated with the AEQ-A cognitive enhancement subscale ( $p < .01$ ). Bivariate correlations between positive social skills and other subscales of the AEQ-A were not statistically significant. The negative social skills subscale was significantly positively correlated with the global positive transformation, social facilitation, sexual enhancement, relaxation/tension reduction ( $p < .01$ ), as well as arousal ( $p < .05$ ) AEQ-A subscales.

Adolescents' involvement in risk taking behaviors was assessed using the Reckless Behavior Questionnaire (Shaw et al., 1992). Two indicators of risk-taking behaviors were derived from this measure. A total involvement indicator measured general deviant behavior, including alcohol and other drug use behaviors. A second indicator specifically tapped non-drug related risky behaviors (e.g., unsafe sex, vandalism, reckless driving). As shown in Table 7, both indicators were significantly positively correlated with all AEQ-A subscales except cognitive impairment. The strongest bivariate correlation was observed between the AEQ-A social facilitation subscale and total involvement in reckless behavior  $r(287) = .39, p < .01$ . A more moderate correlation was identified between the social facilitation subscale and non-drug-related risky behaviors  $r(287) = .28, p < .01$ .

Involvement in problem behavior while under the influence of AOD use (e.g., missed curfew, breaking the law, memory impairment) was also measured by the DUSI-R. A composite score was obtained by computing the sum of items that were answered

Table 7

*Correlations between AEQ-A Subscales and indices of Perceived Stress, Social Skills, and Reckless Behaviors*

Psychosocial Indices	Global	Social	Cognitive Enhancement	Sexual Enhancement	Cognitive Impairment	Arousal Impairment	Relaxation
Perceived Stress ( <i>n</i> = 252)							
Overall	.10	.04	.12*	.02	-.04	-.01	-.02
Feeling out of Control	.14*	.18**	-.08	.11	.06	.08	.11
Feeling in Control	.01	-.11	.24**	-.08	-.11	-.07	-.12*
Social Skills ( <i>n</i> = 287)							
Positive	-.04	-.01	-.20**	.04	.11	-.01	.02
Negative	.26**	.26**	.10	.21**	.04	.15*	.16**
Reckless Behaviors ( <i>n</i> = 286)							
Overall	.24**	.39**	.13**	.19**	.04	.21**	.23**
Non-AOD related	.16**	.28**	.16**	.14*	-.03	.16**	.14*

Note: \*  $p < .05$ ; \*\*  $p < .01$ ; 2-tailed tests



positively. AEQ-A subscales for social facilitation  $r(206) = .17, p < .05$ , and sexual enhancement,  $r(206) = .18, p < .05$  were significantly positively correlated with total involvement in problem behavior while under the influence of alcohol and other drugs.

Table 8 summarizes bivariate correlations between alcohol and other drug use and AEQ-A subscales. Alcohol and other drug use variables were measured using the Timeline Follow Back (TLFB) and the Drug Use Screening Inventory-Revised (DUSI-R). Alcohol use was measured using TLFB summary scores for maximum number of drinks per drinking day, average number of drinking days in the past 30 days and total number of drinks in the past 30 days. The data were summarized in the following fashion to better capture different patterning of drinking between groups. Two variables generated from the DUSI-R included the number of times the participants used marijuana and tobacco over the past 30 days. These variables were generated because marijuana and tobacco were the most frequently used substances in this sample of substance-using adolescents, in addition to alcohol.

Small- to moderate-sized bivariate correlations were identified between AEQ-A subscales and TLFB summary scores. The significant correlations with the largest magnitude were noted between maximum number of drinks per drinking day and the social facilitation  $r(284) = .35, p < .01$ ; arousal  $r(284) = .23, p < .01$ , and tension reduction/relaxation AEQ-A subscales  $r(284) = .21, p < .01$ . There were no significant correlations observed between the AEQ-A cognitive enhancement subscale and the TLFB summary scores. While the AEQ-A is designed to measure alcohol expectancies, in this sample of adolescents the magnitude of correlations between AEQ-A subscales and marijuana use during the last month (via DUSI-R) were more robust than the correlations

identified between AEQ-A subscales and alcohol use in the last month (via TLFB summary scores). Marijuana use during the last month was significantly positively correlated with all subscales of the AEQ-A except for the cognitive enhancement and cognitive impairment subscales. The strongest correlations were identified between marijuana use and the social facilitation  $r(287) = .40, p < .01$ , and tension reduction/relaxation AEQ-A subscales  $r(287) = .24, p < .01$ . Therefore, alcohol expectancies for social facilitation appear to be the most relevant alcohol expectancy associated with AOD outcomes in this sample of adolescents. This finding is consistent with previous research that suggests that adolescents who endorse alcohol expectancies for social facilitation are more likely to have higher levels of AOD use and to be at higher risk for developing AOD-related problems (Smith, Greenbaum, & Goldman, 1995). Positive bivariate correlations were also noted between several AEQ-A subscales and tobacco use during the last month. Specifically, tobacco use during the last month was significantly positively correlated with social facilitation  $r(285) = .28, p < .01$ . More modest bivariate correlations were identified between past month tobacco use and the tension reduction/relaxation AEQ-A subscale,  $r(285) = .18, p < .01$ , Arousal,  $r(285) = .16, p < .01$ , global positive transformation,  $r(285) = .14, p < .05$ , and sexual enhancement AEQ-A subscales,  $r(287) = .15, p < .05$ . It is important to note that the social facilitation scale is a bidirectional scale. Ten items measured whether participants reported that alcohol enhances social behavior and seven items assessed whether alcohol impedes social behavior.

### *Summary of Descriptive results*

In summary, these preliminary analyses describe a heterogeneous treatment sample of adolescents. While sample selection for this study focused on adolescents receiving school-based treatment for AOD use, their background characteristics (i.e. family structure, school grade) as well as AOD use history were consistent with that of a community sample of adolescents (Johnson et al., 2003). This feature of the present data is unique in that it afforded the opportunity to discuss variability in individual-level and contextual level characteristics (i.e., demographic variables) associated with different patterns of alcohol expectancies that may generalize to other high risk samples of adolescents.

Bivariate results indicated that the correlations between component variables (i.e., AEQ-A subscales) and indices of psychosocial adjustment ranged from small to medium in magnitude. Furthermore, several consistent patterns were noted between AOD use variables, indicators of psychosocial adjustment and AEQ-A subscales. As expected, bivariate correlations documented significant relations between AEQ-A subscales and sets of external variables that will be used in the validation analyses. Overall, these findings provide empirical support for the selection of specific indicators of psychosocial adjustment as external variables to validate the cluster solution. Furthermore, the current data suggests that differences observed between alcohol expectancy profile clusters (i.e., results reported in the next section) are not artifactual in nature since the magnitude of correlations between key component and external variables were described before conducting multivariate analyses (e.g., via cluster analysis). The objective of the next set of analyses was to classify this sample of adolescents receiving treatment services using

Table 8

*Correlations between AEQ-A Subscales and AOD Use Variables*

Subscales	Marijuana use Past month	Tobacco Use Past month	Alcohol Use Past 30 days	Alcohol Use Max # drinks/day	Alcohol Use Total # drinks/day
Adolescents ( $n = 285$ )					
Global Positive	.18**	.14*	.14*	.19**	.15*
Social Facilitation	.40**	.28**	.31**	.35**	.31**
Cognitive Enhancement	.08	.00	.08	.00	.02
Sexual Enhancement	.20**	.15*	.05	.17**	.08
Cognitive Impairment	-.02	.11	-.01	.05	.04
Arousal	.13*	.16**	.12*	.23**	.22**
Relaxation	.24**	.18**	.01	.21**	.12*
<i>Not</i>					

*e*: \*  $p < .05$ ; \*\*  $p < .01$ ; 2-tailed

their AEQ-A scores, in order to identify homogenous subgroups in this sample that report distinct and meaningful patterns of alcohol expectancies.

#### *Identification of Subtypes of Adolescents as a Function of AEQ-A Scores*

The tradition of person-centered analytic approaches is to “preserve the person” during the analysis of the data. That is, the purpose of employing a person-centered analytic technique is (a) to capture different patterns associated with meaningful and distinct subgroups, and (b) document qualitatively unique characteristics within homogeneous subgroups (Bergman, 2001). The goal of using a person-centered analytic technique in the current study was (a) to identify distinct and meaningful subgroups of adolescents on the basis of their self-reported AEQ-A scores, and (b) describe between-group differences associated with membership in different AEQ-A endorsement patterns.

This set of analyses included two components. First, to classify this sample of adolescents, Ward’s Method cluster analysis was used. Ward’s Method cluster analysis is an exploratory classification technique that uses a hierarchical iterative algorithm based on the notion that clusters are determined on the basis of similarity of cases within the data (Aldenderfer & Blashfield, 1984; Ward, 1963). While cluster analysis is a valuable tool for uncovering meaningful and distinct groups in the data, it does not provide information identifying the reasons for the existence of the distinct groups (Aldenderfer & Blashfield, 1984). Therefore, a subsequent step following the classification of this group of adolescents involved a two-phase validation procedure to document significant between-cluster differences in (a) endorsement patterns of alcohol expectancies and (b) adolescents’ ratings of multiple dimensions of psychosocial adjustment. The alcohol expectancy clusters were constructed using Ward’s Method cluster analysis (Ward,

1963). An optimal 6-part cluster solution was retained. This solution was selected on the basis of an inspection of the agglomeration schedule. Specifically, this solution was selected with regard to: between-cluster differences on component variables; cluster sizes; and, the magnitude of associated  $F$  tests. The 6-part cluster solution included a total of 287 participants.

#### *Between-Cluster Differences in AEQ-A Scores*

The Pillai's Trace multivariate test statistic indicated an overall pattern of significant differences across the six alcohol expectancy clusters ( $V = .985$ ,  $F = 2660.6$ ,  $7/275$   $df$ ,  $p < .001$ ). The overall effect size was  $n^2 = .98$ ; suggesting that 98% of the variability between AEQ-A subscales is accounted for by alcohol expectancy clusters. Univariate  $F$  statistics showed significant differences by cluster membership for each alcohol expectancy subscale: Global Positive Transformation ( $F = 137.27$ ,  $5/281$   $df$ ,  $p < .001$ ,  $n^2 = .710$ ); Social Facilitation ( $F = 61.46$ ,  $5/281$   $df$ ,  $p < .001$ ,  $n^2 = .522$ ); Cognitive and Motor Enhancement ( $F = 79.47$ ,  $5/281$   $df$ ,  $p < .001$ ,  $n^2 = .586$ ); Sexual Enhancement ( $F = 66.95$ ,  $5/281$   $df$ ,  $p < .001$ ,  $n^2 = .544$ ); Cognitive Impairment ( $F = 47.36$ ,  $5/281$   $df$ ,  $p < .001$ ,  $n^2 = .457$ ); Arousal ( $F = 43.84$ ,  $5/281$   $df$ ,  $p < .001$ ,  $n^2 = .438$ ); Relaxation and Tension Reduction ( $F = 111.74$ ,  $5/281$   $df$ ,  $p < .001$ ,  $n^2 = .665$ ). This finding suggests the existence of six empirically distinct and meaningful subgroups in this sample of adolescents receiving treatment services (see Table 9).

Mean level differences in AEQ-A subscale scores between alcohol expectancy clusters were examined further using the Tukey HSD test in post-hoc group comparisons to determine which clusters among the six alcohol expectancy clusters were significantly different from each other. The Tukey HSD (honestly significant difference) procedure

allows for a comparison of the possible pairs of means and maintains the experimentwise error at the selected alpha level of .05 (Jaccard & Guilamo-Ramos, 2004). Cluster means and standard deviations for AEQ-A subscales are presented in Table 9. While Ward's Method cluster analysis was conducted using standardized scores on alcohol expectancy subscales, the means that are summarized in Table 9 are based on non-standardized scores to facilitate comprehension of results. Significant differences were observed between several clusters on the Global Positive Transformation scale. In particular, Clusters 6 and 3 reported significantly higher scores on the AEQ-A Global Positive Transformation subscale than did Clusters 1 and 4, which reported significantly higher scores than Cluster 2. Cluster 5 reported the lowest mean levels for this scale. Higher mean scores on the AEQ-A subscale of Social Facilitation were observed in Clusters 3, 4, 6 and 1 which were significantly higher than the mean score reported by members of Cluster 2, which reported significantly higher scores than members of Cluster 5.

Significant group differences among the six clusters with regard to the AEQ-A Cognitive Enhancement Scale indicated that members of Cluster 6 reported the highest mean score for this scale. It is also noteworthy that although members of Cluster 4 reported a significantly lower mean score on this scale than those in Cluster 6, members of Cluster 4 reported a significantly higher mean score than members of Clusters 1, 2, 3, and 5. Members of Clusters 6 and 3 reported significantly higher scores on the AEQ-A Sexual Enhancement subscale than did members of Clusters 2, 4, and 1 who reported significantly higher mean scores than members of Cluster 5. Mean scores for Cognitive Impairment were comparable among members of Clusters 1, 2, 3, and 6, but the mean scores reported by members of Clusters 4 and 5 were significantly lower than those

reported by the other four clusters. Members of Clusters 6 and 3 reported significantly higher mean scores on the AEQ-A. Arousal subscale than members of Clusters 1, 2, and 4, which reported significantly higher mean scores than members of Cluster 5. With regard to the Relaxation/Tension Reduction AEQ-A scale, Clusters 6, 1, and 3 reported significantly higher mean scores than Clusters 2 and 4. As noted with other AEQ-A subscales, members of Cluster 5 reported the lowest average scores for the Relaxation/Tension Reduction subscale.

Descriptive profiles of AEQ-A subscale scores depicted in Figure 1 show that the empirical distinctions among the six alcohol expectancy clusters do not reflect uniform patterns of anticipated beliefs about the effects of alcohol (i.e., alcohol expectancies). Patterns of descriptive profiles are consistent with three general overall patterns of AEQ-A scores and functioning: Two elevated clusters (Clusters 6 and 3), three “normative” clusters (Clusters 4, 1, 2) and a least elevated cluster (Cluster 5). Cluster 6, the smallest cluster ( $n = 14$ ) is the most problematic cluster reporting highest scores for the Cognitive Enhancement AEQ-A subscale. This type of expectancy has been associated with the highest risk for relapse and more maladaptive psychosocial functioning in alcoholics (Brown, McCarthy, & Smith, 1999). In addition, studies that have examined alcohol expectancies among adolescents suggest that positive expectancies of cognitive enhancement are the least endorsed expectancies among adolescents (Christiansen et al., 1989; Dunn et al., 1999). This atypical pattern exhibited by members of Cluster 6 suggests heightened level of risk for AOD use, as well as related problems. Members of Cluster 6 also reported higher mean scores on the Global Positive Transformation, Social Facilitation, Arousal, and Relaxation/Tension Reduction subscales of the AEQ-A.



Therefore, members of Cluster 6 endorsed more positive expectancies (i.e., social facilitation, global positive transformation, arousal). The endorsement patterns of members of Cluster 6 with a constellation of expectancies that are highly positive except for cognitive impairment suggest that members of Cluster 6 are at greater risk for developing or maintaining alcohol and other drug use-related problems (Greenbaum et al., 1995; Smith, 1994)

Members of Cluster 3, the largest cluster ( $n = 113$ ), show an alcohol expectancy profile characterized by AEQ-A endorsements of positive expectancies for social facilitation, global positive transformation, arousal, as well as relaxation/tension reduction. As noted above, members of Cluster 3 endorsed positive expectancies that have been associated with risk for AOD use behaviors among adolescents. It is notable that members of cluster 3 also endorsed negative expectancies of cognitive impairment at high levels. This pattern of AEQ-A endorsements distinguishes members of Cluster 3 from members of Cluster 6 in that negative expectancies of cognitive impairment expectancies have been correlated with lower AOD use (Brown et al., 1999; Christiansen et al., 1982). Compared to members of Cluster 6, who also endorsed high scores for positive expectancies, members of Cluster 3 endorsed significantly lower mean scores for alcohol expectancies of cognitive enhancement. Low scores for cognitive enhancement expectancies are generally reported to be more normative among adolescents, and is related to fewer subsequent AOD use behaviors (Cruz et al., 2003; Dunn et al., 1999).

Table 9.

*Mean Scores on AEQ-A Subscales for Groups Generated by 6-part Cluster Solution*

	Cluster 1		Cluster 2		Cluster 3		Cluster 4		Cluster 5		Cluster 6		<i>F</i>
	<i>M</i>	<i>SD</i>	<i>M</i>	<i>SD</i>	<i>M</i>	<i>SD</i>	<i>M</i>	<i>SD</i>	<i>M</i>	<i>SD</i>	<i>M</i>	<i>SD</i>	
AEQ-A Subscales													
Global Positive Transformation	6.41 <sub>c</sub>	2.45	3.91 <sub>b</sub>	2.06	10.66 <sub>d</sub>	2.09	7.50 <sub>c</sub>	2.69	.95 <sub>a</sub>	1.20	11.07 <sub>d</sub>	2.40	137.27*
Social Facilitation	9.75 <sub>c</sub>	2.08	5.28 <sub>b</sub>	2.64	10.44 <sub>c</sub>	2.68	10.19 <sub>c</sub>	3.15	2.81 <sub>a</sub>	1.66	9.86 <sub>c</sub>	2.11	61.46*
Cognitive and Motor Enhancement	1.09 <sub>a,b</sub>	.96	.81 <sub>a,b</sub>	.87	1.57 <sub>b</sub>	1.22	2.63 <sub>c</sub>	1.64	.14 <sub>a</sub>	.36	6.86 <sub>d</sub>	1.56	79.47*
Sexual Enhancement	3.06 <sub>b</sub>	1.90	3.33 <sub>b</sub>	1.56	5.83 <sub>c</sub>	1.23	3.97 <sub>b</sub>	1.94	.57 <sub>a</sub>	.68	6.07 <sub>c</sub>	1.21	66.95*
Cognitive Impairment	21.69 <sub>b</sub>	1.69	21.56 <sub>b</sub>	2.09	22.73 <sub>b</sub>	1.27	16.13 <sub>a</sub>	2.81	17.38 <sub>a</sub>	6.13	21.07 <sub>b</sub>	2.59	47.36*
Arousal	2.41 <sub>b,c</sub>	1.04	1.99 <sub>b</sub>	1.19	3.35 <sub>d,e</sub>	.75	2.84 <sub>c,d</sub>	.88	.81 <sub>a</sub>	.68	3.93 <sub>e</sub>	.27	43.84*
Relaxation or Tension Reduction	11.25 <sub>c</sub>	1.19	8.32 <sub>b</sub>	2.24	11.77 <sub>c</sub>	1.43	8.62 <sub>b</sub>	2.42	2.71 <sub>a</sub>	2.15	12.21 <sub>c</sub>	.97	111.74*

Note: \*  $p < .001$ . Means with different subscripts are significantly different by Tukey HSD test,  $p < .05$ ,  $df = 5$

Figure 1. Descriptive Alcohol Expectancy Profiles in a Treatment Sample of Adolescents



Members of Cluster 4 ( $n = 32$ ) reported the second highest mean scores of positive expectancies for social facilitation. Members of this cluster also endorsed positive expectancies for relaxation/tension reduction and global positive transformation. The mean scores for other positive expectancies (i.e., arousal, cognitive and sexual enhancement) were on the lower end of the range of the mean scores in this sample of adolescents. In comparison to the other five clusters, members of Cluster 4 endorsed lower mean scores for cognitive impairment. Members of Cluster 4 exhibited patterns of alcohol expectancy endorsements that are consistent with patterns among adolescents vulnerable for developing alcohol and other drug-related problems (Christiansen et al., 1989; Dunn et al., 1999; Smith et al., 1995).

Members of Cluster 1 reported the third highest mean scores for positive expectancies for relaxation/tension reduction. Members of this cluster also had the fourth highest mean scores for positive alcohol expectancies for social facilitation. Their mean scores for other positive expectancies such as Sexual Enhancement ( $M = 3.06$ ), Arousal subscale ( $M = 2.41$ ), and Cognitive Enhancement, ( $M = 1.09$ ), were toward the lower end of the mean scores reported by the members of other clusters (e.g., Clusters 6, 3, and 4) that reported higher means for positive alcohol expectancies. Members of Cluster 1 reported high scores on cognitive impairment. The general pattern of alcohol expectancy endorsements observed among members of Cluster 1 suggests a normative pattern of alcohol expectancy endorsement. Christiansen and colleagues (1989) indicated that adolescents typically report high mean scores on negative expectancies for cognitive impairment. Negative expectancies for cognitive impairment have been associated with lower involvement with AOD use behaviors (Christiansen et al., 1987; 1989)

Members of Cluster 2 ( $n = 75$ ) reported higher scores for relaxation/tension reduction. Members of this cluster also reported lower mean scores on other dimensions of positive alcohol expectancies. For example, the AEQ-A mean scores were for: the Social Facilitation subscale ( $M = 5.28$ ), Global Positive Transformation ( $M = 3.91$ ), Sexual Enhancement subscale was ( $M = 3.33$ ) and Arousal, ( $M = 1.99$ ). Members of Cluster 2 reported particularly low mean endorsement ratings for positive alcohol expectancies for cognitive enhancement, ( $M = .81$ ). Members of this cluster reported high mean scores for endorsement for negative expectancies of cognitive impairment. The pattern of alcohol expectancy endorsements exhibited by members of Cluster 2 was significantly different from patterns of endorsements reported by “elevated” Clusters 6 and 3. Mean levels in endorsements for positive expectancies were lower in Cluster 2 compared to Cluster 1. This finding supports the notion that adolescents who report lower mean scores in positive expectancies present lower levels of risk for AOD use-related problems as lower scores in positive alcohol expectancies were associated with decreased involvement in AOD use behaviors (Greenbaum et al., 1999).

Members of Cluster 5 reported the lowest mean scores across all AEQ-A subscales. Members of this cluster showed a pattern of alcohol expectancy endorsements that was the least elevated across all AEQ-A subscales. Members of Cluster 5 also endorsed high scores for negative expectancies for cognitive impairment. The pattern of alcohol expectancy endorsements reported by members of Cluster 5 suggests a pattern of beliefs about the effects of alcohol that is consistent with lower levels of involvement with alcohol and other drugs (Christiansen et al., 1989).

In summary, the six empirically-derived alcohol expectancy clusters reflected qualitatively distinct patterns of beliefs about the effects of alcohol. Clusters 6 and 3 were identified as being “elevated” based on higher mean endorsements for positive alcohol expectancies. Clusters 4, 2, and 1 were characterized as being “normative” because their AEQ-A endorsement patterns were representative of expectancies endorsed by adolescents of this age group receiving treatment for alcohol and other drug use (Barnow, Schultz, Lucht, & Freyberger, 2003). Members of Cluster 5 were characterized as “least elevated” as they reported consistently lower scores across all AEQ-A subscales.

#### *Validation of Alcohol Expectancy Profile Clusters*

The next phase of the validation analyses consisted of conducting univariate analyses via ANOVA and Chi Square for sets of external variables that were shown to be correlates of AEQ-A subscales in preliminary analyses. Table 10 presents the distribution of lifetime psychiatric diagnoses by alcohol expectancy cluster membership. The distribution of conduct disorder diagnosis by alcohol expectancy profile is as follows: Cluster 1 ( $n = 32$ ; 71.9%), Cluster 2 ( $n = 75$ ; 52%), Cluster 3 ( $n = 113$ ; 61.9%), Cluster 4 ( $n = 32$ ; 81.9%), Cluster 5 ( $n = 21$ ; 42.9%), and Cluster 6 ( $n = 14$ ; 71.4%). The distribution of lifetime diagnoses of conduct disorder differed significantly by cluster membership,  $X^2(5, n = 287) = 13.28, \phi = .215, p < .05$ . Conduct Disorder (CD) was the most prevalent DSM-IV diagnosis in this sample of adolescents. Adolescents with CD diagnoses were overrepresented in Clusters 1, 4, and 6. This finding was expected given the fact that in this sample of adolescents receiving treatment services, there was an overrepresentation of male adolescents. Furthermore, this finding is consistent with other research that has found that endorsement of positive alcohol expectancies is associated

with conduct problems among AOD-using adolescents (e.g., Greenbaum, 1999). Other psychiatric disorders assessed were Major Depression, Dysthymic Disorder, Generalized Anxiety Disorder, Specific Phobia, Social Phobia, Panic Attack, and Attention Deficit Hyperactive Disorder. There were no significant between-cluster differences in the proportion of cluster members receiving CIDI-generated psychiatric diagnoses, other than Conduct Disorder.

Table 11 summarizes levels of alcohol use measured by the TLFB and frequency of AOD use over the past month measured by the Drug Use Screening Inventory (DUSI-R) by alcohol expectancy cluster membership. Significant between-cluster differences were revealed for all self-reported AOD use variables. Specifically, for the alcohol use only variable, between-cluster differences were observed for the maximum number of drinks per day variable ( $F = 5.08, 5/283 \text{ df}, p < .001, n^2 = .084$ ), the number of days alcohol was consumed in the past thirty days ( $F = 3.08, 5/283 \text{ df}, p < .01, n^2 = .052$ ), and for the total number of drinks over the past thirty days ( $F = 4.41, 5/283 \text{ df}, p < .001, n^2 = .073$ ). Members of Cluster 3 identified as one of the “elevated” clusters for positive expectancies, reported the highest mean scores for maximum drinks per day, total number of days alcohol was consumed in the past month and the score total for involvement with alcohol and other drugs from the DUSI-R. Members of Cluster 6, the other cluster characterized by higher scores for endorsements of positive expectancies also reported high scores of AOD involvement on all AOD use variables and AOD-related problems (see Table 11). Consistent with their patterns of alcohol expectancy endorsements, members of Cluster 5 reported the lowest mean levels of alcohol use and involvement

Table 10.

*Lifetime Prevalence of Psychiatric Diagnoses by Membership in Alcohol Expectancy Profile Clusters*

	Cluster 1 (n = 32)	Cluster 2 (n=74)	Cluster 3 (n=112)	Cluster 4 (n=32)	Cluster 5 (n=21)	Cluster 6 (n=11)	
	N	N	N	N	N	N	$\chi^2$
	%	%	%	%	%	%	df
Major Depression	8	9	29	7	4	5	5
	25.0	12.0	26.4	21.9	19.0	35.7	7.44
Dysthymic Disorder	3	6	10	4	2	1	5
	9.4	8.0	8.9	12.5	9.5	7.1	.63
GAD	3	5	5	3	4	1	5
	9.4	6.7	4.5	9.4	19.0	7.1	6.03
Specific Phobia	4	2	7	3	0	0	5
	12.9	2.7	6.4	9.4	0	0	7.19
Social Phobia	3	5	3	5	0	0	5
	9.7	6.7	5.3	15.6	0	0	7.44
Panic Attack	4	3	6	2	2	1	5
	12.5	4.1	5.3	6.3	10.0	7.1	3.38
Conduct Disorder	23	39	70	26	21	14	5
	71.9	52.0	61.9	81.3	42.9	71.4	13.28**
ADHD	8	12	25	9	5	3	5
	25.0	16.2	22.1	28.1	23.8	21.4	2.36

Note: Percents reported are within Cluster solutions \*\* $p < .01$ , 2-tailed test



with other drugs. Overall, results from between-cluster comparisons of AOD use variables suggest considerable between-cluster variability that is consistent with the alcohol expectancy endorsement patterns described in Table 9.

Significant mean differences were found for members of Clusters 2 and 3 in all three summary alcohol only variables (i.e. number of drinking days in the last 30 days, maximum of drinks on drinking in the last 30 days and total number of drinks in the last 30 days). Members of Cluster 5 significantly reported lower mean scores for the maximum drinks variable than Cluster 3. Significant mean differences between Clusters 2 and 3 suggest a clear correspondence between alcohol expectancy endorsement patterns and scores for AOD use. In fact, members of Cluster 3 were identified as reporting “elevated” patterns in positive alcohol expectancies which have been found to be related to higher drinking levels. Similar patterns of significant mean differences between Clusters 2 and 3 were found with regard to alcohol use in the last month measured by the DUSI-R.

Table 12 describes between-cluster differences in self-reported psychosocial adjustment ratings. Significant between-cluster differences were revealed in mean levels of the feeling out of control subscale of the perceived stress scale ( $F = 2.84, 5/280 df, p < .05, n^2 = .048$ ), and of the negative social interactions subscale of the Teenage Social Inventory Scale ( $F = 3.52, 5/281 df, p < .01, n^2 = .059$ ). Consistent with alcohol expectancy endorsement patterns documented in Table 9, members of Clusters 3 and 6 designated as “elevated patterns,” reported more negative social interactions. Members of Cluster 3 reported the highest mean scores of perceived stress with respect to feeling out of control, followed by members of Clusters 4 and 1. The finding that members of

Cluster 1 reported significantly higher mean scores for perceived stress is consistent with their patterns of alcohol expectancy endorsements. In fact, members of Cluster 1, characterized by normative patterns of positive alcohol expectancies, reported higher mean scores for relaxation/tension reduction expectancies than the comparable normative Cluster 2.

Significant between-cluster differences were found for psychosocial adjustment indices of reckless behaviors and coping dimensions. Consistent with their “elevated patterns” of positive expectancies and AOD use, members of Cluster 6 reported significantly higher mean scores for total involvement in reckless behaviors ( $M = 21.21$ ,  $SD = 7.28$ ) than members of Cluster 2 ( $M = 15.95$ ,  $SD = 5.71$ ) and Cluster 5 ( $M = 13.52$ ,  $SD = 5.0$ ) identified as reporting “normative” and “least elevated” endorsement patterns of positive expectancies respectively. Means scores with respect to reckless behaviors were comparable among members of Clusters 3 and 4. Significant differences were also found when relations between coping styles and alcohol expectancy clusters were evaluated. Univariate  $F$  statistics indicated an overall pattern of significant differences between alcohol expectancy clusters and the Problem-Focused, Blames Self, Wishful Thinking and Avoidant Coping subscales of the Revised-Ways of Coping Checklist. There were no significant differences between alcohol expectancy clusters and the seeking-social support subscale of the Revised-Ways of Coping Checklist. Members of Cluster 2 (i.e., “normative” patterns for positive expectancies) reported significantly lower mean scores on the Blames Self subscale than members of Clusters 3 and 4 (i.e., “elevated patterns for positive expectancies). While members of Clusters 3, 4, and 6 were identified as reporting “elevated patterns” for positive expectancies significant between-

cluster differences were found across these three clusters on the Wishful Thinking subscale and Avoidant coping subscale suggesting heterogeneity in patterns of adjustment among alcohol expectancy clusters.

Table 13 describes the ethnic, gender and family structure variables by cluster membership. Significant differences were observed with respect to the ethnic composition and family structure by alcohol expectancy cluster membership. Clusters 1, 3, and 6 were largely composed of White adolescents. Clusters 4 and 5 had a higher proportion of Blacks while Cluster 4 had a higher proportion of Hispanics. Although, gender differences were not observed in this sample, it is noteworthy that 35.7% of members of Cluster 6 (i.e., elevated patterns cluster) were females. This is particularly telling since recent reports from national surveys of adolescent AOD use suggest increases in the rates of AOD use among female adolescents (Johnson et al., 2004). The proportion of adolescents living in single families was higher in lower risk clusters particularly in Clusters 1 and 5 suggesting that one-parent household was not related to the consistent pattern of risk in this sample of adolescents (i.e. elevated patterns of endorsement for positive expectancies). This finding supports the notion of heterogeneity in adjustment outcomes (e.g., Luthar, 1993). Furthermore, this finding parallels a growing body of a literature that contends that family processes such as family conflict resolution and parenting style are stronger correlates of risk for AOD and psychosocial maladjustment than family structure (Brody & Forehand, 1993; Eitle, 2005).

Table 14 summarizes school grade and age differences by cluster membership. In this sample, 28.6% of adolescents in 8<sup>th</sup> grade were members of the highest risk for AOD use and maladjustment (i.e., Cluster 6). The current finding is consistent with national

surveys which reported that many 8<sup>th</sup> graders reported experimenting with alcohol and other drugs (Johnson et al., 2004). The mean age for members of Cluster 6 was 14.6 years. Cluster membership was not characterized by statistically significant differences in age. The mean age across alcohol expectancy clusters ranged between 14.98 and 15.72.

In summary, the findings presented in this section suggest heterogeneity in patterns of alcohol expectancy endorsements are related to specific indices of psychosocial adjustment. The current results described patterns of alcohol expectancy endorsement that were significantly associated with individual-level characteristics such as perceived stress, social interactions, coping styles, reckless, as well as AOD use behaviors. The present findings provide additional data that support the validity of the cluster solution. Specifically, the results presented in this section, suggest that alcohol expectancy profiles are meaningfully related to heterogeneity in adjustment outcomes among adolescents receiving treatment services for AOD use behaviors.

Table 11.

*Summary of AOD involvement by Membership in Alcohol Expectancy Cluster Membership*

Alcohol Variable	Cluster 1 (N = 32)		Cluster 2 (N=75)		Cluster 3 (N=32)		Cluster 4 (N=32)		Cluster 5 (N=21)		Cluster 6 (N=14)		F
	M	SD	M	SD	M	SD	M	SD	M	SD	M	SD	
Alcohol use only													
Max drinks/day	3.4/ 5.4 <sub>abc</sub>		1.5/2.7 <sub>b</sub>		4.3/4.9 <sub>c</sub>		3.3/4.3 <sub>abc</sub>		.88/1.7 <sub>b</sub>		3.0/3.5 <sub>abc</sub>		5.08***
# of past 30 days use	2.3/2.5 <sub>a</sub>		1.1/3.5 <sub>a</sub>		2.7/3.3 <sub>b</sub>		2.9/3.3 <sub>a</sub>		1.0/1.8 <sub>a</sub>		2.5/2.4 <sub>a</sub>		3.08**
Total # of drinks over past 30 days	7.47/12.6 <sub>a</sub>		2.52/7.0 <sub>a</sub>		13.16/22.4 <sub>ab</sub>		11.31/18.6 <sub>a</sub>		2.70/7.4 <sub>a</sub>		7.07/7.7 <sub>a</sub>		4.41**
Frequency of AOD Past month use													
Alcohol	2.3/1.0 <sub>a</sub>		1.8/1.8 <sub>a</sub>		2.3/1.1 <sub>ab</sub>		2.4/1.1 <sub>a</sub>		1.5/.6 <sub>ad</sub>		2.4/.8 <sub>a</sub>		4.55***
Marijuana	3.0/1.4 <sub>a</sub>		1.8/1.3 <sub>bc</sub>		2.8/1.5 <sub>ad</sub>		2.9/1.5 <sub>a</sub>		1.5/.93 <sub>c</sub>		2.4/1.3 <sub>ac</sub>		8.10***
Smoking tobacco	3.8/1.5 <sub>a</sub>		2.3/1.7 <sub>b</sub>		3.2/1.8 <sub>ac</sub>		2.7/1.8 <sub>a</sub>		1.8/1.5 <sub>d</sub>		3.0/1.9 <sub>a</sub>		5.99***
Total AOD-related problems	4.2/3.0 <sub>a</sub>		1.9/2.3 <sub>a</sub>		4.6/3.6 <sub>a</sub>		3.4/3.6 <sub>a</sub>		1.3/1.0 <sub>a</sub>		5.0/3.9 <sub>b</sub>		2.34*

Note:

\*  $p < .05$ , \*\*  $p < .01$ , \*\*\*  $p < .001$ . Means with different subscripts are significantly different by Tukey HSD test,  $p < .05$ ,  $df = 5$

Table 12.

*Levels of Psychosocial Adjustment Ratings by Alcohol Expectancy Cluster Membership*

Psychosocial Variables	Cluster 1 (n = 32)	Cluster 2 (n = 74)	Cluster 3 (n = 113)	Cluster 4 (n = 32)	Cluster 5 (n = 21)	Cluster 6 (n = 14)	F
Reckless Behaviors	19.97(4.48) <sub>ac</sub>	15.95(5.71) <sub>b</sub>	19.67(5.78) <sub>c</sub>	19.81(7.6) <sub>acd</sub>	13.52 (5.0) <sub>b</sub>	21.21(7.8) <sub>e</sub>	7.86***
Perceived Stress	15.72(4.5) <sub>a</sub>	13.66(5.3) <sub>a</sub>	16.07(4.9) <sub>b</sub>	15.94(4.7) <sub>a</sub>	14.66(4.4) <sub>a</sub>	13.07(6.3) <sub>a</sub>	2.84*
Negative Social Interactions	53.78(15.49) <sub>a</sub>	49.37(15.3) <sub>b</sub>	56.97(15.2) <sub>c</sub>	53.06(14.7) <sub>a</sub>	46.10(13.7) <sub>d</sub>	57.93(17.4) <sub>a</sub>	3.52*
Coping Dimensions							
Social seeking	15.12 (3.73)	12.97(4.36)	14.29(3.65)	13.92(3.46)	14.37(4.56)	11.75(3.60)	2.22*
Problem-focused	39.27 (7.09)	34.23 (10.18)	37.86(8.32)	37.16(7.50)	36.74 (9.46)	30.75(11.43)	2.86*
Self-Blaming	6.77 (2.12) <sub>a</sub>	5.45 (1.98) <sub>ab</sub>	6.66(2.19) <sub>ac</sub>	7.16(1.55) <sub>ac</sub>	6.05(2.12) <sub>a</sub>	5.92(2.68) <sub>a</sub>	3.94**
Wishful thinking	21.7 (5.89) <sub>a</sub>	18.42(6.38) <sub>ab</sub>	21.90(5.53) <sub>ac</sub>	22.24(4.72) <sub>abc</sub>	18.89(6.51) <sub>a</sub>	16.17(6.69) <sub>ad</sub>	5.06***
Avoidant	23.85(4.39) <sub>a</sub>	20.70 (5.45) <sub>a</sub>	24.47 (5.18) <sub>ab</sub>	24.64 (5.30) <sub>ac</sub>	20.32 (5.94) <sub>ac</sub>	19.42 (7.59) <sub>ac</sub>	6.51***

*Note:* Higher means indicate higher levels of construct; *Note:* \*  $p < .05$ , \*\*  $p < .01$ , \*\*\*  $p < .001$ . Means with different subscripts are significantly different by Tukey HSD test,  $p < .05$ ,  $df = 5$

Table 13.

*Ethnic, Gender and Family Composition of Alcohol Expectancy Cluster Membership*

	Cluster 1 N %	Cluster 2 N %	Cluster 3 N %	Cluster 4 N %	Cluster 5 N %	Cluster 6 N %	df	X <sup>2</sup>
Ethnicity	(N = 32)	(N=74)	(N=112)	(N=32)	(N=21)	(N=11)		
Whites	21 65.6	38 51.4	81 72.3	14 43.8	11 52.4	11 61.8		
Blacks	2 6.3	15 9.8	11 9.8	7 21.9	4 19.0	0		
Hispanics	6 18.8	17 23.0	17 15.2	11 34.4	4 19.0	2 20.0		
Other	3 9.4	4 5.4	3 2.7	0	1 4.8	0	20	40.17**
Gender	(N = 32)	(N=75)	(N=113)	(N=32)	(N=21)	(N=14)		
Male	16 50.0	53 70.7	66 58.4	20 62.5	11 52.4	9 64.3		
Female	16 50.0	22 29.3	47 41.6	12 37.5	10 47.6	5 35.7	5	5.64
Family Structure	(N = 29)	(N=63)	(N=98)	(N=24)	(N=19)	(N=11)		
Nuclear	7 24.1	25 39.7	43 43.9	7 29.2	2 10.5	4 36.4		
Single - Mother	18 62.1	27 42.9	43 43.9	10 41.7	15 78.9	6 54.5		
Single - Father	3 10.3	6 9.5	8 8.2	7 29.2	2 10.5	1 9.1		
Other	1 3.4	5 7.9	4 4.1	0	0	0	15	25.19*

Note: Score indicates percent within clusters. \* p<.05, \*\* p<.01

Table 14.

*School Grade and Age differences by Alcohol Expectancy Cluster Membership*

Grade	Cluster 1 (n = 32)		Cluster 2 (n = 75)		Cluster 3 (n = 113)		Cluster 4 (n = 32)		Cluster 5 (n = 21)		Cluster 6 (n = 14)		df	X <sup>2</sup>
	N	%	N	%	N	%	N	%	N	%	N	%		
6th	0		3	4.0	2	1.8	1	3.1	3	14.3	0			
7th	3	9.4	15	20.0	8	7.1	3	9.4	1	4.8	2	14.3		
8th	13	40.6	31	41.3	38	33.6	7	21.9	6	28.6	4	28.6		
Freshman	3	9.4	5	6.71	8	15.9	6	18.8	3	14.3	3	21.4		
Sophomore	9	28.1	8	10.7	22	19.5	9	28.1	5	23.8	3	21.4		
Junior	2	6.3	5	6.7	21	18.6	3	9.4	1	4.8	2	14.3		
Senior	2	6.3	8	10.7	4	3.5	3	9.4	2	9.5	0		30	45.46*

  

Age	Cluster 1		Cluster 2		Cluster 3		Cluster 4		Cluster 5		Cluster 6		F
	M	SD	M	SD	M	SD	M	SD	M	SD	M	SD	
	15.72(1.30)		14.98(1.60)		15.39(1.44)		15.69(1.67)		15.12(1.86)		15.47(1.38)		1.69

*Note:* Score indicates percent within clusters, \* p<.05, \*\*p<.01



The overarching purposes of the present study were to describe distinct patterns of alcohol expectancies and their relations to psychosocial adjustment in a school-based sample of adolescents receiving treatment services. In order to achieve these goals, the present investigation used a person-centered analytic approach to: (a) classify adolescents receiving substance use treatment services using their scores on the Alcohol Expectancy Questionnaire-Adolescent Version, (b) identify homogenous subgroups of adolescents with distinct patterns of alcohol expectancies, and (c) document group differences between alcohol expectancy profiles for specific indicators of psychosocial adjustment.

Results of the current study support the proposition that adolescents who report AOD use and AOD use-related problems are a heterogeneous group. The identification of subgroups in this sample is an important first step for understanding how prevention and treatment programs may be impacted by adolescents' individual characteristics such as alcohol expectancy endorsement patterns. In this study, adolescents differed by scores for specific types of endorsements of alcohol expectancies. Group differences as revealed by expectancy profile clusters suggested that distinct patterns of alcohol expectancies are significantly associated with both AOD use behaviors, as well as other indicators of psychosocial adjustment. While the current study is essentially descriptive, it illustrated the utility of a person-centered analytic approach to highlight heterogeneity in patterns of endorsements of alcohol expectancies that may have been missed in previous variable-centered analyses of alcohol expectancies.

## Summary of Key Findings

### *Descriptive Analyses of Alcohol Expectancy Clusters*

The current findings revealed heterogeneous patterns of alcohol expectancies for distinct subgroups within the sample of adolescents who participated in the study. Findings from the current study identified six empirically distinct alcohol expectancy clusters defined by adolescents' self-reported scores on the AEQ-Adolescent Version. Higher risk profiles (i.e., Cluster 6, 4, and 3) reported AEQ-A scores reflecting expectancy patterns of high endorsement of cognitive enhancement, global positive transformation, and social facilitation alcohol expectancies. Cluster 1 and 2 were differentiated as “normative” risk groups by moderately high scores for social facilitation, and global positive transformation, but lower scores for cognitive enhancement in comparison to Clusters 6, 4, and 3. Cluster 5 was distinguished as a lower risk cluster, since members of Cluster 5 reported scores for positive expectancies that were lowest (i.e., lower mean scores for global positive effects, social facilitation and cognitive enhancement expectancies).

Between-cluster comparisons revealed significant differences in patterns of endorsements across AEQ-A domains, suggesting significant variability in the sample of adolescents participating in the current study. This finding provides evidence for the initial validation of the cluster solution (Aldenderfer & Blashfield, 1984). In fact, all expectancy domains commonly found in the positive and arousing quadrant of the two-dimensional representation of alcohol expectancies (e.g., Rather, 1994) including global positive transformation, social facilitation, relaxation/tension reduction, and sexual enhancement expectancies were differentially endorsed by AEQ-A cluster membership.

In the current study, alcohol expectancy clusters with higher endorsements for positive alcohol expectancies reflected existing literature which suggests that adolescents at risk for the persistence and escalation of AOD use behaviors and AOD-related problems are more likely to endorse positive alcohol expectancies (Christiansen 1987, 1989; Smith et al., 1995, 2001).

#### *Differences in AOD Involvement by Alcohol Expectancy Profile Clusters*

Univariate analyses revealed differential patterns of AOD involvement between expectancy profile clusters. Important subgroups were identified in clusters in which higher mean scores for positive expectancies (i.e. social facilitation, cognitive enhancement, sexual enhancement) were endorsed. As expected, there was a significant association between cluster membership and total AOD involvement, as well as involvement with specific substances including alcohol, marijuana and other illicit drugs. Specifically, adolescents who reported higher scores for AOD use behaviors were members of Clusters 6, 4, and 3 that were characterized as reporting positive alcohol expectancies. This finding is consistent with research suggesting that positive and arousing expectancies are associated with heavier AOD use and the progression of AOD use behavior (Christiansen & Goldman, 1983; Dunn, 1999; McCarty et al., 2001). A unique feature of the current study with regard to AOD use behavior and alcohol expectancies is that this study highlights relations between the differential patterning of a constellation of expectancies (i.e, via expectancy cluster membership) and AOD use outcomes. Therefore, the current findings support the notion that the examination of alcohol expectancies using a person-centered analytic approach is useful for providing data that underscores within-group differences in alcohol expectancy endorsement

patterns associated with patterns of AOD use among adolescents receiving AOD use treatment services.

#### *Differences in Psychosocial Adjustment by Alcohol Expectancy Profile Clusters*

The examination of relations between alcohol expectancy cluster membership and specific indices of psychosocial adjustment revealed significant between-cluster differences in psychosocial adjustment ratings. This finding supports the hypothesis that distinctions in the patterning of alcohol expectancies would be related systematically to indices of psychosocial adjustment measured in the current investigation. Specifically, the overrepresentation of adolescents in Clusters 6, 4 and 3 with lifetime diagnoses of conduct disorder supports the hypothesis that the patterning of alcohol expectancies would be associated significantly with adjustment outcomes as indexed by psychiatric symptomatology. Moreover, across alcohol expectancy clusters, adolescents in clusters described at higher risk reported higher scores for perceived stress and more negative social interactions. This general trend was also found for the psychosocial adjustment domains of reckless behaviors and coping styles.

While this finding suggests that alcohol expectancy endorsement patterns were related to indicators of reckless behaviors and coping styles, it also supports the notion of heterogeneity of adjustment outcomes in this school-based sample of adolescents receiving AOD use treatment services. Studies that have examined heterogeneity in adjustment outcomes among high-risk samples of adolescents indicate that at-risk youth often differ across adjustment outcomes (e.g., Luthar & Zelazo, 2003). For example, in the current study, adolescents who endorsed “elevated patterns” of positive expectancies reported significantly higher AOD-related problems. However, mean differences in

problem-focused coping, a more adaptive coping style (e.g., Cooper et al., 1992) were not significantly differentiated by cluster membership. The advantage of using a person-centered analytic approach in this study is that it yielded information about meaningful subgroup distinctions with regard to specific adjustment outcomes in this high-risk sample of adolescents.

Specific hypotheses were not formulated with regard to possible differences in demographic characteristics by alcohol expectancy clusters. However, the assessment of these domains yielded a number of noteworthy findings. Chi Square analyses indicated significant between-cluster differences in family composition, school grade and ethnicity. Between-cluster differences by gender were not statistically significant. Demographic differences by cluster membership are noteworthy for describing patterns associated with alcohol expectancy clusters. They are also essential factors that support the use of person-centered analyses, as this approach has permitted the identification of qualitatively different homogenous subgroups of adolescents with regard to their AOD use and adjustment outcomes, as well as demographic characteristics.

#### Integration of Current findings with Existing Literature

##### *Alcohol Expectancy Clusters*

The findings of the present study support the merit of using a person-centered analytic approach to examine heterogeneity in alcohol expectancy patterns and the relation of cluster membership to specific adjustment outcomes among adolescents receiving AOD use treatment services. Taken together, the current findings support the contention that there is considerable heterogeneity in patterns of alcohol expectancy endorsements among this at-risk sample of adolescents. While many studies have

explored the contribution of alcohol expectancies to AOD use outcomes, most have addressed linear relations between alcohol expectancies and AOD use via variable-centered approaches. To date, the identification of meaningful subgroups in broader patterns of endorsements of alcohol expectancies has been neglected through the largely exclusive use of variable-centered analytic approaches.

Evidence from developmental research has been instrumental in providing support for the use of alternative analytical approaches to study more effectively heterogeneous patterns of adjustment outcomes, including AOD use, in adolescence (e.g., Schulenberg et al., 2001). In the present study, distinct and meaningful alcohol expectancy-based clusters were validated empirically with specific indices of both AOD use behavior and broader psychosocial adjustment. Membership in alcohol expectancy clusters were consistently related to not only to specific measures of AOD use but also to more general indicators of broader psychosocial adjustment. These findings parallel other developmental research describing relations between AOD use and psychosocial adjustment among adolescents showing significant heterogeneity in outcomes with regard to adolescent AOD use (Li, Barrera, Hopes, & Fisher, 2002; Tubman et al., 1991, 2003).

While a different analytic approach was used to describe relations between distinct and meaningful patterns of expectancy endorsements and AOD use outcomes, the findings reported in this study intersect with research regarding traditional expectancy models. All alcohol expectancy-based clusters were distinguished by high scores for cognitive impairment expectancies. This is consistent with the current expectancy literature that suggests that adolescents routinely endorse negative expectancies (Christiansen, 1987; Dunn, 2001; Smith, 1995). Furthermore, alcohol expectancy clusters

associated with greater risk for involvement with AOD use corresponded with high ratings for positive expectancies (e.g., regarding cognitive enhancement, social facilitation, global positive transformation) that have been shown to be associated with continuing AOD use and related problems (Smith, 1994).

There is significant overlap between the patterns of expectancies reported by specific clusters in this at-risk sample of adolescents and research conducted among clinical samples of adults. For example, Cluster 6, the highest risk cluster, reported particularly high scores for cognitive enhancement. It has been suggested that the endorsement of these particular expectancies present increased vulnerability for relapse and more serious AOD-related problems in adult samples (Mann, Chassin, & Sher, 1987). General population samples of adolescents are less likely to endorse high scores for cognitive enhancement expectancies. Therefore, the high scores for positive alcohol expectancies endorsed by members of Cluster 6 may reflect incrementally higher risk for future maladaptative outcomes for this at-risk subsample. Other notable findings regard the patterns of expectancy endorsements reported by the three alcohol expectancy clusters at higher risk. Cluster 6, 4, and 3 not only reported high scores for cognitive enhancement but also high scores for social facilitation, and global positive transformation expectancies. Their levels of endorsement of negative expectancies (i.e., cognitive impairment expectancies) were comparable to their levels of endorsements of positive expectancies. The latter is consistent with research that has examined alcohol expectancies among adolescents (e.g., Botvin et al., 1999; Christiansen et al., 1982; Smith et al., 1995)

In addition, the current findings support the model of alcohol expectancy circumplex (Darkes, Greenbaum, & Goldman, 2004) which purports that expectancy endorsements are not accurately represented along a two-dimensional depiction of positive/arousing and negative/sedating expectancies (Rather, 1994). The model of alcohol expectancy circumplex suggests that alcohol expectancies are not dichotomous variables, whereby individuals endorse either positive or negative beliefs about the effects of alcohol when on the contrary, individuals more often endorse both positive and negative alcohol-related expectancies (Darkes et al., 2004). The multivariate constellation of expectancies or alcohol expectancy clusters is significantly associated with AOD use outcomes. Consistent with Darkes and colleagues (2004), in the current study, adolescents endorsed alcohol expectancies that included both positive/arousing and negative/sedating expectancies. The constellation of expectancy endorsement patterns reported by adolescents participating in this study may be far more reflective of patterns of risk, and potentially more telling with regard to systematic variations in adjustment outcomes. Consequently, the findings of the current study may meaningfully add to current understanding of alcohol expectancies and their relations to AOD use and other adjustment outcomes. Specifically, the current findings suggest that: (a) alcohol expectancy endorsements patterns are heterogeneous among adolescents receiving AOD use treatment services and, (b) the identification of meaningful homogeneous subgroups is useful for distinguishing youth at greater risk for continued involvement with AOD use and development of AOD-related consequences.

Between-cluster differences observed for specific indices of psychosocial adjustment support and inform research on both adolescent development (e.g.,



Schulenberg et al., 1999), as well as alcohol expectancies (Chassin et al., 2001). Also, the current findings provide practice-relevant information that is particularly useful for AOD use prevention and intervention programs. The finding that alcohol expectancy Clusters 6, 4, and 3 reported patterns of expectancy ratings associated with more involvement with AOD use suggests that members of these clusters are at higher risk for future AOD-related problems. This finding is consistent with previous research indicating that adolescents who tend to endorse positive expectancies are at risk for poorer adjustment outcomes (Greenbaum et al., 1999; Smith et al., 1995). Members of clusters 6, 4, and 3 also reported psychosocial adjustment ratings reflecting poorer outcomes. For example, higher proportions of adolescents in Clusters 6, 4, and 3 reported psychiatric symptomatology related to depression, anxiety, and conduct disorder.

Between-cluster differences observed in all indicators of psychosocial adjustment used in the current study suggest that alcohol expectancy clusters are related to specific domain of adjustment outcomes in this clinical sample of adolescents. Consequently, the findings of the present study with regard to relations between alcohol expectancy cluster membership and indicators of psychosocial adjustment highlight important within-group variability in adjustment outcomes. In particular, the use of a person-centered analytic approach has permitted the description of systematic relations between multivariate alcohol expectancy endorsement patterns and specific domains of psychosocial adjustment.

### Implications of the Current Findings

The findings reported here both expand and build upon current literature on adolescent AOD use and related adjustment outcomes. First, the findings of this study

support existing research that shows that alcohol expectancies are strong correlates of AOD use outcomes among adolescents (Botvin & Scheier, 1997; Chassin & D'Amico, 2002; Christiansen et al., 1987; Greenbaum et al., 1995, Smith et al., 1995). In the present study, alcohol expectancy cluster membership was related to involvement with AOD use. Furthermore, members of clusters who reported higher scores for positive expectancies of cognitive enhancement, social facilitation, arousal, and sexual enhancement also reported more AOD use. Therefore, the results of this study build upon current research that shows significant relations between patterns of alcohol expectancies and AOD use outcomes.

Second, the present results expand current knowledge in that they provide evidence supporting the use of a person-centered analytic technique to describe heterogeneity in alcohol expectancy endorsements patterns and relations with psychosocial adjustment among at-risk adolescents. To this end, the literature on alcohol expectancies and AOD outcomes has largely emphasized one-to-one relations between specific expectancies and AOD use behaviors. In general, high scores on positive expectancies (e.g. global positive transformation, sexual enhancement expectancies) strongly predicted AOD use behavior and high endorsements of negative expectancies (e.g., cognitive impairment expectancies) were associated with lower involvement with AOD use (e.g., Noll, Del Boca, Darkes, & Goldman 1999). Other studies have focused on the mediating role of expectancies as they have been shown to account for the influence of distal factors (e.g., family history of AOD use and related problems, personality characteristics) commonly associated with AOD use behavior (Darkes & Goldman, 1999). In spite of the extensive literature that suggests that expectancies are significantly associated with AOD use behaviors in different populations, including

children and adolescents (Dunn et al., 1999, 2002, 2004; Smith et al., 1989, 1995), little research has been designed to examine heterogeneity in multivariate patterns of alcohol expectancies. Therefore, the current study contributes to the existing research regarding alcohol expectancy endorsements as it highlighted heterogeneity in patterns of alcohol expectancies and its significance with respect to the diversity in associated adjustment ratings in this sample of adolescents receiving treatment services.

Third, the findings of the present study illustrated the significance of using a person-centered framework (Bergman, 2001) for distinguishing heterogeneity in patterns of alcohol expectancies. In this study, the use of this framework has added greatly to current understanding of expectancy characterization in high-risk adolescents. The documentation of relations between key indices of psychosocial adjustment and empirically distinct, homogenous subgroups defined by expectancy endorsements supports the notion of variability among at-risk adolescents (Muthén & Muthén, 2000; Loeber et al., 1988). In addition, the range of multivariate factors (i.e., risk and protective factors for AOD use) used in this study has provided relevant data with regard to the current conceptualization of alcohol expectancies. Indeed, the current results suggest that alcohol expectancies, in addition to being predictors of AOD use behaviors (i.e., from a variable-centered framework) may be essential amenability to treatment factors that could be important targets of intervention efforts when devising treatment services for AOD-using adolescents.

Recent research on adolescent AOD use suggests that knowledge of heterogeneity is advantageous for devising prevention and intervention programs. The use of a person-centered strategy is especially informative for clinical practice in that such a strategy

takes into account variability among subgroups of individuals (Gil, Wagner, & Tubman, 2004). Specifically, this study has meaningfully summarized unique processes (i.e., alcohol expectancy profiles) that potentially distinguish adolescents on key processes such as treatment engagement, amenability and response. While it is beyond the scope of the present study to speak of possible implications of the current findings with regard to response to treatment, the present findings do have important and useful implications for treatment engagement or/and amenability. The amenability to treatment model specifies that preventive programs and interventions may be differentially effective for subgroups with similar characteristics (Kazdin, 1988; Snow, Tebes, & Ayers, 1997; Tubman, Wagner, Gil, & Pate, 2002, Wagner, 2003). In this study, high-risk adolescents with similar expectancy endorsement patterns were distinguished by incrementally distinct levels of risk. The results of the present study suggest the potential existence of alcohol expectancy specific amenability to treatment factors. Between-group differences were sufficiently important to suggest that treatment approaches may need to be sensitive to differences in alcohol expectancy endorsement patterns.

### *Study Limitations*

The present findings supported the notion of heterogeneity in alcohol expectancy endorsement patterns. Also, the current study provided important data with respect to heterogeneity in patterns of alcohol expectancy profiles and their association with specific adjustment outcomes. In spite of these important findings, our conclusions are significantly limited by the use of a cross-sectional design, the clinical status of the sample, self-reported data regarding alcohol expectancies and psychosocial adjustment ratings. Empirical distinctions in heterogeneous patterns of expectancy clusters were

validated using specific indices of psychosocial adjustment (i.e., risk and protective factors). However, the use of a cross-sectional design cannot determine cause and effect regarding relations between alcohol expectancy clusters and AOD use outcomes (Robinson, Schmidt & Teti, 2005). Therefore, the design of the present study limits our ability to offer more conclusive statements regarding the mechanisms underlying the influence of alcohol expectancy clusters on AOD use outcomes.

In addition, given the clinical status of the current sample, the heterogeneous patterns of AEQ-A scores tended to consist of similar trends across alcohol expectancy profiles, with cluster members reporting high AEQ-A scores for positive alcohol expectancies. Nonetheless, alcohol expectancy clusters did not reflect uniform patterns of risk for alcohol-related problems in this sample. In fact, differential patterns of alcohol expectancies resulted in the identification of three homogeneous subgroups (i.e., elevated positive AEQ-A scores by members of Clusters 6, 4, and 3; moderately high positive patterns of AEQ-A scores by members of Clusters 1 and 2, and low positive AEQ-A scores reported by members of Cluster 5). While these findings may not be generalized to adolescents in the general population, they are particularly relevant for adolescents receiving treatment for AOD use and consequences related to AOD use behaviors.

The present findings were based on self-reports by adolescents participating in the study. Therefore, the current results may be confounded by the effect of social desirability. Also, the data was obtained from a single informant (i.e., the adolescent) which may have partly affected ratings of AOD use and psychosocial adjustment ratings. In addition, the study examined relations between alcohol expectancy clusters and selected indicators of psychosocial adjustment, such as AOD use, psychiatric

symptomatology, social interactions, perceived stress, reckless behavior and coping styles. It is clear that these indices of adjustment are not the only indicators that reflect overall psychosocial adjustment. There are a number of other variables such as family history of AOD use, parenting practices, age of onset of AOD use that have been shown to be associated with adjustment outcomes among at-risk adolescents (e.g., Brody & Forehand, 1993; Shen, Locke-Wellman, & Hill, 2001).

### *Directions for Future Research*

One of the fundamental ideas that emerged in this study is that patterns of endorsements for alcohol expectancies among adolescents entail considerable heterogeneity. Furthermore, the current findings support the usefulness of a person-centered analytic approach (e.g., Bergman, 2001; Bergman & Stattin, 1988; Magnusson, 2002) to evaluate relations between heterogeneous patterns of alcohol expectancy ratings and AOD use or other adjustment outcomes. As mentioned above, the use of a cross-sectional design has limited our conclusions with respect to the direction of relations between alcohol expectancy clusters and adjustment ratings summarized in this study. Therefore, longitudinal analyses are warranted in order (a) to increase internal validity and, (b) to more fully elucidate the role of alcohol expectancy patterns in relation to overall adjustment outcomes, including AOD use behaviors.

Future research should also seek to examine the heterogeneity of alcohol expectancy clusters from a developmental perspective. The use of longitudinal data would provide information about processes involved in the formation of expectancies, as well as processes of continuity and discontinuity with regard to any critical periods and normative shifts from negative to positive expectancies. Furthermore, longitudinal

measurement of heterogeneous patterns of alcohol expectancy clusters may yield interesting information about how expectancies may change during development or during AOD use treatment.

In addition, the use of a community sample of adolescents would provide a more inclusive perspective regarding endorsement patterns of alcohol expectancies during this dynamic developmental period. Inclusion of a community sample would facilitate the assessment of not only broader patterns of alcohol expectancies but this would also allow the examination of meaningful and distinct alcohol expectancy patterns among adolescents who are symptomatic and asymptomatic with regard to psychiatric symptomatology, as well as relations with overall patterns of adaptation and maladaptation.

The application of a model that integrates person-centered and variable-centered analytic techniques to data analysis (e.g., Muthén & Muthén, 2000) may be an effective strategy for future studies. Recent methodological advances indicate that integrative approaches increasingly take into account heterogeneity and allow the examination of functional relationships between putative risk and protective factors and diversity of outcomes (e.g., Hix-Small, Duncan, Duncan, & Okut, 2004). Longitudinal measurement of heterogeneity via an integrative model would yield information about individual differences in the formation and development of expectancies, as well as the mechanisms underlying the relations between expectancy endorsement patterns and AOD or other adjustment outcomes.

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