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PSYCHOSOCIAL FACTORS ASSOCIATED WITH SUBSTANCE USE AMONG
YOUTH IN HAWAII

A DISSERTATION SUBMITTED TO THE GRADUATE DIVISION OF THE
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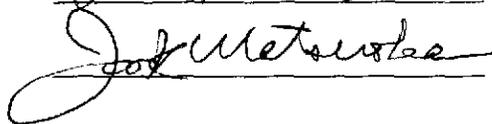
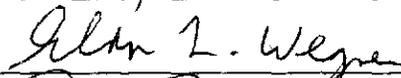
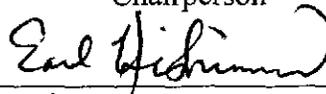
Eldon Wegner

We certify that we have read this dissertation and that, in our opinion, it is satisfactory in scope and quality as a dissertation for the degree of Doctor of Philosophy in Social Welfare.

DISSERTATION COMMITTEE



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ABSTRACT

Adolescent substance use is a prominent public health concern, with heavy use or abuse of substances being associated with acute or chronic health problems and has been found to be comorbid with other mental health disorders. Research on adolescent substance use for Asian and Pacific Islander adolescents have not typically taken into consideration the differences across the heterogeneous ethnic groups. The dissertation study assessed the prevalence substance abuse and dependence rates (by utilizing DSM-IV criteria) among the four major ethnic groups of Hawai'i (i.e., Native Hawaiian, Japanese, Filipino, and Caucasian) and examined the relationship among risk factors, protective factors, and demographic variables relating to adolescents substance use.

A total of 196 high school students (in the 9th and 12th grade) participated in the Study. Students were administered the Diagnostic Interview Schedule for Children (DISC), the American Drug and Alcohol Survey (ADAS), and the Prevention Planning Survey (PPS). There were 50 (25.5%) Native Hawaiian, 49 (25.0%) Japanese, 50 (25.4%) Filipino, and 47 (24.0%) Caucasian students.

Descriptive statistics, chi-square tests, factor analysis (on the PPS), and univariate as well as multiple logistic regression were conducted. There were 30 students (15.5% of the sample) that met criteria for DISC Alcohol or Marijuana Abuse or Dependence, with 62% of the sample reporting Any Alcohol or Marijuana Use. Pairwise logistic regressions found that Native Hawaiian rates were significantly greater than Japanese and Caucasian students. Statistically significant multiple logistic regressions (i.e., the model included gender, grade level, ethnicity, main wage earner's educational level, and 7

factors of the PPS) were found for all 6 dependent variables, with 49% of the variance for ADAS Any Alcohol or Marijuana Use being accounted for.

The findings show there are differences when ethnic groups are disaggregated for Asian and Pacific Islander students and future research should take this finding into consideration. When there is a greater understanding of the distinct differences across Asian and Pacific Islander students, the findings can then be applied to develop culturally appropriate intervention and prevention strategies.

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CHAPTER 1: INTRODUCTION

Historically, there has been no differentiation in the diagnosis and treatment of substance abuse between adults and adolescents. Prior to the 1970s, the addiction field overlooked variations and tended to treat adolescents as miniature versions of adults. However, there are significant differences between adolescent and adult substance users that should influence their diagnosis and treatment. One difference is that adolescents may not possess the cognitive ability to understand abstract values and concepts (i.e., denial, responsibility, and higher power) that are basic in the addiction field, (Kaminer, 1994) as they have yet to achieve the stage of formal operational thinking as defined by Piaget (1962). Another difference is the shorter duration of substance use by adolescents, thereby making the need for detoxification from substances infrequent in comparison to adult substance users who have experienced using substances for many years and have hit *rock bottom*. Furthermore, adolescents are experiencing a transition period which entails achieving their own identity and independence in comparison to adults who have typically completed the transition. Despite differences between adult and adolescent substance users, it has not been until relatively recently that the addiction field has focused on studying adolescent substance users separate from adult substance users.

In the 1970s, there was a significant increase in research on epidemiological and etiological issues relating to adolescent substance use. In the 1980s, more treatment options were being explored for this population (Kaminer, 1994). In the 1990s, there has been increased attention to issues relating to adolescent substance use. Despite these advances within the last 30 years, there has been a limited examination of ethnic and cultural variations in adolescent substance use.

In particular, there is a dearth of studies that disaggregate ethnic groups, especially for Asian and Pacific Islander adolescents. This dissertation augments the current paucity of literature on adolescent substance use for four major ethnic groups in Hawai'i: Native Hawaiian, Caucasian, Japanese, and Filipino adolescents. Although these four ethnic groups constitute 73.2% of Hawai'i's current population, there are currently few studies specifically attempting to understand variables associated with adolescent substance use and fewer studies utilizing a random sample design. The one large-scale study typically conducted every other year in Hawai'i (and last administered in 2003) is the Hawai'i Student Alcohol, Tobacco, and Other Drug Use Study. The Study obtains information on substance use rates for adolescents in Hawai'i based on the use of DSM-III-R criteria. Although the study attempts to survey a large number of students within the State of Hawai'i, the study does not utilize a random sample design.

This dissertation project will contribute to the literature in several ways. First, it will report prevalence rates across disaggregated ethnic groups in Hawai'i. Second, it will utilize criteria from the DSM-IV, considered the "gold standard" (versus the DSM-III-R), to assess prevalence rates. Third, it will also address the relationship between risk and protective factors, along with other demographic variables, that are associated with substance abuse or dependence for adolescents in Hawai'i.

The following section provides the contextual background to this study by reviewing the literature examining the definitions of adolescent substance use, the scope of adolescent substance use, risk and protective factors, and cultural considerations.

Definitions relating to adolescent substance use

In order to understand adolescent substance use, it is first crucial to establish a common language by adequately defining core concepts within the field. It is apparent in the literature that there is no universal definition for many of the terms relating to adolescent substance use, with researchers and policy makers tending to use their own operational definitions of terms, thereby making it difficult to adequately compare reported findings as well as adding to the difficulty of making accurate interpretations from the data gathered. The following sections highlight some of the debates in defining adolescent substance use and then presents those definitions used in this study.

Adolescent

The term adolescent can be defined as “a key period during which young people face a variety of new challenges and developmental goals” (Griffin, 2003, p. 97). Although the definition is vague and could encompass someone as young as 13 years of age to someone 21 years of age, the definition adequately reflects the varying definitions that can be found in the literature. Typically, adolescence has been described as the period of time from puberty to the early twenties or when adult responsibilities begin (Arnett, 1992). For purposes of this paper, the term adolescent will refer to the stage of life between childhood (the stage of being a child) and adulthood (when one reaches the legal age of majority) (Adams, Cantwell, & Matheis, 2002). More specifically, the term adolescent will refer to individuals between the ages of 13 and 19 (i.e., students in the 9th and 12th grade of high school).

DSM-IV and ICD 10

While it is difficult to define the term adolescent, an even bigger debate within the field relates to the lack of clarity between substance abuse and substance use (Bukstein & Kaminer, 1994). On the one hand, there is a belief that *any* substance use by an adolescent should be considered “substance abuse.” In contrast, there is the viewpoint that attributes the use of substances during adolescence as a period of time whereby *experimentation* (rather than a formal label of substance abuse) typically occurs. Depending on the viewpoint one holds, a broad definition of adolescent “substance abuse” that includes a high percentage of adolescents will require more resources in order to provide interventions to impact the problem area. Conversely, a narrow definition could omit adolescents with a substance use problem from receiving services since they may fall short of the specified determination criteria.

Formal clinical definitions of substance abuse and substance dependence that are currently used (within the addictions field) for adolescents are those identified in the Diagnostic and Statistical Manual of Mental Disorders – IV (DSM-IV) (American Psychiatric Association – APA, 1994) and the International Statistical Classification of Diseases and Related Health Problems, tenth edition (ICD-10) (World Health Organization, 1993). The ICD-10 classification system is utilized by approximately 190 countries (including Germany, China, the United Kingdom, European countries, and countries in South America) (World Health Organization, 2005). The DSM-IV is widely used throughout the United States as a tool to diagnose mental health disorders, while the ICD-10 is predominantly used to guide mental health diagnoses outside of the United States (Ridenour et al., 2002). The DSM-IV and the ICD-10 are similar in many

respects. Both systems classify substance use into the categories of abuse or dependence (for the DSM-IV) or harmful use (for the ICD-10). Both systems define dependence as the presence of withdrawal and/or tolerance, with the user not being able to control use of the substance, and the substance having a negative and discernible impact upon the user's life (Adams, Canwell, & Matheis, 2002). Lastly, both systems utilize the same criteria for substance abuse and substance dependence regardless of the user's age (Rounsaville, Bryant, Babor, Kranzler, & Kadden, 1993).

According to the DSM-IV, a diagnosis of substance abuse is met if any of the four listed criteria are present to a clinically significant degree over a 12-month period and the symptoms have not met criteria for substance dependence (see Table 1.1 or Appendix A for a more detailed list of symptoms). In order to meet criteria for substance dependence, three or more of seven criteria must be met within a 12-month period.

Table 1.1. DSM-IV Symptoms for Substance Abuse and Dependence

Substance Abuse Symptoms Summarized:

- a) unable to fulfill role obligations;
- b) utilizes substances in situations that are physically hazardous
- c) encounters substance-related legal problems (e.g., arrests related to use of substances);
- d) continues use despite interpersonal problems.

Substance Dependence Symptoms Summarized:

- a) tolerance to a substance;
- b) withdrawal;
- c) takes the substance in larger amounts over a longer period of time than intended;
- d) exhibits a persistent desire or unsuccessful efforts to cut down or control substance use;
- e) time is spent on activities to obtain, use or recover from the substance use;
- f) social, occupational, or recreational activities are reduced due to substance use;
- g) continued substance use despite experiencing physical or psychological problems that are likely due to the substance.

Adapted from the "Diagnostic and Statistical Manual of Mental Disorders - Fourth Edition," by the American Psychiatric Association, 1994, Washington, D.C.: Author.

Cautions when using the DSM-IV diagnostic system

Since the United States utilizes the DSM-IV to diagnose substance abuse and dependence, much of the information within this paper will be specific to work conducted with the DSM-IV. Although the classification system is able to distinguish between a person who is addicted versus a person who is well (Winters, 2001), it is unclear whether professionals within the field *accept* the system (Newcomb & Bentler, 1989). In addition, the definitions in DSM-IV were developed primarily based on clinical and empirical work with adults. Therefore, caution must be utilized when looking at the validity of the criteria in diagnosing an adolescent who is dependent upon a substance or who is abusing a substance (Bukstein & Kaminer, 1994; Gilvarry, 2000).

Another caution when using the DSM-IV classification system has to do with the “*diagnostic orphans*” or the adolescents who only meet one or two criteria, and therefore, do not meet criteria for dependence or abuse (Hasin & Paykin, 1998, 1999; Pollock & Martin, 1999). These “*orphans*” experience problems associated with the use of a substance or substances but have not met criteria for a DSM-IV diagnosis. When individuals who are labeled as “*diagnostic orphans*” are compared to individuals who may or may not use substances but do not report meeting any DSM-IV criterion, the “*diagnostic orphans*” experience severe problems such as early age of substance use onset, a greater extent of substance use, and a greater number of psychiatric disorders (Hasin & Paykin, 1998, 1999; Pollock & Martin, 1999).

Studies with adolescents have typically tested whether abuse and dependence are distinctly separate disorders. The results have been mixed. For example, Lewinsohn, Rohde, and Seeley (1996) conducted a longitudinal study of 1,507 Oregon high school

students and found DSM-IV criteria to be highly effective in differentiating adolescents with pathological functioning relating to substance use versus normal functioning. On the other hand, Fulkerson, Harrison, and Beebe (1999) found in their sample of 18,803 high school students in Minnesota that there were no major differences between the two diagnoses. This split in the findings shows that although a classification system is used by professionals within the field, it should not be assumed that the system is accepted by professionals in the field nor is the system valid simply due to the use of the system. Ultimately, the DSM-IV classification of either substance abuse or dependence must be carefully reviewed, particularly when considering classification for adolescents.

Drug definitions

Substances or drugs are defined as “any physical compounds, whether in a solid, liquid, or gaseous state, that can be taken into the body via at least one route of administration (e.g., oral, nasal, intramuscular, intravenous)” (Giancola & Tarter, 1999, p. 23). For purposes of this dissertation, the terms “substance” and “drug” will be used interchangeably and includes both illicit and licit substances, unless otherwise noted. Due to the myriad of definitions encompassing the term “substance,” the focus of this dissertation study will be on common drugs of abuse for adolescents, which include alcohol and marijuana.

Throughout the literature, the term illicit drug use appears and refers to illegal substances such as marijuana, cocaine, and amphetamines. Licit substances refer to legal substances such as alcohol. However, purchasing and consuming alcoholic beverages prior to 21 years of age is illegal within the United States and thus alcohol can be considered an illicit substance when used by adolescents (Peterson, Nisenholz, &

Robinson, 2003), with the exception of small amounts of alcohol that may be found in over-the-counter medications such as cough syrups.

Alcohol

Alcohol is the “oldest of recorded drugs” and is also referred to as ethanol or methanol (Giannini, 1997, p. 14). Beer, wine, and hard liquor all fall under the category of alcohol. Another term that is associated with alcohol is binge drinking which is typically defined as five or more drinks in one sitting. Medical complications associated with alcohol use and abuse include cirrhosis of the liver, ataxia (problems with muscle coordination), and potential death due to alcohol overdose or poisoning (Doweiko, 2002).

Marijuana

Marijuana, hemp, weed, or hashish (the resin from the marijuana plant) is a member of the cannabis sativa family of plants and has been the cause of much debate throughout the United States. The debate has centered on whether marijuana use should be made legal in order to act as a pain reliever. Within the State of Hawai‘i, marijuana has been legalized for medicinal purposes. However, the federal government does not support the use of marijuana for medicinal purposes and it is likely that marijuana use will continue to be controversial. Physicians in the United States and England (circa 19th century) used marijuana as a hypnotic, analgesic, and an anticonvulsant (Grinspoon & Bakalar, 1995). Marijuana can be smoked, mixed with other drugs, and baked in foods.

Scope of Adolescent Substance Use

For individuals advancing through adolescence, substance abuse can lead to acute or chronic health problems that could potentially lead to disability or death, injuries, violence, suicide, depression, low self-esteem, scholastic problems, delinquency,

increased drop out from school, teenage pregnancy, sexually transmitted diseases, and adverse mental health (Aarons et al., 1999; Ammerman, Ott, Tarter, & Blackson, 1999; Goodwin & Gabrielli, 1997; Hawkins, Catalano, & Miller, 1992; Sells & Blum, 1996). Substance abuse during adolescence can also lead to diseases of the liver and central nervous system, as well as heart and lung cancer. Substance use has also been found to be comorbid with other mental health disorders, particularly with depression, suicide, and conduct disorder (Fergusson & Horwood, 1997; Hawkins, Catalano, Morrison, O'Donnell, Abbott, & Day, 1992; Robins & McEvoy, 1990; Shaffer, Gould, Fisher, Trautman, Moreau, Kleinman, & Flory, 1996).

In order to understand the impact of prevalence rates and findings within studies, it is important to be able to recognize the terms of substance use, abuse, and dependence as well as the individual drugs that will be discussed. The following section will provide the reader with information relating to the scope of adolescent substance use.

As with any other disorder or social problem affecting society, the definition as well as classification system for the disorder or social problem is extremely important in order for individuals to compare and contrast findings. However, as was indicated previously, the lack of universality over common definitions relating to adolescent substance use makes comparisons and reported findings difficult to interpret. Thus the estimates and rates that will be provided should be interpreted with caution because they are accompanied by methodological and statistical issues.

Prevalence Rates of Adolescent Substance Use

Substance use and abuse typically emerges in adolescence (between 13 and 16 years of age) whereby individuals commonly begin to experiment with substances (Ammerman, Ott, Tarter, & Blackson, 1999; Doweiko, 2002; Gilvarry, 2000; Sloboda, 2002). Several studies have focused on obtaining prevalence rates of substance use over the years. A few ongoing studies have specifically looked at the prevalence rates and trends of adolescent substance use over time.

Monitoring the Future Study

The Monitoring the Future Study (conducted by the University of Michigan, Institute of Social Research, with funding from the National Institute on Drug Abuse) began collecting data from a nationally representative sample of 12th grade students in the United States in 1975. Data from 8th and 12th grade students began in 1991 (Johnston, O'Malley, & Bachman, 2003). As a longitudinal study, it has produced a wealth of data on the trends of drug use by adolescents and young adults within the United States. Data showed a disturbing trend from 1991-1997 when the use of illicit drugs rapidly increased for 8th, 10th and 12th grade students from 18.7%, 30.6%, and 44.1% to 29.4%, 47.3%, and 54.3%, respectively (Johnston et al., 2007). However, the rates of substance use have steadily decreased since 1997, with 19.0% of 8th graders, 35.6% of 10th graders, and 46.8% of 12th graders reported the use of illicit drugs in 2007 (Johnston et al., 2007). Please refer to Table 1.2 for prevalence rates of substance use.

Table 1.2. Monitoring the Future Study Substance Use Prevalence Rates

	8th Grade	10th Grade	12th Grade
1991 Lifetime use of illicit drugs	18.7%	30.6%	44.1%
1997 Lifetime use of illicit drugs	29.4%	47.3%	54.3%
2003 Lifetime use of illicit drugs	22.8%	41.4%	51.1%
2007 Lifetime use of illicit drugs	19.0%	35.6%	46.8%
1991 Lifetime alcohol use	70.1%	83.8%	88.0%
1997 Lifetime alcohol use	53.8%	72.0%	81.7%
2003 Lifetime alcohol use	45.6%	66.0%	76.6%
2007 Lifetime alcohol use	38.9%	61.7%	72.2%
1991 "been drunk" in the past month	26.7%	50.0%	65.4%
1997 "been drunk" in the past month	25.2%	49.4%	64.2%
2003 "been drunk" in the past month	20.3%	42.4%	58.1%
2007 "been drunk" in the past month	17.9%	41.2%	55.1%
1991 Lifetime Marijuana/Hashish use	10.2%	23.4%	36.7%
1997 Lifetime Marijuana/Hashish use	22.6%	42.3%	49.6%
2003 Lifetime Marijuana/Hashish use	17.5%	36.4%	46.1%
2007 Lifetime Marijuana/Hashish use	14.2%	31.0%	41.8%

Adapted from "Overall, illicit drug use by American teens continues gradual decline in 2007," by Johnston et al., 2007, University of Michigan News Service: Ann Arbor, MI.

Regardless of the trends, the rates basically inform the public that approximately five out of seven 12th graders reported they had used alcohol in their lifetime and over half of the 12th graders reported being drunk in their lifetime. For 10th grade students, roughly three out of five students reported lifetime use of alcohol, with two out of five students reported being drunk in their lifetime. The 6th grade students reported lower rates in comparison to the 8th and 12th grade students. However, nearly two out of five students reported the use of alcohol in their lifetime and close to one of five 6th graders reported being drunk in their lifetime.

Although prevalence rates for lifetime marijuana use have steadily declined since the highs of the 1990s, marijuana remained the illicit drug that was most widely used by

adolescents in 2007. Approximately 42% of 12th grade students reported the use of marijuana in their lifetime.

The reported rates of lifetime use for methamphetamine have also decreased since the first year the data on methamphetamine was collected in 1999, with 1.8% of 6th grade students, 2.8% of 10th grade students, and 3.0% of 12th grade students reported the use of methamphetamine in their lifetime.

Despite the gradual decline in drug use since 1997, prevalence rates for adolescent substance use remain disconcerting, with approximately 47% of 12th graders (close to half of the 12th graders surveyed) reported the use of illicit drugs and 72% (roughly three out of four 12th graders) reported the use of alcohol. The rates continue to represent a significant level of involvement with substances by adolescents.

The Youth Risk Behavior Survey

The Youth Risk Behavior Survey (funded by the Centers for Disease Control and Prevention) was developed in 1990 as a way to monitor health risk behaviors such as sexual behaviors, unhealthy dietary behaviors, substance use, and behaviors leading to violence. The Youth Risk Behavior Survey was administered every two years and employed a three-stage cluster sample designed to produce a representative sample of students in grades 9-12 (Centers for Disease Control and Prevention, 2003). The first stage sampling frame consisted of primary sampling units that consisted of large counties or smaller, adjacent counties. The second stage entailed random selection of schools with the probability proportional to school enrollment size and the third stage was composed of random selection of one or two intact classes of a required subject (e.g., English or Social Studies) or period within each chosen school. Overall response rates from each

state or district must be equal to or greater than 60% in order for the data to be weighted, with unweighted data representing only students who participated in the survey (and thus not representative of all students throughout the respective State). Data from the Youth Risk Behavior Survey can be disaggregated by states and is easily accessible via the internet, whereby visitors have the ability to select and compare State data as well as item responses across various years of administration. Weighted data for the State of Hawai'i were accessible for 1993, 1995, 1997, 1999, and 2005. However, weighted data for 1991, 2001, and 2003 were not accessible due to the minimum response rate not being achieved for these years.

Table 1.3. Youth Risk Behavior Survey Substance Use Prevalence Rates (based on findings for weighted data only)

	Hawai'i	United States	p value
1993 Lifetime alcohol use	72.8%	80.9%	**
1995 Lifetime alcohol use	75.8%	80.4%	
1997 Lifetime alcohol use	72.5%	79.1%	*
1999 Lifetime alcohol use	76.4%	81.0%	*
2005 Lifetime alcohol use	64.8%	74.3%	**
1993 Past 30 days had 5 or more drinks of alcohol in a row	22.7%	30.0%	**
1995 Past 30 days had 5 or more drinks of alcohol in a row	24.0%	32.6%	**
1997 Past 30 days had 5 or more drinks of alcohol in a row	25.1%	33.4%	**
1999 Past 30 days had 5 or more drinks of alcohol in a row	26.8%	31.5%	*
2005 Past 30 days had 5 or more drinks of alcohol in a row	18.8%	25.5%	**
1993 Lifetime marijuana use	33.6%	32.8%	
1995 Lifetime marijuana use	42.4%	42.4%	
1997 Lifetime marijuana use	46.4%	47.1%	
1999 Lifetime marijuana use	44.6%	47.2%	
2005 Lifetime marijuana use	34.6%	38.4%	

Adapted from the "Youth Risk Behavior Survey," by the Centers for Disease Control and Prevention, 2007.

Overall, substance use prevalence rates of lifetime alcohol use, having five or more drinks in a row within a couple of hours, and marijuana use for Hawai'i were lower in comparison to the rates reported by students across the United States. Similar substance use patterns to the Monitoring the Future Study was also found for the Youth Risk Behavior Survey, whereby increase in lifetime alcohol use and having five or more drinks within a couple of hours were seen through 1999 and lifetime marijuana use was seen through 1997.

Although the findings indicated that adolescents in Hawai'i use less alcohol and marijuana in comparison to adolescents in the rest of the United States, this did not mean that substance use issues did not exist. The 2005 findings showed that approximately 65% of the students in Hawai'i reported drinking in their lifetime, which equated to two thirds of students having had alcohol in their lifetime. Nearly 19% of the students in Hawai'i reported binge drinking (drinking five or more alcohol drinks in a row, within a couple of hours) in the past 30 days and close to 35% of the students reported using marijuana at least once in their lifetime. Although reported rates have gradually declined since the high rates of the 1990s and despite rates in Hawai'i being lower than rates of the United States, the rates of substance use remain a concern with regards to the behaviors and consequences of substance use upon the adolescent, family, and community.

Prevalence rates reported in other national studies

In addition to the Monitoring the Future Study and the Youth Risk Behavior Survey, prevalence rates have been reported through the National Household Survey on Drug Abuse (NHSDA) and other studies conducted by individual investigators. The National Household Survey on Drug Abuse was administered annually and provided

estimates of the prevalence of illicit drug use in the United States. The National Household Survey on Drug Abuse was funded through the Substance Abuse and Mental Health Services Administration (SAMHSA) and was based on a representative sample of the United States population aged 12 and older, which included individuals living in households as well as other places of residence such as dormitories and homeless shelters. The National Household Survey on Drug Abuse included Hawai'i within the sample. However, the data cannot be disaggregated to look at rates specifically for Hawai'i. The 2000 National Household Survey on Drug Abuse reported that 13.4% of the adolescents between the ages of 12-17 years of age met criteria for drug dependence or abuse (Epstein, 2002). The National Household Survey on Drug Abuse further reported that 1.6% of the adolescents received treatment for an alcohol or illicit drug problem in the past year.

Studies conducted by individual investigators reported substance abuse prevalence rates (of a community sample) ranging from 3.3% (in 15-17 year olds) to 9.8% (Reinherz et al., 1993), with considerably higher rates for clinical samples (e.g., 81% for juvenile delinquents; Milin, Halikas, Meller, & Morse, 1991). Higher prevalence rates of adolescent substance use were also found for particular groups such as runaways, homeless youth, and those involved with the criminal justice system (Gilvarry, 2000). One study showed that 71% of homeless youth surveyed reported alcohol and/or illicit drug abuse (Kipke, Montgomery, Simon, & Iverson, 1997) while another study reported street youth were involved with more serious drug use, with over 50% of the youth reported the use of illicit drugs (not including marijuana) and over 17% reported intravenous drug use (Greene, Ennett, & Ringwalt, 1997).

Austin (1999) reported on rates of substance use among 586 Asian Americans, 413 African Americans, 1,762 Hispanics, 117 Native Americans, 2,036 Whites, and 446 Mixed students using the California Student Substance Use Survey. The California Student Substance Use Survey monitored substance use for 7th, 9th, and 11th grade students. Asian students generally reported the lowest prevalence rates of substance (including alcohol and marijuana) use with 56% of Asian students reported alcohol use in the past six months in comparison to 68% of the African American, 75% Hispanic, 75% Native American, 75% White, and 76% of the Mixed students (Skager & Austin, 1993). Lower rates for Asian students were reported regarding any illicit drug use. However, the study did not disaggregate the Asian American students in order to determine whether variation in substance use existed for the broader term, "Asian American."

A study by Wong, Klinge, and Price (2004) compared substance use rates of Whites, Chinese, Filipino, Japanese, and Pacific Islander adolescents in California and Hawai'i. Considerable variation in substance use rates was found. Alcohol rates ranged from 37% for Chinese adolescents, 47% for Japanese, 57% for Filipino, 63% for Whites, and up to 65% for Pacific Islanders. Marijuana rates ranged from 6% for Chinese adolescents, 14% for Japanese, 19% for Filipino, and 27% for White students to a high of 31% for Pacific Islanders. The overall findings showed Chinese students reported the lowest substance use rates, while Whites and Pacific Islanders reported the highest rates of use.

Price, Risk, Wong, and Klinge (2002) disaggregated Asian and Pacific Islander data from the 1995 National Longitudinal Study of Adolescent Health In-School and In-Home Surveys. Findings within the In-School Survey showed 36.5% of the Vietnamese

adolescents, followed by 38.9% Chinese, 44.4% Korean, 50.6% Filipino, 51.5% Japanese, and 55.5% of the White adolescents reported drinking alcohol within the past year. A similar pattern for marijuana use was found, with the exception of the Chinese and Korean adolescents reversing positions: 4.7% Vietnamese, 11.1% Korean, 19.3% Chinese, 28.6% Filipino, 31.6% Japanese, and 25.9% White. Overall, the substance use rates for Japanese adolescents were closer to the rate found for White adolescents. This difference was perhaps masked in other national surveys due to the broad *Asian* category that has been utilized.

Another study looked at Asian and Pacific Islander rates of substance use (for a national sample of students) and disaggregated the Asian students. Harachi, Catalano, Kim, and Choi (2001) generally found that Asian and Pacific Islander students were less likely to have initiated use of licit and illicit drugs, with the exception of using crack or cocaine, in which the Asian and Pacific Islander students reported the highest frequency (in comparison to White and African American students), although the group differences were not found to be statistically significant. Harachi et al. (2001) disaggregated the sample of adolescents (9th and 11th graders) and found that overall, Pacific Islanders (who were not disaggregated) appeared to have higher rates of substance use, with rates equivalent to non-Asian Americans. Southeast Asians and Chinese students generally reported the lowest rates.

Hawai'i Student Alcohol, Tobacco, and Other Drug Use Study

In comparison to the studies conducted on Asian and Pacific Islander groups within the United States, similar patterns of substance use also have been found in Hawai'i. Although substance use prevalence rates for the State of Hawai'i were reported

earlier, the large-scale study in Hawai'i that obtained prevalence rates for licit and illicit substance use was the Hawai'i Student Alcohol, Tobacco, and Other Drug Use Study.

The State of Hawai'i, Department of Health (Alcohol and Drug Abuse Division) and the University of Hawai'i Speech Department conducted a study (administered every other year) that was designed to examine prevalence rates and trends of substance use, treatment issues, and risk and protective factors related to substance use for youth (in Grades 6, 8, 10, and 12) throughout the State of Hawai'i (Klinge, 2001; Pearson, 2003). The Hawai'i Student Alcohol, Tobacco, and Other Drug Use survey was last administered in 2003. Based on the 2003 data, 24% of the 6th graders, 27% of the 8th graders, 24% of the 10th graders, and 26% of the 12th grade students statewide participated in the study (Pearson, 2004).

In general, there was a general decrease in substance use prevalence rates for all grade levels. However, substance use continued to be a significant factor affecting Hawai'i's youth. Nearly 1 in 5 (19%) 8th graders, approximately 1 in 3 (35%) 10th graders, and nearly one-half of 12th graders (47%) reported utilizing a substance at least once in their lifetime based on the 2003 survey.

The data also indicated that 3% of 8th graders, 11% of 10th graders, and 16% of 12th graders met the criteria for needing substance abuse treatment. Substance abuse treatment need was determined when students were classified as either dependent on or abusing one or more substances based on DSM-III-R criteria. Nine questions related to the diagnostic criteria for dependency were provided within the survey. If the student responded in the affirmative to at least three of the nine questions, the student was considered dependent on a substance(s) and classified as needing treatment. If the

student did not meet the dependence criteria but met the criteria for abuse (which is determined by answering positively to one out of two abuse questions), then the individual was also deemed as needing treatment. The report estimated that 7% of the students in Grades 6 through 12 have treatment needs, and a quarter of 8th graders (25%), 18% of 10th graders, and 15% of 12th graders obtained treatment at treatment facilities.

The Hawai'i Student Alcohol, Tobacco, and Other Drug Use study also noted that students of different ethnic backgrounds reported different substance use patterns, with Native Hawaiian (80.9%) and Caucasian (79.8%) students having the highest rates of substance use, while Chinese (60.1%) students reported the lowest rates of substance use (Pearson, 2004). Filipino and Japanese student rates fell between the highest and lowest rates, with 75.9% of Filipino and 70.3% of Japanese students reported lifetime substance use. In addition, rates of 30-day alcohol use ranged from 29.0% for Chinese students to 80.9% for Hawaiian and 79.8% for White students, with rates for Filipino (40.7%) and Japanese (35.7%) students reported to be between the rates of Native Hawaiian and Chinese students. Table 1.4 reported illicit drug use and alcohol use data from the Hawai'i Student Alcohol, Tobacco, and Other Drug Use Survey across 1987 (the first year the Hawai'i Student Alcohol, Tobacco, and Other Drug Use Survey was administered), 1991 (rates obtained from the Monitoring the Future Study as well for this year), 1993 (rates obtained from the Youth Risk Behavior Survey as well for this year), and 2003 (the last year the Hawai'i Student Alcohol, Tobacco, and Other Drug Use Survey was administered and the same year's results were reported for the Monitoring the Future Study).

Table 1.4. Hawai'i Student Alcohol, Tobacco, and Other Drug Use Substance Use Prevalence Rates by Ethnicity

	6th Grade	8th Grade	10th Grade	12th Grade
1987 Lifetime use of illicit drugs	14.4%	27.1%	38.7%	50.5%
1991 Lifetime use of illicit drugs	9.2%	21.6%	33.5%	39.3%
1993 Lifetime use of illicit drugs	12.4%	27.3%	38.7%	42.0%
2003 Lifetime use of illicit drugs	7.5%	19.2%	35.1%	46.9%
1987 Lifetime alcohol use	47.6%	64.7%	76.1%	85.9%
1991 Lifetime alcohol use	31.1%	55.8%	72.9%	79.8%
1993 Lifetime alcohol use	34.9%	57.4%	73.3%	79.2%
2003 Lifetime alcohol use	13.2%	36.8%	59.1%	72.5%
1987 Lifetime marijuana use	3.0%	16.5%	32.9%	46.0%
1991 Lifetime marijuana use	1.7%	12.3%	25.7%	34.3%
1993 Lifetime marijuana use	2.4%	16.7%	31.4%	37.1%
2003 Lifetime marijuana use	1.5%	12.1%	30.5%	44.4%

Adapted from the "Hawai'i Student Alcohol, Tobacco, and Other Drug Use Survey," by Pearson, 2004.

Findings from other studies conducted in Hawai'i

Similar findings, whereby higher rates of substance use were found for Native Hawaiians in comparison to non-Hawaiians, have been supported by other studies. For example, in a review of the literature on alcohol use in Hawai'i, Hishinuma et al. (2000) found higher rates of alcohol use for Native Hawaiian and White youth in comparison to the other major ethnic groups in Hawai'i (i.e., Japanese, Filipino, Chinese, Korean, etc.). In addition, a study by Makini et al. (2001) specifically looked at alcohol use among adolescents in Hawai'i and found comparable rates for both Native Hawaiian and non-Hawaiian youth regarding answers to a question asking youth whether they *drink too much alcohol*. However, Native Hawaiian adolescents had significantly higher rates (3.7%) in comparison to non-Hawaiian adolescents (1.3%) in regards to taking "a drink

in the morning to steady my nerves or to get rid of a hangover.” A study conducted by Nishimura et al. (2001) analyzed data collected across three school years (1993-1994 through 1995-1996) on 3,711 adolescents attending five high schools across three of the Hawaiian islands and found higher factor scores (Use, Impairment, and Family Use) for Caucasian, Native Hawaiian, and Other youths in comparison to Japanese and Filipino groups, with the exception of Family Use, whereby the Filipino students reported higher scores than Caucasian students. As mentioned earlier, a large-scale study (7,317 adolescents) conducted by Andrade et al. (2006) utilized the Diagnostic Interview Schedule for Children – version 2.3 and found no statistically significant differences for alcohol, marijuana, and substance abuse or dependency by Native Hawaiian versus non-Hawaiian students. However, higher prevalence rates were typically found for the Native Hawaiian males and females in comparison to the non-Hawaiian males and females. For example, 15% of Native Hawaiian males, followed by 10.4% non-Hawaiian males, 10.1% of Native Hawaiian females, and 7.1% of non-Hawaiian females met criteria for any substance abuse or dependence. Other studies that utilized the same general database also found significantly higher rates of substance use for Native Hawaiian youth in comparison to non-Hawaiian youth (Goebert et al., 2000; Yuen et al., 2000).

Given the findings that Native Hawaiian and White students typically reported the highest levels of substance use, prevention and intervention programs should specifically target these two groups of adolescents. Research specifically looking at the risk factors for Native Hawaiian and White adolescents must be gathered to obtain a better understanding as to the reasons for the high rates of substance use within these groups. In addition, since the Japanese and Chinese groups typically reported the lowest rates of

substance use, identification of protective factors can perhaps be applied to the Native Hawaiian and White groups of students.

Overall, while there seemed to be a decline in substance use as evidenced by the reported prevalence rates from various surveys, there also appeared to be specific populations such as homeless youth who were at much greater risk for substance use. However, caution must be noted when looking at prevalence rates as methodological concerns impacted the generalizability of the findings.

While the previous section reported prevalence rates for adolescent substance use, the next section will provide a review of risk and protective factors associated with adolescent substance use.

Risk and Protective Factors

Risk Factors

A risk factor as defined by Clayton (1992) is an individual attribute, characteristic, condition, or environmental factor that increases the likelihood of substance use or abuse. Risk factors for adolescent substance use occur prior to the onset of substance abuse and are statistically correlated with an increase in the probability of an individual abusing a substance (Hawkins, Catalano, & Miller, 1992). However, there is difficulty in determining specific risk factors or specific combinations of risk factors that are most virulent, modifiable, or specific to substance abuse rather than contributors to adolescent problem behavior in general.

The identification of risk factors is important for a number of reasons. Identification of risk factors can guide the development of intervention and prevention programs to adequately address adolescent substance use. In addition, the identification

of risk factor indices can be used to identify at-risk youth and families who might benefit from appropriate services (Sullivan & Farrell, 2002).

Although twin studies have suggested the importance of genetic factors on substance use disorders in adults, little is known about the cause of adolescent substance use (Rhee et al., 2003). However, having a family history of substance use disorders is known to be a risk factor for adolescent substance use. Studies have shown a link between parental alcoholism and higher levels of substance use in adolescence (Chassin et al., 1996). For example, Rhee and colleagues (2003) conducted a study with twins to determine whether genetic and environmental factors had an impact upon substance use and the findings suggested there was a genetic influence upon adolescent substance use and initiation of substance use.

Two review articles relating to risk factors for adolescent substance use were conducted by Hawkins, Catalano and Miller (1992) and Petraitis, Flay and Miller (1995). Based on these review articles, risk factors are divided into two categories: 1) individual and interpersonal factors and 2) contextual/cultural factors.

Individual and interpersonal risk factors include:

- Physiological factors such as a student having a genetic pre-disposition for substance use from mom, dad, or other genetic relations;
- Academic failure which includes a student having impaired cognitive functions or learning difficulties;
- Early and persistent problem behaviors including impulsiveness, difficult temperament, hyperactivity and attention-deficit disorders, and antisocial personality behaviors;

- Low degree of commitment to school, which may lead to students experimenting with substances or finding other ways to “stimulate” their minds;
- Peer rejection in elementary grades which is not a direct link between rejection and substance use per se but traits of the child who is associated with peer rejection such as aggressiveness, shyness, and withdrawal;
- Association with substance-using peers that may persuade students to begin to use substances (e.g., peer pressure);
- Alienation and rebelliousness that may lead a student to rebel against family members and school staff by utilizing substances;
- Attitudes favorable to drug use which include tolerant or positive attitudes toward substance use and thus having a higher likelihood for utilizing substances;
- Early onset of drug use (i.e., the earlier onset of any substance use, the greater involvement in other drug use);
- Family supports or tolerates positive attitudes and behaviors toward substance use, which may help to decrease or prevent students from using drugs;
- Poor and inconsistent family management practices, which subjects a student to mixed messages about whether substance use is appropriate or not;
- Family conflict (e.g., family members fighting with each other, marital discord, etc.) which may impact the student in a negative way and students may then begin to utilize substances in order to escape conflicts at home and;
- Limited parental monitoring that may lead students to experiment with substances or be influenced by others (e.g., peers or other family members) who may have

attitudes favorable toward substance use, thus supporting students behaviors and attitudes towards substance use.

Contextual/cultural factors related to adolescent substance use comprise of laws and norms favorable toward substance use, availability and access to substances, economic deprivation, and neighborhood disorganization.

Protective Factors

In contrast to the number of studies on risk factors, only a few studies have examined protective factors regarding the development of substance use disorders. A protective factor can be defined as an individual attribute, characteristic, condition, or environmental situation that decreases, guards against or restrains the likelihood of an individual beginning to use substances (Clayton, 1992). One way to look at the protective factors associated with adolescent substance use is to simply decrease, when possible, the number of risk factors mentioned above. For example, since having peer groups who provide reinforcement for drug-using behavior is shown to be a risk factor, encouraging individuals to be in positive peer groups with friends who do not support drug-using behavior is a protective factor. Although this is not always possible, as society does not necessarily have control over parental behaviors, knowing what may be a protective factor for adolescent substance use can help to foster healthier environments and communities through the establishment of policies preventing or inhibiting the use of substances.

Hawkins et al. (1992) reviewed a number of protective factors that are believed to “mediate or moderate the effects of exposure to risk” (p. 86). Prior research has shown that there are subgroups (within populations) that are able to survive and negotiate their

way through multiple risks successfully (Werner, 1989). For example, the longitudinal study conducted by Werner and Smith (1982) on the island of Kauai (Hawai'i) found that factors such as high intelligence, being raised in a small family with low conflict, and being the first-born child helped to buffer the effects of risk factors (such as poverty, poor education, economic disadvantage, and poor health outcomes). Other identified protective factors include a strong attachment (bond) to parents, child's positive temperament, supportive family members, and social problem solving abilities (Brook et al., 1990; Garnezy, 1985; Rutter, 1985; Sullivan & Farrell, 2002).

Risk and protective factors can be considered to be part of a continuum or scale, with risk factors on one end and protective factors at the other end. The less risk factors and the more protective factors an individual possesses, the less likely the individual will use or abuse substances and vice versa.

Cultural Considerations Related to Adolescent Substance Use

In a multicultural state such as Hawai'i, cultural factors are important to consider when working with adolescent substance users. Culture influences all aspects of human lifestyles. Although not all members of a particular population believe and act the same way, specific norms, beliefs, and behaviors are expected of members within a specific population. In addition, the norms and beliefs of one particular population are different from the norms and beliefs of another population.

Cultural values, beliefs, and attitudes held by adolescent substance users (passed on through their family, friends, and community) must be understood and applied to assessment, intervention and prevention programs in order to provide effective services.

Various ethnic groups have different values, beliefs, and attitudes towards substance use and other health problems.

Asian and Pacific Islanders are the fastest growing ethnic minority population in the United States (Austin, 1999; Grunbaum et al., 2000; U.S. Census Bureau, 2000). Existing research presented earlier suggests that when separating out the specific ethnic groups within the Asian and Pacific Islander umbrella, different patterns of substance use emerge. The studies support the notion that Asian and Pacific Islander groups are heterogeneous and should be studied as separate, distinct groups rather than being analyzed together.

Collectivistic groups (such as Pacific Islanders) should include immediate family members as well as other influential members of the family when providing intervention and prevention programs. Within Asian groups, the concept of bringing shame upon one's family or *losing face* should be avoided at all costs.

Given that Native Hawaiian and Caucasian students have typically reported the highest levels of substance use (in comparison to other ethnic groups such as Japanese and Chinese students), prevention and intervention programs should specifically address cultural factors that may be important when working with adolescent substance users. For example, Native Hawaiians are descendents of the indigenous people who inhabited the Hawaiian Islands prior to the arrival of Captain Cook in 1778 and have endured the decimation of their population (due to contact and disease), the takeover by a foreign governmental system, and the imposition of values and ways of life of the dominant group. All of these factors may contribute to Native Hawaiians experiencing acculturative stress, whereby the non-dominant group (e.g., Native Hawaiians) strike out

“against the larger society” and may experience “feelings of alienation, loss of identity, and stress” (Berry & Annis, 1974, p. 385). Acculturative stress may take many different forms and may be evidenced as mental health issues in which individuals may experience anxiety and depression or utilize substances to cope with the stressful situations.

Currently, Native Hawaiians suffer from far more socioeconomic, educational, and health-related problems than other ethnic groups in Hawai‘i, which may, in part, be due to acculturative stress. Ensuring that cultural beliefs and values for Native Hawaiian adolescents are understood, acknowledged, and incorporated into prevention and intervention services for adolescent substance users would be of great benefit.

Issues associated with acculturative stress may also apply to Caucasian students, who may find themselves as being part of the minority on school campuses, especially campuses that may have predominantly greater Asian and Pacific Islander students enrolled. Caucasian students may find themselves in a foreign environment and the belief systems, attitudes, and values that have been supported by their family members may be contrary to their experiences with other students or who may find themselves at odds with their peers. Being part of a minority group at school may lead students to feelings of isolation or alienation, which may then lead students to experiment or use substances. Therefore, ensuring that cultural factors or considerations that are being experienced by Caucasian students should be integrated into substance use prevention or intervention programs.

Although rates for Asian (e.g., Japanese and Filipino students) have typically been lower than rates of Native Hawaiian and Caucasian students, acculturation and cultural factors are also important to look at when working with Asian students. For example, a

study conducted by Hahm, Lahiff, and Guterman (2003) specifically looked at the effect culture has upon Asian American adolescent alcohol use. Hahm et al. found that high acculturation (as measured by whether or not English was spoken at home and whether the individual was foreign-born or not) was associated with greater alcohol use. However, when taking parental attachment into consideration, acculturation alone was not found to be a risk factor. This finding suggests that although acculturation is an important factor to consider when studying adolescent substance use, other factors that may have an impact on adolescent substance use (such as family factors, including parental attachment) must also be taken into consideration.

Ultimately, having a better understanding of an adolescent substance user, which includes family factors, peer factors, environmental factors, as well as cultural factors, allows substance use providers to view the whole picture for the individual. The more information and knowledge gained about an adolescent substance user, in addition to the cultural competence of the substance use provider, the greater the likelihood of developing appropriate and effective substance use prevention and intervention strategies. Future interventions and research studies on Asian and Pacific Islander adolescents should be culturally competent and sensitive, taking into consideration important cultural factors such as spirituality and the concept of family (*'ohana*), to ensure that quality care is provided to diverse populations, in order to ensure improve health-related outcomes (Mokuau, 2002).

When there is a greater understanding of the distinct differences across Asian and Pacific Islander groups, culturally appropriate intervention and prevention strategies can be developed. While the above information provided an overview to adolescent

substance use, the next section will report the various theories associated with adolescent substance use.

Theories Associated With Adolescent Substance Use

Theories help to organize concepts into a comprehensive and coherent picture of the variables associated with adolescent substance use. This section will present the predominant psychosocial theories associated with adolescent substance use and provide empirical evidence supporting the theories.

In the late 1960s and early 1970s, distress concerning teenage drug use intensified (White, 1996). The theories developed relating to adolescent substance use were borrowed from *theories of deviance*, more specifically, theories concerning adolescent delinquency. Therefore, the theories that will be presented include concepts that are found within the criminology or deviance literature. The prominent theories identified in the literature that have been used to explain adolescent substance use included social learning theory (e.g., Bandura and Akers' versions) and primary socialization theory.

Social Learning Theory

Sociologist Edward Sutherland developed the differential association theory in 1939 that suggested delinquent behaviors were socially learned in small, informal groups (as cited in Petraitis, Flay, & Miller, 1995). Bandura (a psychologist) and Akers (a sociologist) built upon Sutherland's work and stated that adolescents developed beliefs about delinquent behaviors (such as substance use and crime) from their role models, namely parents and close friends. Thus, social learning theories attempted to explain adolescent substance use through interpersonal or social influences.

Bandura's Social Cognitive/Learning Theory

Bandura was an influential contributor to the development of social learning theory and his ideas served as the foundation of research investigating adolescent substance use. Bandura viewed behavior as being “determined by external stimulus events, by internal processing systems and regulatory codes, and by reinforcing response-feedback systems” (Bandura, 1969, p. 19). Four major elements of Bandura’s social learning theory were differential reinforcement, vicarious learning, cognitive processes, and reciprocal determinism (Bandura, 1969).

Differential reinforcement. Differential reinforcement referred to an individual’s behavior being dependent upon one’s setting or conditions. Positive or negative reinforcement, punishment, or withdrawal contributed to developing an individual’s behavior and was influenced directly by the external environment. For example, when an adolescent was in a setting (e.g., school) and used a substance, the adolescent’s behavior was likely to result in punishing consequences (e.g., being expelled from school). On the other hand, if an adolescent was attending a party where substance use was prevalent, the adolescent may experience positive outcomes such as social approval. Therefore, the environment had direct influences upon an individual’s behavior.

Vicarious learning. Vicarious learning referred to the idea that individuals may acquire new behaviors through the observation of others (modeling). An example that can be applied to vicarious learning as it related to substance use was an adolescent who observed his or her parents’ marijuana use and learned through modeling how to roll a joint, light the joint, and finally to smoke the joint.

Social learning theory posited that observing someone being reinforced for a given behavior can increase the likelihood of the same behavior in the observer. Similarly, observing negative results or punishment of a behavior may cause the observer to avoid a particular behavior. An example that can be applied to reinforcement as it relates to substance use was if an adolescent saw that his or her friend was given a joint to smoke by other peers and the friend was praised by the other peers as being cool for smoking the joint, the adolescent observed a behavior (smoking a joint) being reinforced and may be more likely to try smoking a joint as well. Conversely, if the adolescent observed a friend being scolded or put down for smoking a joint, the adolescent may not smoke a joint. Later work by Bandura (1986) argued that virtually all that can be learned through direct experience can be acquired through vicarious learning or modeling. The influences of vicarious learning or modeling were evident before the person began to use substances because parents, siblings, peers, and the media all influenced the individual about appropriate and inappropriate behaviors related to substance use.

Cognitive processes. Cognitive processes referred to events that provided the individual with information, which was cognitively processed, and depending upon how the information was processed, a specific behavior followed. Individuals typically behaved in a way to experience reinforcements in the environment rather than behaved in ways that would result in a punishment. An example of cognitive processes related to adolescent substance use was an adolescent who attended an educational class on the dangers of cigarette smoking (e.g., watched a graphic video on how individuals with severe emphysema destroyed their lungs) and then thought twice about smoking another

cigarette because cognitively, the adolescent began to associate the dangers and potential long-term outcome of smoking.

Reciprocal determinism. Reciprocal determinism referred to the idea that behavior may be controlled by the environment and behavior may also alter (through change or control) the environment (Bandura, 1969). Bandura (1969) argued that drinking behavior typically begins as experimentation in youth and that if, during the course of alcohol use, the individual experienced reinforcement (e.g., feeling that stress was being reduced by alcohol use) and if the alcohol use was intermittently reinforced, the individual will tend to use alcohol on occasions when the individual experienced stress. If the stressful occasions frequently persisted and the alcohol use interfered with the individual's life, it may be likely that an alcohol use disorder will develop.

In summary, Bandura's social cognitive/learning theory (1986) stated that adolescents received their beliefs about substance use (irrespective of whether beliefs were positive or negative) through their role models, close friends, and/or parents. Role models can either promote the use of substances in adolescents or may decrease the use of substances, depending on the behaviors exhibited by "role models" and the reactions by others to the behaviors exhibited by "role models."

Aker's Social Learning Theory

Akers' social learning theory has been applied to deviant and criminal behaviors as well as to drug use and abuse (Akers, 1977; Akers et al., 1979). The theory proposed that the use of or abstinence from drugs was a socially influenced behavior that was acquired and sustained through a learning process that included differential association, differential reinforcement, imitation, and cognitive definitions. Differential association

(direct and indirect interaction with others), differential reinforcement (learning through reward and punishment), imitation (learning through observation), and cognitive definitions (attitudes) elicited conforming behaviors in accord with society or deviant behaviors such as the use of substances or juvenile delinquency.

Whether individuals abstained from or took drugs depended upon past, present, and anticipated rewards and punishments believed to be associated with abstinence or use. The more an individual defined the behavior relating to drug use as good or justified, the more likely the individual continued to use drugs. In other words, if the adolescent's role models used substances and positive feedback towards substance use was the norm, the adolescent was likely to observe and imitate the behavior of the role models, thus utilizing substances. Subsequently, the adolescent obtained social reinforcement from the role models.

Empirical Evidence

There was empirical evidence to support both Bandura and Aker's social learning theories related to adolescent substance use. In a review of experimental studies focused on the relationship between the environment (e.g., situation) and substance use, McCarty (1985) found that the number of social companions impacted the individual's use of alcohol. When an individual was part of a group, the individual tended to drink more than in a setting whereby the individual was alone. In addition, the social norms (the expectations shared by group members) influenced the use of alcohol. For example, drinking at fraternity parties but abstaining from drinking at work was influenced by social norms. These findings suggested that situational factors impacted adolescent substance use.

Studies that focused on the modeling concept of social learning theory have been conducted. The findings suggested that role models (e.g., parents or peers) strongly contributed to substance use by adolescents and young adults. For example, college students were found to drink more when they were in the presence of a heavy drinker and drink less when in the presence of a light drinker (Caudill & Marlatt, 1975; Hendricks, Sobell, & Cooper, 1978).

Studies that focused on the effects of parent versus peer modeling of substance use also have been conducted. Ary et al. (1993) conducted a prospective study that consisted of 173 families. The families were comprised of an adolescent between the ages of 11 and 17, and at least one sibling 11 years of age or older. Parent modeling (consisted of the frequency of alcohol use) did not predict the use of alcohol by their children at Time 1 assessments but peer alcohol use did. However, assessments conducted one year later showed parent alcohol use predicted the change in their adolescent's alcohol use.

A Boys Town study surveyed adolescent substance use and abuse among approximately 3,000 students in Grades 7 through 12 in eight communities in the midwest and provided empirical support for social learning theory (Akers, Krohn, Lanza-Kaduce, & Radosevich, 1979). The main focus of the Boys Town study was to explain abstinence and frequency of substance use through the use of social learning theory. Social learning models of substance use were constructed and incorporated measures of differential association, differential reinforcement, imitation, and cognitive definitions. The findings provided support for the theory, with more than half of the total variance ($R^2 = .54$) of frequency of drinking and over two-thirds of the variance ($R^2 = .68$) in

marijuana use were accounted for by the theoretical variables (differential association, differential reinforcement, imitation, and cognitive definitions) (Akers, 1977; Akers & Cochran, 1985). In a more recent study conducted by Akers and Lee (1996) that focused on testing social learning theory on adolescent smoking, the authors found that 47% of the variance was accounted for by the social learning model. These findings provided empirical support for social learning theory.

Other studies have been conducted that provided support for social learning theory. For example, marijuana use was found to be more common among adolescents who talked to friends about using illicit drugs (Kandel, Kesler, & Margulies, 1978), who had friends who held positive views toward marijuana use, and who had friends who used substances (Bailey & Hubbard, 1990; Kandel, Kesler, & Margulies, 1978).

Evaluation of Social Learning Theory

Both Bandura and Aker's social learning theories provided clearly defined concepts and statements. The variations of the theories provided a somewhat comprehensive and integrative social approach to adolescent substance use and the theories provided operational definitions of theoretical concepts that enabled researchers to conduct empirical studies that tested the theories (as evidenced in the previous section). The variations of social learning theory were also fruitful in that the theories generated a number of useful hypotheses related to adolescent substance use and empirical studies of social learning theory utilized a variety of scientific techniques, thus meeting the criterion of scientific self-regulation. Unfortunately, social learning theory did not take into account cultural considerations such as knowledge passed on from one generation to the next that may be used to navigate an adolescent through situations or

the impact cultural values and beliefs have upon an individual that may influence whether a student will experiment and/or use substances.

Primary Socialization Theory

Oetting et al. (1998) introduced primary socialization theory, which proposed that all human social behaviors (including adolescent substance use) were learned behaviors or had major components that were learned (similar to social learning theory). Thus, drug use and deviant behaviors (e.g., vandalism, theft, and robbery) were learned. In Western society, during adolescence, the three primary socialization sources were the family, school, and peer clusters (which referred to small groups of friends, best friends, or couples). Therefore, the family, school, and peer clusters influenced whether an adolescent used substances.

In addition to the three primary socialization sources, another important concept of primary socialization theory had to do with culture and the effect culture had on adolescent substance use. The addition of culture made primary socialization theory distinctly different than social learning theory.

The concept of culture within primary socialization theory consisted of the following points:

- Culture was a body of knowledge, attitudes, and skills (passed on from one generation to the next) that were used to deal with the physical and social environment;
- Cultures had stability and continuity due to each generation attempting to pass the culture intact; and

- Cultures changed over time as physical, social, political, and spiritual environments changed (Oetting et al., 1998).

The relationship between culture and primary socialization was highly interactive, with culture influencing primary socialization and primary socialization, in turn, influencing culture. Primary socialization theory proposed that, within any culture, the communication (or teaching) of attitudes, beliefs, and behaviors to the young was assigned through explicit or implicit socialization sources (i.e., family, school and peer clusters) across the individual's developmental process.

Strong bonds with the family and school typically served as protective factors against deviance or substance use, while peer clusters could either be sources of conventional or socially accepted norms or deviant norms (Oetting et al., 1998). When bonding problems occurred among any of the three primary socialization sources, there was an increased probability for individuals to get involved with substance use or delinquent behaviors, or for individuals to get involved with peers that transmitted the deviant norms (i.e., substance use).

Empirical Evidence

Oetting and colleagues introduced primary socialization theory in 1998. Interestingly, a literature review conducted within the Psycinfo database yielded only one published study utilizing primary socialization theory to account for drug consumption. The study was conducted by Lopez and colleagues (2001) in Spain with a sample of 650 individuals ranging from 15 to 29 years of age. The study's findings suggested associations between primary socialization sources (i.e., family, school, and friends) and

substance use. For example, a weaker family and school bond increased the likelihood of substance use. In addition, groups that reported moderate substance use reported greater satisfaction and perceived support from their peer groups.

Evaluation of Primary Socialization Theory

Although primary socialization theory is a relatively newly developed theory, the theory possessed a positive aspect. The theory was innovative and included culture as an important concept to consider when studying adolescent substance use. Furthermore, the theory accounted for cultural considerations by attributing a link between culture and primary socialization sources that, in turn, influenced adolescent substance use. Obviously, much more research must be conducted to determine whether the theory will be adequate in addressing issues related to adolescent substance use.

No single theory can account for all aspects of adolescent substance use. However, social learning theory and primary socialization theory as described above best accounted for individual, social/interpersonal, and contextual/cultural factors which were integral components to better understanding adolescent substance use.

Research Questions

Currently, there is a lack of data in Hawai'i on prevalence rates of adolescent substance abuse and dependence disorders based on the criteria provided within the DSM-IV. This research project will attempt to fill the gap in knowledge by addressing the following research questions: 1) Are there differences in substance abuse or dependence rates across the four major ethnic groups in Hawai'i (i.e., Native Hawaiian, Japanese, Filipino, and Caucasian)?; and 2) What are the relationships among the

independent variables (i.e., demographic, risk, and protective factors) and the prevalence rates of substance use?

Research Question 1

Research Question 1 is whether there are any differences among ethnic groups (Native Hawaiian, Caucasian, Japanese, and Filipino) for prevalence rates of substance use (i.e., DISC Alcohol or Marijuana Abuse or Dependence, DISC Alcohol Abuse or Dependence, DISC Marijuana Abuse or Dependence, American Drug and Alcohol Scale Any Alcohol or Marijuana Use, American Drug and Alcohol Scale Any Alcohol Use, and American Drug and Alcohol Scale Any Marijuana Use). There are six hypotheses relating to this research question and they are listed below:

Hypothesis 1

There will be no statistically significant differences in prevalence rates (i.e., DISC Alcohol or Marijuana Abuse or Dependence, DISC Alcohol Abuse or Dependence, DISC Marijuana Abuse or Dependence, American Drug and Alcohol Scale Any Alcohol or Marijuana Use, American Drug and Alcohol Scale Any Alcohol Use, and American Drug and Alcohol Scale Any Marijuana Use) between Native Hawaiian and Caucasian students, in light of previously reported rates (based on data from the Hawai'i Student Alcohol, Tobacco, and Other Drug Use Survey and other studies that disaggregate ethnic groups) as substance use prevalence rates for these two groups have been consistently similar to one another.

Hypothesis 2

Prevalence rates (i.e., DISC Alcohol or Marijuana Abuse or Dependence, DISC Alcohol Abuse or Dependence, DISC Marijuana Abuse or Dependence, American Drug

and Alcohol Scale Any Alcohol or Marijuana Use, American Drug and Alcohol Scale Any Alcohol Use, and American Drug and Alcohol Scale Any Marijuana Use) will be higher for Native Hawaiian in comparison to Filipino students, as previous rates (based on data from the Hawai'i Student Alcohol, Tobacco, and Other Drug Use Survey and other studies that disaggregate ethnic groups) have reported this finding.

Hypothesis 3

Prevalence rates (i.e., DISC Alcohol or Marijuana Abuse or Dependence, DISC Alcohol Abuse or Dependence, DISC Marijuana Abuse or Dependence, American Drug and Alcohol Scale Any Alcohol or Marijuana Use, American Drug and Alcohol Scale Any Alcohol Use, and American Drug and Alcohol Scale Any Marijuana Use) will be higher for Native Hawaiian in comparison to Japanese students, as previous rates (based on data from the Hawai'i Student Alcohol, Tobacco, and Other Drug Use Survey and other studies that disaggregate ethnic groups) have reported this finding.

Hypothesis 4

Prevalence rates (i.e., DISC Alcohol or Marijuana Abuse or Dependence, DISC Alcohol Abuse or Dependence, DISC Marijuana Abuse or Dependence, American Drug and Alcohol Scale Any Alcohol or Marijuana Use, American Drug and Alcohol Scale Any Alcohol Use, and American Drug and Alcohol Scale Any Marijuana Use) will be higher for Caucasian students in comparison to Filipino students, as previous rates (based on data from the Hawai'i Student Alcohol, Tobacco, and Other Drug Use Survey and other studies that disaggregate ethnic groups) have reported this finding.

Hypothesis 5

Prevalence rates (i.e., DISC Alcohol or Marijuana Abuse or Dependence, DISC Alcohol Abuse or Dependence, DISC Marijuana Abuse or Dependence, American Drug and Alcohol Scale Any Alcohol or Marijuana Use, American Drug and Alcohol Scale Any Alcohol Use, and American Drug and Alcohol Scale Any Marijuana Use) will be higher for Caucasian students in comparison to Japanese students, as previous rates (based on data from the Hawai'i Student Alcohol, Tobacco, and Other Drug Use Survey and other studies that disaggregate ethnic groups) have reported this finding.

Hypothesis 6

Prevalence rates (i.e., DISC Alcohol or Marijuana Abuse or Dependence, DISC Alcohol Abuse or Dependence, DISC Marijuana Abuse or Dependence, American Drug and Alcohol Scale Any Alcohol or Marijuana Use, American Drug and Alcohol Scale Any Alcohol Use, and American Drug and Alcohol Scale Any Marijuana Use) will be higher for Filipino students in comparison to Japanese students, as previous rates (based on data from the Hawai'i Student Alcohol, Tobacco, and Other Drug Use Survey and other studies that disaggregate ethnic groups) have reported this finding.

If the dissertation findings support the six hypotheses listed above, the findings will significantly contribute to the scientific literature in that the same ethnic differences are found utilizing DSM-IV criteria, even after disaggregating the Asian ethnic groups (Filipino and Japanese groups). If the dissertation findings do not support or only partially support the hypotheses listed above, the findings may reveal a new trend relating to the prevalence of substance use across ethnic groups in Hawai'i.

Research Question 2 and Proposed Analyses

Research Question 2 refers to the exploratory development of a model (which includes gender, grade level, ethnicity, main wage earner's educational level, and factors of the Prevention Planning Survey) and the relationship of the variables with adolescent substance use. It is hypothesized that 1) identified risk factors (based on factors of the Prevention Planning Survey) will be associated with an increase in prevalence rates for substance use and 2) identified protective factors (based on the factors of the Prevention Planning Survey) will be associated with a decrease in prevalence rates for substance use.

Risk and protective factors will be obtained from the Prevention Planning Survey. Due to the instrument not previously being validated with an Asian/Pacific Islander population, exploratory factor analyses will be conducted in an effort to investigate the factor structure for Asian/Pacific Islanders and to parsimoniously reduce the number of individual variables being studied.

While Chapter 1 provided an introduction to adolescent substance use and discussed the various theories associated with adolescent substance use, Chapter 2 will report the methodology of the dissertation pilot study.

CHAPTER 2: METHODOLOGY

The dissertation pilot study utilized a cross-sectional survey design, with data obtained from participants at one point of time. The foci of the dissertation were to assess the prevalence of substance use rates among the four major ethnic groups of Hawai'i (Native Hawaiian, Japanese, Filipino, and Caucasian) and to examine the relationships among variables related to adolescent substance use for students who attended two high schools on the island of O'ahu.

The dissertation pilot study was one of several studies (at one of the two high schools on the island of O'ahu) aimed at studying adolescent behaviors in Hawai'i and was one of two pilot studies of a grant that was submitted and funded through the National Institute of Alcohol Abuse and Alcoholism (NIAAA). As part of the several studies and being a pilot study of a grant, the study was required to secure approval from four organizations including the National Institute of Alcohol Abuse and Alcoholism (i.e., a Certificate of Confidentiality was obtained for the dissertation pilot study), the Centers for Disease Control and Prevention (i.e., a Certificate of Confidentiality was obtained as the dissertation pilot study was one of several studies conducted at one of the two high schools on the island of O'ahu); the University of Hawai'i at Manoa (i.e., approval was obtained from the Committee on Human Studies); and the State of Hawai'i, Department of Education. After approval was obtained from the organizations mentioned above, the dissertation pilot study was conducted at two high schools and spanned across two years. For purposes of this dissertation, in an effort to protect the confidentiality of the two schools and at the request of school staff, the two schools will hereafter be referred to as School 1 and School 2.

Procedures

Initial approval to conduct the pilot study was obtained from principals at both schools in a meeting that occurred in the summer of 2005. At the meeting, the author presented an overview of the study and requested access to 9th and 12th grade students at the schools. The principals agreed to allow the study to be conducted in the high schools and periodic contact continued while the author obtained approvals from the organizations and agencies mentioned above.

Recruitment Procedures

Recruitment of students to participate in the dissertation pilot study spanned two years (at School 2), with both individual and group strategies being employed. The reasons for the dissertation pilot study accruing over two years were due to length of time that was required to obtain approvals from the various agencies and organizations and the relatively late start of the pilot study within School 2 (i.e., recruitment began in the Spring of the 2005-2006 school year). Overall recruitment procedures (at both schools) included obtaining class lists (which included student names, grade level, gender, and ethnicity) from the two schools. Students were then randomly sorted based on ethnicity, grade level, and gender.

Group recruitment procedures (as recommended by School 2's staff) entailed recruiting all 96 students (total number of students initially proposed for the study) at one time by having all students go to the cafeteria to meet with the author and trained interviewers. The group recruitment method entailed filling out call slips for all 96 students. The call slip listed the student's name, period to be excused from, date, and

location to send the student and was signed by the Vice Principal of the school (who was assigned as the school liaison between the author and School 2).

Individual recruitment procedures included trained interviewers approaching students on the class list (beginning at the top of the list and sequentially moving down the list) in order to recruit participants until the proposed sample size for each ethnicity by grade level and gender was obtained or until the list was exhausted.

Recruitment of students to participate in the pilot study included communicating to students the purpose of the pilot study, procedures, compensation, potential risks and discomforts, anticipated benefits to students as well as society, and issues related to privacy and confidentiality. Students who were interested in taking part in the pilot study were provided consent form packets to take home, which included a letter signed by the school's principal, two copies of the permission form for parents to review and sign if they agreed to allow their child to participate in the pilot study, and a stamped and self-addressed envelope to mail in the signed permission form. Students/parents were given the option of mailing the signed parent permission forms directly to the author, dropping the signed forms off at the school's office (where a box was placed or designated), or turning the signed forms in to interviewers at the schools.

School 1

Recruitment at School 1 began on November 29, 2006. Due to the dissertation pilot study being one of several studies conducted at School 1, packets (which included a letter signed by the principal of the school that explained the studies being conducted at the school and two copies of permission forms) were mailed to all parents. Parents were asked to mail back signed parent permission forms by a specified deadline. Of the 81

students from School 1 that participated in the pilot study, there were 20 instances whereby parents mailed back signed parent permission forms. The remaining 61 students were individually approached to participate in the pilot study. Therefore, a total of 81 face-to-face interviews were conducted at School 1 during the 2006-2007 school year.

School 2

Students at School 2 were recruited across two school years. During the 2005-2006 school year, the group recruitment method was conducted twice, due to the first day being a day whereby heavy rainstorms resulted in teachers as well as students being late for school. A total of 47 students at School 2 attended the group recruitment on February 16, 2006 and 40 students attended the March 2, 2006 recruitment. Twenty one students out of 65 students who participated in the pilot study (32.3%) were recruited through the group method. The remaining 44 students (67.7%) were individually recruited (either in addition to the group recruitment method or were solely recruited by individual recruitment).

The proposed sample size for School 2 was not reached during the 2005-2006 school year. Therefore the author requested an extension to continue interviews during the 2006-2007 school year. Permission was granted and new class lists for the 9th and 12th grade students were obtained at the beginning of the 2006-2007 school year. Random selection was performed once again, with students being individually recruited and interviews resumed on September 28, 2006. The last interview at School 2 was conducted on April 3, 2007. A total of 50 face-to-face interviews were conducted during the 2006-2007 school year. Therefore, a total of 115 face-to-face interviews were conducted at School 2.

Interview Procedures

When signed parent permission forms were received, interviewers asked teachers if students were allowed to be excused from class (typically a non-core class) in order to be surveyed. Interviewers obtained student class schedules either from the Registrar's office or by utilizing a school computer to research student schedules. Students were taken to several locations throughout the schools to be interviewed (e.g., classroom, room in the library, quiet area in the library or cafeteria). Interviewers went over the informed assent process with students (i.e., aims and purpose of the pilot study, assent and confidentiality issues, risks and benefits associated with the pilot study, and compensation) and were reminded that the student was free to terminate the interview at any time with absolutely no penalty or recriminations. If the student was still interested in participating in the study, student assent was obtained and the interview began. If a student responded to being a different ethnicity than the four ethnic groups studied for purposes of the dissertation pilot study, the student was told that unfortunately they would not be able to participate in the pilot study and was provided a token of appreciation (i.e., a pen).

None of the 196 students asked that the interview be terminated. The confidential interviews ranged from approximately 45 to 75 minutes to administer. Students who participated in the pilot study received a total of \$25.00 in gift certificates (e.g., Jamba Juice gift card, movie gift certificates, gift cards to a local vendor/store).

Participants were reminded of their right to decline from answering any question. All data were kept confidential (locked in an office), with student assent and parent permission forms kept separately from the interview form and data. The interview forms

were labeled with a unique identification number and any researcher who helped to conduct interviews was required to attend a training session by the author and sign a pledge of confidentiality, with enforcement being monitored by the author. Data dissemination was reported in ways that did not compromise a respondent's identity (e.g., only aggregate results disseminated).

Human Subjects

The pilot study recruited participants from the island of O'ahu and complied with the University of Hawai'i's Committee on Human Subjects (CHS) requirements and the Department of Health and Human Services Regulations (45 CFR 46) regarding the protection of human research participants. The pilot study was also reviewed and approved by the State of Hawai'i's, Department of Education.

Sample

The pilot study concentrated on a community sample of adolescents from two high schools on the island of O'ahu. The two high schools were selected specifically for their representation of the major ethnic minority populations (Native Hawaiian, Japanese, Filipino, and Caucasian adolescents) in Hawai'i. During the 2004-2005 school year, 53,569 high school students were enrolled in public high schools within the State of Hawai'i, with an ethnic breakdown as follows: 26% Native Hawaiians, 11% Japanese, 20% Filipinos, and 14% Caucasian (Department of Education, 2005).

The pilot study proposed that 96 interviews be conducted at each of the high schools (i.e., 6 males and 6 females for each ethnicity and each of 2 grade levels), for a total of 192 interviews (i.e., 12 males and 12 females for each ethnicity and grade level). Ninth and 12th grade students were selected to participate in this study, as these grade

levels were considered to be transition periods for adolescents (i.e., 9th grade students entering high school for the first time and 12th grade students about to enter adulthood). A random sample procedure (by gender, grade level, and ethnicity) was utilized to select students to participate in the pilot study.

School 1

Beginning in October of 2006, a total of 81 interviews (across six months) was completed at School 1. Table 2.1 indicated the number of completed interviews for each school, while Table 2.2 reported the total number of interviews by ethnicity, gender, and grade level conducted when combining both schools.

Table 2.1. Breakdown of the Sample by School, Ethnicity, Grade Level, and Gender Completed Interviews for School 1

	9th Grade	12th Grade
Native Hawaiian (21 total)	2 males 6 females	5 males 8 females
Japanese (22 total)	4 males 7 females	6 males 5 females
Filipino (14 total)	4 males 4 females	4 males 2 females
Caucasian (24 total)	5 males 7 females	6 males 6 females
<u>Completed Interviews for School 2</u>		
	9th Grade	12th Grade
Native Hawaiian (29 total)	7 males 10 females	6 males 6 females
Japanese (27 total)	6 males 7 females	7 males 7 females
Filipino (36 total)	7 males 8 females	8 males 13 females
Caucasian (23 total)	6 males 5 females	6 males 6 females

Table 2.2. Total Sample Breakdown by Ethnicity, Grade Level, and Gender ($N = 196$)

	9th Grade	12th Grade
Native Hawaiian (50 total)	9 males 16 females	11 males 14 females
Japanese (49 total)	10 males 14 females	13 males 12 females
Filipino (50 total)	11 males 12 females	12 males 15 females
Caucasian (47 total)	11 males 12 females	12 males 12 females

School 2

School 2 allowed interviews to be conducted beginning late February of the 2005-2006 school year. Although 65 students were interviewed the first year, School 2 allowed additional students to be interviewed during the 2006-2007 school year, in an effort to meet or surpass the initially proposed sample sizes (i.e., 6 male and 6 female students for each ethnicity and two grade levels). Therefore, a total of 115 interviews were conducted, across 10 months, at School 2. Due to having more time within School 2 in comparison to School 1, more interviews were completed at School 2.

Participation Rates

A master file of all students approached to participate in the study was kept, as well as students who declined to participate in the study, in an effort to obtain participation rates. Table 2.3 examined participation rates for the pilot study and also reported students who were on the school list but were never approached due to various reasons. The overall participation rate for this dissertation pilot study was 43.9%.

Table 2.3. Participation Rates

	School 1		School 2 (2005-2006)		School 2 (2006-2007)		Total	
	Ratio	%	Ratio	%	Ratio	%	Ratio	%
<i>Declines</i>								
Student not interested; No reason provided	20/161	12.4	10/164	6.1	5/121	4.1	35/446	7.8
Student said parent not interested in allowing student to participate	3/161	1.9	0/164	0.0	1/121	0.8	4/446	0.9
Student did not want to make up class work	1/161	0.6	0/164	0.0	0/121	0.0	1/446	0.2
<i>Declines Total</i>	24/161	14.9	10/164	6.1	6/121	5.0	40/446	9.0
<i>Student approached (1-3 times) but did not participate in study</i>	56/161	34.8	89/164	54.3	65/121	53.7	210/446	47.1
<i>Student Participated</i>	81/161	50.3	65/164	39.6	50/121	41.3	196/446	43.9
<i>Total Number of Students Approached</i>	161/446	36.1	164/446	36.8	121/446	27.1	446/446	100
<i>Student on school list but never approached</i>								
Off campus	9/21	42.9	1/11	9.1	4/14	28.6	14/46	30.4
Suspended	2/21	9.5	0/11	0.0	0/14	0.0	2/46	4.3
Not going to school or class (e.g., pregnant)	4/21	19.0	6/11	54.5	5/14	0.4	15/46	32.6
Special education and not capable to take survey	3/21	14.3	4/11	36.4	3/14	21.4	10/46	21.7
Transferred to another school/released from school	2/21	9.5	0/11	0.0	2/14	14.3	4/46	8.7
At home (sick or injured)	1/21	4.8	0/11	0.0	0/14	0.0	1/46	2.2
<i>Total Number of Student Never Approached</i>	21/46	45.7	11/46	23.9	14/46	30.4	46/46	100.0

School 1

Approximately one-half (50.3%) of all students approached at School 1 participated in the pilot study. For School 1, during the 2006-2007 school year, a total of 161 students were approached to participate in the study, of which 24 students or 14.9% (24/161) of students declined to participate. Approximately 35% (56/161) of students

who were approached to participate in the pilot study did not return signed parent permission forms.

School 2

For School 2, 36.8% of students approached during the 2005-2006 school year participated in the pilot study. During the 2006-2007 school year at School 2, 41.3% of the students approached, participated in the pilot study.

During the 2005-2006 school year at School 2, 164 students were approached to participate in the study, of which 10 students declined to participate. The decline rate for 2005-2006 was 6.1% (10/164), with 54.3% (89/164) of the students who were approached to participate in the pilot study not returning signed parent permission forms.

During the 2006-2007 school year for School 2, 121 students were approached to participate in the study, of which 6 students declined to participate. The decline rate for the 2006-2007 school year was 5.0% (6/121), with 53.7% (65/121) of the students approached to participate in the pilot study not returning signed parent permission forms.

Sample Bias

Information on ethnicity, gender, and grade level were obtained for both students who participated in the pilot study ($N = 196$) and students who did not participate in the pilot study (i.e., 250 students who either declined to participate or were approached but were not interviewed). These data allowed one to determine whether there were statistically significant differences (i.e., sample bias) between those who participated versus those who did not participate in the study. Chi square analysis was conducted on these demographic variables due to the relatively even split between the two groups (i.e., participated vs. did not participate). There were significant ethnic (p value = .0083),

gender (p value = .0038), and grade level (p value = .0451) differences in the proportions of students who participated in the study and those who did not participate in the study. Approximately 39% (50/127) Native Hawaiian, 53.3% (i.e., 49/92) Japanese, 35.7% (i.e., 50/140) Filipino, and 54.0% (i.e., 47/87) Caucasian students participated in the pilot study. With regards to ethnicity, two-thirds of Native Hawaiian and Filipino students did not participate in the study while approximately one-half of Japanese and Caucasian students participated in the study. There were a higher proportion of females than males who participated in the study and a higher proportion of seniors than freshmen who participated in the pilot study.

Sample Description

There were a total of 196 students who participated in the pilot study.

Frequencies and percentages for gender, grade level, age, and main wage earner's educational level by ethnicity were reported in Table 2.4.

Table 2.4. Sample Description ($N = 196$)

Demographic Variable	Levels	Ethnic Group														
		Native Hawaiian			Japanese			Filipino			Caucasian			Total		
		<i>n</i>	%		<i>n</i>	%		<i>n</i>	%		<i>n</i>	%	<i>n</i>	%		
Total (Row %)		50	25.5		49	25.0		50	25.5		47	24.0		196	100.0	
Gender	Male	20	40.0		23	46.9		23	46.0		23	48.9		89	45.4	
	Female	30	60.0		26	53.1		27	54.0		24	51.1		107	54.6	
Grade Level	9th	25	50.0		24	49.0		23	46.0		23	48.9		95	48.5	
	12th	25	50.0		25	51.0		27	54.0		24	51.1		101	51.5	
Age	9th	<i>n</i>	<i>m</i>	<i>sd</i>	<i>n</i>	<i>m</i>	<i>sd</i>	<i>n</i>	<i>m</i>	<i>sd</i>	<i>n</i>	<i>m</i>	<i>sd</i>	<i>n</i>	<i>m</i>	<i>sd</i>
	12th	25	14.4	0.58	24	14.1	0.68	23	14.4	0.89	23	14.1	0.55	95	14.3	0.69
Main Wage Earner's Educational Level		25	17.3	0.61	25	17.4	0.51	27	17.5	0.51	24	17.5	0.66	101	17.4	0.57
		50	3.7	1.13	48	4.4	0.96	49	3.9	0.93	47	4.3	1.18	194	4.1	1.08

Main Effects:

Ethnicity = $\chi^2(3, N = 196) = 0.1, p = .9890$.

Gender = $\chi^2(1, N = 196) = 1.7, p = .1985$.

Grade Level = $\chi^2(1, N = 196) = 0.2, p = .6682$.

Age = $F(3, 192) = 0.2; R^2 = .003; p = .8853$.

Main Wage Earner's Educational Level = $F(3, 190) = 4.6; R^2 = .067; p = .0041$.

Interaction Effects with Ethnicity:

Gender = $\chi^2(3, N = 196) = 0.9, p = .8304$.

Grade Level = $\chi^2(3, N = 196) = 0.2, p = .9810$.

To determine whether there were any statistically significant main-effect differences in the proportions based on ethnicity, gender, and grade level, chi square analyses were conducted for ethnicity, gender and grade level due to the measures being categorical and there being an adequate number of students included in the analysis. In addition, two-way chi squares were conducted in order to determine whether the interaction effects for (1) gender by ethnicity and (2) grade level by ethnicity were statistically significant. The findings determined that there were no significant proportional differences for the main effects of ethnicity, gender, and grade level, and for the interaction effects of gender by ethnicity. In addition, there were no significant proportional differences for the interaction effect of grade level by ethnicity.

The mean was obtained for age of students, with 14.3 years of age reported as the mean for 9th grade students and 17.4 years of age for 12th grade students. A (linear) regression analysis (i.e., general linear model) was conducted for age in order to determine whether there were any significant differences for age (dependent variable) by ethnicity (independent categorical variable). No significant differences were found.

There was an overall statistically significant difference ($p = .0041$) among the ethnic group means for the main wage earner's educational level (see Measures section below for the operational definition). Means for the main wage earner's educational level by ethnicity ranged from 3.7 for Native Hawaiian students, followed by Filipino (3.9), Caucasian (4.3), and Japanese (4.4) students. A student Newman-Keuls test was conducted for main wage earner's educational level in order to determine where the significant ethnic differences were. The means for Japanese and Caucasian students were significantly higher (4.4 and 4.3 respectively) than for Native Hawaiian students (3.7).

Measures

Dependent Variables

The dependent variables in this pilot study were six indicators of substance use: three obtained through the Diagnostic Interview Schedule for Children (DISC) and the remaining three from the American Drug and Alcohol Scale (ADAS). The six substance use outcomes were dichotomous in nature where 1 = yes and 0 = no.

Diagnostic Interview Schedule for Children IV (DISC)

The Diagnostic Interview Schedule for Children (Shaffer, Fisher, Lucas, Dulcan, & Schwab-Stone, 2000) was a highly structured diagnostic interview designed to assess mental health diagnoses based on DSM-IV criteria. Trained lay interviewers asked respondents a series of questions exactly as worded on the computer screen. In general, DISC 2.3, a previous version of the DISC-IV, was found to be adequately reliable and valid with community samples in different countries (e.g., Lahey et al., 1996; Schwab-Stone et al., 1996; Shaffer et al., 1996). The DISC 2.3 was also utilized by Nishimura et al. (2001) with an adolescent population of high school students in Hawai'i and included Asian and Pacific Islander students. The DISC 2.3 was found to be a valid indicator of substance use disorders with Asian and Pacific Islander adolescents. Andrade et al. (2006) also administered the DISC 2.3 to over 600 adolescents in Hawai'i and the DISC has been used with a variety of ethnic and minority groups, with adequate measures of reliability, sensitivity, and concurrent validity (Lahey et al., 1996; Schwab-Stone et al., 1996; Shaffer et al., 1996). Shaffer et al. (2000) reported that the DISC-IV "compares favorably with earlier versions" (Shaffer et al., 2000, p. 35).

The DISC 2.3 computer program asked questions related to substance use. Based on the responses to each question, the computer generated a report for each participant and determined whether each participant met criteria for alcohol or marijuana abuse or alcohol or marijuana dependence. The DISC program followed the criteria set forth by the DSM-IV (American Psychiatric Association, 1994). A participant was determined to be *abusing* alcohol or marijuana if the participant did not meet criteria for alcohol or marijuana dependence and reported “a maladaptive pattern of substance use leading to clinically significant impairment or distress, as manifested by one (or more)” symptoms, “occurring within a 12-month period.” The 4 symptoms include: (1) “recurrent substance use resulting in a failure to fulfill major role obligations at work, school, or home;” (2) “recurrent substance use in situations in which it is physically hazardous;” (3) “recurrent substance-related legal problems;” and (4) “continued substance use despite having persistent or recurrent social or interpersonal problems caused or exacerbated by the effects of the substances.”

A participant was determined to be dependent on alcohol or marijuana if the participant experienced “a maladaptive pattern of substance use, leading to clinically significant impairment or distress, as manifested by three (or more)” symptoms, occurring at any time in the same 12-month period.” Symptom one referred to “tolerance, as defined by either of the following: (A) a need for markedly increased amounts of the substance to achieve intoxication or desired effect” or (B) “markedly diminished effect with continued use of the same amount of the substance.” Symptom two referred to “withdrawal, as manifested by either of the following: (A) characteristic withdrawal syndrome for the substance” or (B) “the same (or a closely related) substance

is taken to relieve or avoid withdrawal symptoms.” The other five symptoms include: (1) “the substance is often taken in larger amounts or over a longer period than was intended; (2) there is persistent desire or unsuccessful efforts to cut down or control substance use; (3) a great deal of time is spent in activities necessary to obtain the substance, use the substance, or recover from its effects; (4) important social, occupational, or recreational activities are given up or reduced because of substance use; and (5) the substance use is continued despite knowledge of having a persistent or recurrent physical or psychological problem that is likely to have been caused or exacerbated by the substance.”

A participant can meet the criteria for substance abuse or dependence but it is not possible to meet criteria for both abuse and dependence at the same time. The demographic and substance-related modules of the DISC 2.3 were administered. Three DISC substance prevalence rates were utilized as outcome measures.

(1) DISC Alcohol or Marijuana Abuse or Dependence: Due to the relatively low percentage of students meeting criteria for substance abuse or dependence, a variable was derived to include students who met criteria for alcohol *or* marijuana abuse *or* dependence (i.e., alcohol abuse, alcohol dependence, marijuana abuse, *or* marijuana dependence), where 1 = any of the four disorders and 0 = none of the four disorders.

(2) DISC Alcohol Abuse or Dependence: The second measure was based on whether a student met criteria for DISC alcohol abuse *or* dependence, where 1 = either alcohol abuse *or* alcohol dependence, and 0 = neither.

(3) DISC Marijuana Abuse or Dependence: The third DISC dependent variable related to whether students met DSM-IV diagnostic criteria for marijuana abuse *or* dependence, where 1 = either marijuana abuse *or* marijuana dependence, and 0 = neither.

American Drug and Alcohol Scale (ADAS)

In addition to the DISC, the American Drug and Alcohol Survey (ADAS; Adolescent version), which was developed by Beauvais, Edwards, and Oetting (through the Rocky Mountain Behavioral Science Institute, Inc.) in 1987, was also administered. The ADAS (a copyrighted instrument) was a paper-pencil instrument that consisted of 214 items related to students' experience with a variety of drugs, students' attitudes about drugs, ease of obtaining substances, peer influences related to drugs, and problems related to drug use. The ADAS has shown adequate to high reliability (ranging from .75 for the Current Ketamine Use Scale to .94 for the Current Marijuana Use Scale and Disapproval of Peers' alcohol, tobacco, and other drug use) with major ethnic populations in the United States (including European American, African American, Mexican American, Puerto Rican American, and Native American youth).

For purposes of the dissertation, three dependent measures were utilized based on data collected on the ADAS:

(1) ADAS Any Alcohol or Marijuana Use: The first ADAS variable was developed by including students who reported in the affirmative to ever having alcohol to drink (more than a few sips) *or* ever trying marijuana (see below for exact wording of the questions). If a student reported yes to either question, the variable entitled, "ADAS Any Alcohol or Marijuana Use," was coded 1 and if a student reported no to both questions, the variable was coded as 0.

(2) ADAS Any Alcohol Use: The second measure was based on a student's response to the following question, "Have you ever had alcohol to drink more than a few

sips?” If a student reported yes, the measure was coded 1 and if the student reported no, the measure was coded 0. The variable was labeled, “ADAS Any Alcohol Use.”

(3) ADAS Any Marijuana Use: Lastly, the third measure was based on the responses that students provided to the following question, “Have you ever tried marijuana (pot, grass, hash, etc.)?” If a student reported yes, the measure was coded 1 and if a student reported no, the measure was coded 0. The measure was labeled, “ADAS Any Marijuana Use.”

Independent Variables

Independent variables in this pilot study included ethnicity, gender, grade level, main wage earner’s educational level, and seven factors from the Prevention Planning Survey (Fights/Reaction to Anger, Positive Family Values/Discipline, Student Empathetic and Liked/Respected, Parent Cares, Family Communicates Dangers of Drug Use, Positive School Beliefs/Experiences, and Family Cares if Student Using Drugs). The measures, scoring and factor structure (for the Prevention Planning Survey) will be discussed below. In addition, the development of the seven factor structure that was obtained by conducting an exploratory factor analyses on the Prevention Planning Survey will be explained, in detail, in Chapter 4 of this dissertation.

Ethnicity

Approximately one-fourth (21%) of Hawai‘i’s population reported two or more races based on responses to the U.S. Census, making ethnic identification a unique and sometimes problematic issue when conducting research in Hawai‘i (State of Hawai‘i, 2002). Ethnicity for the pilot study was determined by self-identification, based on the student’s response to the question, “Which racial or ethnic group best

describes/represents you?” Rather than assigning rules with regards to the ethnic group the student would be placed in, the author wanted the student to determine which ethnic group best suited the student. Based on the response to this question, students were placed in the Native Hawaiian, Japanese, Filipino, or Caucasian group. Students who stated they were Native Hawaiian were assigned a code of 1; students who identified with Japanese were assigned a code of 2; students who stated they were Filipino were assigned a code of 3; and students who identified with Caucasian were assigned a code of 4.

Gender

Gender was assessed with the question (obtained through the American Drug and Alcohol Survey), “Sex:” and responses included either “Male” or “Female.” Males were assigned a code of 0 and females were assigned a code of 1.

Grade Level

Grade level was based on a question obtained through the American Drug and Alcohol Survey that asked, “What grade are you in?” Responses ranged from “5” (5th grade) to “College.” Since students in only the 9th or 12th grade were included in the pilot study, the measure was coded as a 1 for students who responded with a “9” and a 2 for students who responded with a “12.”

Main Wage Earner’s Educational Level

The main wage earner’s educational level was obtained in an effort to determine the household’s socioeconomic status. Students were asked, “How much school does the main wage earner (breadwinner, who brings in the most money support in the family) have?” Responses included “8th grade or less” (coded a 1), “some high school” (coded a 2), “high school graduate or G.E.D.” (coded a 3); “some college or community college”

(coded a 4), “college graduate” (coded a 5), “master’s degree” (coded a 6), and “doctoral degree (Ph.D., Medical, Law)” (coded a 7). The distribution of this variable for the sample included 1 student who reported “8th grade or less;” 7 students reported “some high school;” 60 students reported “high school graduate or G.E.D.,” 53 students reported “some college or community college;” 57 students reported college graduate;” 14 students reported master’s degree;” 2 students reported “doctoral degree (Ph.D., Medical, Law);” and 2 students reported that they did not know or were unsure of the educational level for the main wage earner (which were assigned a missing score).

Main wage earner’s educational level was utilized as a continuous variable, rather than a categorical variable, because there was a relatively small number of students participating in the study ($N=196$), with seven levels to the variable. Rather than collapsing the responses for this variable, the measure was left as a continuous variable so that information relating to main wage earner’s educational level was not lost. Therefore, a lower mean indicated a lower educational level for the main wage earner and a higher mean indicated a higher educational level for the main wage earner.

The Prevention Planning Survey Factors

The Prevention Planning Survey was developed by Oetting, Edwards, and Beauvais (through the Rocky Mountain Behavioral Science Institute, Inc.) in 1987 and was a copyrighted instrument (Rocky Mountain Behavioral Science Institute, Incorporated, 1997). The Prevention Planning Survey was a paper-pencil instrument that consisted of 170 items that assessed a variety of personal and social characteristics (risk and protective factors) related to drug use among youth. The Prevention Planning Survey was developed based on peer cluster theory (Oetting & Beauvais, 1986a, 1986b) whereby

the researchers proposed that adolescent drug use was a group activity that takes place in the social context of peer clusters. Peer clusters consisted of good friends, couples, or small groups of close friends who shared the same attitudes related to drugs and encompassed the same drug use norms. Peer cluster theory also emphasized the importance of psychological and social characteristics that underlie drug use.

The Prevention Planning Survey consisted of 24 original factors. (Please refer to Table 2.5 for a list of the original 24 factors of the Prevention Planning Survey.) The responses to the 97 questions consisted of dichotomous variables (i.e., responses of yes or no) and several rating scales (with responses including “a lot,” “some,” “not much,” “not at all,” “very good,” “good,” “not too good,” “poor,” “very true,” “mostly true,” “somewhat true,” “not true at all”). Table 2.5 provided the labels for the factors as well as the Cronbach alphas (ranging from 0.60 to 0.91) associated with the Prevention Planning Survey factors.

Exploratory factor analyses were conducted on the pilot study data in order to determine whether the 24-factors (that were originally reported by the Rocky Mountain Behavioral Science Institute, 1997) would hold true for Asian and Pacific Islander students in Hawai‘i. An exploratory factor analysis was conducted on the entire sample and rather than the original 24 factors previously reported, seven factors appeared to be meaningful for the dissertation sample (which included Asian and Pacific Islander students). The exploratory factor analysis and the seven-factor solution will be reported in detail in Chapter 4 of the dissertation.

Table 2.5. 24 Factors of the Prevention Planning Survey

Factor	Cronbach Alpha Reliabilities
1. Perceived Family Disapproval of Alcohol, Tobacco, or Other Drug Use	Not available
2. Friends' School Adjustment	0.82
3. School Adjustment	0.82
4. Family Caring	0.77
5. Parental Monitoring	0.77
6. Family Attends School Events	0.60
7. Family Supports School Goals	0.75
8. Tolerance of Deviance	0.83
9. Deviant Behaviors	0.75
10. Empathy/Lack of Empathy	0.79
11. Family Fights A Lot	0.79
12. Friends Fight A Lot	0.75
13. Likes Guns	0.92
14. Victim of Bullying	0.78
15. Withdrawn From Friends	0.84
16. Feels Isolated	0.81
17. Feels Disrespected	0.71
18. Feels Help is Unavailable	0.84
19. School Rules	0.74
20. School Climate	0.71
21. Verbal Assault When Angry	0.85
22. Assaults Objects When Angry	0.85
23. Assaults People When Angry	0.91
24. Anger Level	0.88

The seven factors that were utilized as independent variables (based on the factor analyses) included, Factor 1: "Fights/Reaction to Anger," Factor 2: "Positive Family Values/Discipline," Factor 3: "Student Empathetic and Liked/Respected," Factor 4: "Parent Cares," Factor 5: "Family Communicates Dangers of Drug Use," Factor 6: "Positive School Beliefs/Experiences," and Factor 7: "Family Cares if Student Using Drugs." The number of items within each factor ranged from a low of three items (for

Factor 7) to a high of 19 items (for Factor 1). The mean for each factor was obtained based on the number of items within each factor and the responses for each item.

Analysis

The SAS 9.1 program was utilized to conduct the analyses of data. Chi square tests were performed to examine whether there were significant proportional differences between students who participated in the pilot study and those who were approached to participate in the pilot study but did not participate or students who declined to participate in the study.

Descriptive statistics as well as chi square tests were performed to examine whether there were significant proportional differences in the sample for demographic variables (including ethnicity, gender, and grade level). Regression analyses (linear) were conducted for age and main wage earner's educational level in order to determine whether there were any significant differences by ethnicity for students who participated in the pilot study.

In order to determine the associations between school, school year, grade level, and gender based on the six dependent variables (i.e., prevalence of substance use), logistic regression analyses were conducted.

Overall univariate logistic regressions were conducted for ethnicity predicting the six dichotomous dependent variables (i.e., prevalence of substance use). Pairwise logistic regression analyses were conducted on significant overall univariate logistic regressions in order to determine where statistically significant ethnic differences existed.

Exploratory factor analyses were conducted on the 97 items of the Prevention Planning Survey to determine whether the 24-factor structure held true for Asian and

Pacific Islander students in Hawai'i. Standardized coefficient loadings and Cronbach alpha levels were obtained, and intercorrelations among the factors were also calculated.

Univariate and multiple logistic regression analyses were conducted for each dependent variable (i.e., substance use). The univariate logistic regressions were conducted to determine whether each of the independent variables was significantly associated with each of the substance use outcomes. Multiple logistic regressions were conducted to begin to develop a model of independent variables (i.e., gender, grade level, ethnicity, main wage earner's educational level, and the seven factors of the Prevention Planning Survey) significantly associated with the prevalence of substance use.

This chapter has discussed the methods employed for the pilot study, described the measures utilized for the pilot study, provided a general sample description, and briefly discussed the statistical analyses that were performed. Chapter 3 will discuss the results of the data analysis.

CHAPTER 3. RESULTS

This chapter examined the proposed research questions and tested the hypotheses reported in Chapter 1. First, school, school year, grade level, and gender associations were examined for each of the six dependent variables (i.e., substance use prevalence rates). This was done to determine not only whether these independent variables were significantly associated with substance use, but also to determine which of these variables might confound subsequent results.

School, School Year, Grade Level, and Gender Associations with Dependent Variables

Logistic regression analysis, rather than chi square analyses, were utilized due to the prevalences of the dependent variables (e.g., DISC substance abuse or dependence) being relatively low and the independent variables being dichotomous. Table 3.1 reported whether there were any significant differences for students who participated in the pilot study based on school, school year, grade level, and gender.

In general, substance use prevalence rates were typically higher for the three ADAS substance prevalence items. Higher rates were found for ADAS Any Alcohol or Marijuana Use and ADAS Any Alcohol Use (~60%); followed by ADAS Any Marijuana Use (ranging between 20%-30%); DISC Alcohol or Marijuana Abuse or Dependence (ranging from 13%-19%); DISC Alcohol Abuse or Dependence (ranging from 7%-16%); and DISC Marijuana Abuse or Dependence (ranging from 5%-11%). The two exceptions to this pattern were found for school year (whereby 69.2% of students reported ADAS Any Alcohol or Marijuana Use) and grade level (whereby significant differences were found and will be reported below).

Table 3.1. School, School Year, Grade Level, and Gender Associations with Substance Use Prevalence Rates

	Ratio	%	Ratio	%	Odds Ratio	Odds Ratio 95% Confidence Interval	logistic χ^2 (Chi square)	R ² (Maximum variance accounted for)	P value	N size	Notes
School 1 (code = 1), School 2 (code = 2)											
DISC Alcohol or Marijuana Abuse or Dependence	15/80	18.8	15/114	13.2	0.7	0.3-1.4	1.1	.010	.2920	194	
DISC Alcohol Abuse or Dependence	12/80	15.0	11/114	9.7	0.6	0.3-1.5	1.3	.013	.2601	194	
DISC Marijuana Abuse or Dependence	9/80	11.3	6/114	5.3	0.4	0.2-1.3	2.3	.028	.1279	194	
ADAS Any Alcohol or Marijuana Use	50/81	61.7	72/115	62.6	1.0	0.6-1.9	0.0	.000	.9004	196	
ADAS Any Alcohol Use	49/81	60.5	71/115	61.7	1.1	0.6-1.9	0.0	.000	.8602	196	
ADAS Any Marijuana Use	24/81	29.6	27/115	23.5	0.7	0.4-1.4	0.9	.007	.3355	196	
2005-2006 Year (code=1), 2006-2007 Year (code=2)											
DISC Alcohol or Marijuana Abuse or Dependence	8/64	12.5	22/130	16.9	1.4	0.6-3.4	0.7	.006	.4160	194	
DISC Alcohol Abuse or Dependence	5/64	7.8	18/130	13.9	1.9	0.7-5.4	1.6	.016	.2070	194	
DISC Marijuana Abuse or Dependence	5/64	7.8	10/130	7.7	1.0	0.3-3.0	0.0	.000	.9765	194	
ADAS Any Alcohol or Marijuana Use	45/65	69.2	77/131	58.8	0.6	0.3-1.2	2.1	.014	.1521	196	
ADAS Any Alcohol Use	44/65	67.7	76/131	58.0	0.7	0.4-1.2	1.7	.012	.1876	196	
ADAS Any Marijuana Use	16/65	24.6	35/131	26.7	1.1	0.6-2.2	0.1	.001	.7514	196	
9th Grade (code=1), 12th Grade (code=2)											
DISC Alcohol or Marijuana Abuse or Dependence	12/95	12.6	18/99	18.2	1.5	0.7-3.4	1.2	.010	.2835	194	
DISC Alcohol Abuse or Dependence	7/95	7.4	16/99	16.2	2.4	0.9-6.2	3.7	.036	.0550	194	
DISC Marijuana Abuse or Dependence	8/95	8.4	7/99	7.1	0.8	0.3-2.4	0.1	.002	.7248	194	
ADAS Any Alcohol or Marijuana Use	47/95	49.5	75/101	74.3	2.9	1.6-5.4	12.9	.087	.0003 ***	196	12th grade> 9th grade
ADAS Any Alcohol Use	46/95	48.4	74/101	73.3	2.9	1.6-5.3	12.9	.086	.0003 ***	196	12th grade> 9th grade
ADAS Any Marijuana Use	20/95	21.1	31/101	30.7	1.7	0.9-3.2	2.4	.018	.1229	196	
Male (code=0), Female (code=1)											
DISC Alcohol or Marijuana Abuse or Dependence	12/89	13.5	18/105	17.1	1.3	0.6-2.9	0.5	.004	.4807	194	
DISC Alcohol Abuse or Dependence	9/89	10.1	14/105	13.3	1.4	0.6-3.3	0.5	.005	.4872	194	
DISC Marijuana Abuse or Dependence	6/89	6.7	9/105	8.6	1.3	0.4-3.8	0.2	.003	.6331	194	
ADAS Any Alcohol or Marijuana Use	54/89	60.7	68/107	63.6	1.1	0.6-2.0	0.2	.001	.6792	196	
ADAS Any Alcohol Use	54/89	60.7	66/107	61.7	1.0	0.6-1.9	0.0	.000	.8853	196	
ADAS Any Marijuana Use	24/89	27.0	27/107	25.2	0.9	0.5-1.7	0.1	.001	.7832	196	

Notes:

DISC = Diagnostic Interview Schedule for Children

ADAS = American Drug and Alcohol Scale

School and Associations with Substance Use Prevalence Rates

There were no statistically significant differences between students at School 1 and students at School 2. Overall, the variance accounted for was relatively low, ranging from 0% (for ADAS Any Alcohol or Marijuana Use and ADAS Any Alcohol Use) to 2.8% (for DISC Marijuana Abuse or Dependence).

School Year and Associations with Substance Use Prevalence Rates

There were no statistically significant differences in the substance use prevalences between the school years. The variance accounted for by school year administration was low, ranging from 0% (for DISC Marijuana Abuse or Dependence and ADAS Any Marijuana Use) to 1.6% (for DISC Alcohol Abuse or Dependence).

Grade Level and Associations with Substance Use Prevalence Rates

Statistically significant results (p value $< .001$ level) were found for grade level and ADAS Any Alcohol or Marijuana Use and ADAS Any Alcohol Use, with higher prevalence rates for 12th grade students. The variance accounted for with regards to ADAS Any Alcohol or Marijuana Use was 8.7% and 8.6% for ADAS Any Alcohol Use. Due to these significant findings, grade level was included as a covariate in the model, as grade level was associated with prevalence of substance use.

Gender and Associations with Substance Use Prevalence Rates

There were no significant gender differences for substance use prevalence rates and $< 0.6\%$ of the variance accounted for was due to gender.

Association between Ethnicity and Prevalence of Substance Use

The first research question examined whether there were any differences among the four ethnic groups (Native Hawaiian, Japanese, Filipino, and Caucasian) for

Table 3.2. Ethnicity and Prevalence of Substance Use

	Ratio	%	Prevalence 95% CI*	N (sample size)	Overall Univariate Logistic			Significant pairwise logistic regression ($\alpha =$.05)	Significant pairwise logistic regression ($\alpha = .01$)
					χ^2 (Chi square)	R ² (Maximum variance accounted for)	P value		
DISC Alcohol or									
Native Hawaiian (NH)	11/49	22.5	13.0-35.9	194	6.3	.055	.0999		
Japanese (J)	4/49	8.2	3.2-19.2						
Filipino (F)	5/49	10.2	4.4-21.8						
Caucasian (C)	10/47	21.3	12.0-34.9						
Total	30/194	15.5	11.1-21.2						
DISC Alcohol Abuse or									
Dependence									
Native Hawaiian (NH)	8/49	16.3	8.5-29.0	194	4.5	.044	.2152		
Japanese (J)	3/49	6.1	2.1-16.5						
Filipino (F)	4/49	8.2	3.2-19.2						
Caucasian (C)	8/47	17.0	8.9-30.1						
Total	23/194	11.9	8.0-17.2						
DISC Marijuana Abuse									
or Dependence									
Native Hawaiian (NH)	7/49	14.3	7.1-26.7	194	7.1	.085	.0693		
Japanese (J)	2/49	4.1	1.1-13.7						
Filipino (F)	1/49	2.0	0.4-10.5						
Caucasian (C)	5/47	10.6	4.6-22.6						
Total	15/194	7.7	4.7-12.4						
ADAS Any Alcohol or									
Marijuana Use									
Native Hawaiian (NH)	41/50	82.0	69.2-90.2	196	15.5	.103	.0015 **	NH > J, F, C	NH > J
Japanese (J)	22/49	44.9	31.9-58.7						
Filipino (F)	31/50	62.0	48.2-74.1						
Caucasian (C)	28/47	59.6	45.3-72.4						
Total	122/196	62.2	55.3-68.7						
ADAS Any Alcohol									
Use									
Native Hawaiian (NH)	41/50	82.0	69.2-90.2	196	15.8	.105	.0013 **	NH > J, F, C	NH > J, C
Japanese (J)	22/49	44.9	31.9-58.7						
Filipino (F)	30/50	60.0	46.2-72.4						
Caucasian (C)	27/47	57.5	43.3-70.5						
Total	120/196	61.2	54.2-67.8						
ADAS Any Marijuana									
Use									
Native Hawaiian (NH)	19/50	38.0	25.9-51.8	196	18.6	.133	.0003 ***	NH & C > J, F	NH & C > J; C > F
Japanese (J)	5/49	10.2	4.4-21.8						
Filipino (F)	8/50	16.0	8.3-28.5						
Caucasian (C)	19/47	40.4	27.6-54.7						
Total	51/196	26.0	20.4-32.6						

Notes:

*CI = Confidence Interval

p < .01; *p < .001

prevalence rates of substance use and consisted of six hypotheses. In Table 3.2, descriptive statistics were employed in order to obtain the ratio, prevalence, and 95% confidence interval of substance use prevalence for each ethnic group. Overall univariate logistic regression analyses were conducted in order to determine how ethnicity related to the outcome, in this case, prevalences of substance use. Statistically significant results

were found for ADAS Any Alcohol or Marijuana Use (p value $<.01$), ADAS Any Alcohol Use (p value $<.01$), and ADAS Any Marijuana Use (p value $<.001$). Pairwise logistic regressions were also conducted in order to determine where the significant differences across the ethnic groups existed.

The variance accounted for by ethnicity for the dependent variables ranged from 4% (DISC Alcohol Abuse or Dependence) to 13% (for ADAS Any Marijuana Use). Six pairwise logistic regressions were conducted for the three dependent variables that were found to be significant in order to determine where the significant differences existed. The results will be reported below.

Hypothesis 1

Hypothesis 1 stated there will be no statistically significant differences in prevalence rates between Native Hawaiian and Caucasian students, in light of the fact that reported rates (based on local data) for these two groups have been consistently similar to one another. No statistically significant ethnic differences were found for the three DISC Abuse or Dependence rates. However, significant differences were found for ADAS Any Alcohol or Marijuana Use (alpha level set at .05) and ADAS Any Alcohol Use (alpha level set at .01), with Native Hawaiian students reporting higher rates of substance use in comparison to Caucasian students. Thus, the hypothesis was found to be only partially supported (i.e., for four of the six dependent variables).

Hypothesis 2

Hypothesis 2 stated that prevalence rates will be higher for Native Hawaiian students in comparison to Filipino students, as the reported rates (based on local data) have been higher for Native Hawaiians. The hypothesis generally held true as Native

Hawaiian students reported higher prevalence rates in comparison to Filipino students, with significant pairwise logistic regressions found for ADAS Any Alcohol or Marijuana Use (alpha level of .05), ADAS Any Alcohol Use (alpha level at .05), and ADAS Any Marijuana Use (alpha level of .01).

Hypothesis 3

Hypothesis 3 stated that prevalence rates will be higher for Native Hawaiians in comparison to Japanese students, as the reported rates (based on local data) have been higher for Native Hawaiians. This hypothesis was found to be generally supported as Native Hawaiian student rates were higher than Japanese students for the three ADAS dependent variables (alpha level of .01).

Hypothesis 4

Hypothesis 4 stated prevalence rates will be higher for Caucasian students in comparison to Filipino students as the reported rates (based on local data) were higher for Caucasians. Hypothesis 4 was generally supported by the results with Caucasians having a higher prevalence than Filipinos for ADAS Any Marijuana Use (alpha level of .01).

Hypothesis 5

Hypothesis 5 stated prevalence rates will be higher for Caucasian students in comparison to Japanese students as the reported rates (based on local data) were higher for Caucasian students. This hypothesis was generally supported, with a significant pairwise logistic regression comparison found for ADAS Any Marijuana Use (alpha level set at .01).

Hypothesis 6

Hypothesis 6 stated that prevalence rates will be higher for Filipino students in comparison to Japanese students, as the reported rates (based on local data) were found to be higher for Filipino students. Support for this hypothesis was not found; there were no significant differences between the two ethnic groups when pairwise logistic regressions were conducted.

Gender and Grade Level as Covariates

For ADAS Any Alcohol or Marijuana Use, ADAS Any Alcohol Use, and ADAS Any Marijuana Use, pairwise logistic regressions remained significant when gender and grade level were used as covariates.

Research Question 2

The following section reports on the analyses that were conducted in order to address Research Question 2 that referred to the exploratory development of a model and the relationship of the variables with adolescent substance use. First, factor analysis of the Prevention Planning Survey will be presented, followed by univariate and multiple logistic regression analyses that were conducted for each substance item.

Factor Analysis for the Prevention Planning Survey

Due to the Prevention Planning Survey not previously being validated with an Asian and Pacific Islander population, an exploratory factor analysis was conducted in an effort to investigate the factor structure for Asian and Pacific Islander students and to reduce the number of individual variables being studied.

The original factor structure for the Prevention Planning Survey consisted of the original 24 factors and 97 items (please refer to table 3.5). Due to the relatively large

number of items consisting of the original factor structure and the relatively small sample size for this pilot study (N=196), it was not possible to conduct exploratory factor analysis for each ethnic group. Therefore, exploratory factor analyses were conducted on the entire sample.

Exploratory factor analyses were conducted forcing 1 through 24 factors and promax rotation. Three students were dropped from the analysis due to not having complete data, and therefore, 193 students were included in the exploratory factor analyses. Each analysis was examined with a standard coefficient of .40 as the factor loading cutoff. Simple factor structure was sought (i.e., each remaining item loaded on only one factor).

Rather than the 24-factor solution originally reported by the researchers who developed the Prevention Planning Survey, the present analyses resulted in a seven-factor solution that was most meaningful and valid. This seven-factor solution consisted of 61 items (rather than the original 97 items), with 2 items double-loading on two factors. One item asked students, "How much would your family care if you...smoke cigarettes" and the other item asked, "How much would your family try to stop you from...smoking cigarettes." The two items were dropped and exploratory factor analysis was conducted once again with 59 items (rather than 61 items). The seven factor solution held and the standardized coefficient loadings for each item were reported in Table 3.3.

Table 3.3. Prevention Planning Survey and Exploratory Analyses with PROMAX
(N = 193)

Overall Item Number	Factor Item Number	Standardized Coefficient Loadings	Cronbach alpha	Factor and Description
<i>.91 Factor 1 = Fights/Reaction to Anger</i>				
30A.	1.	.45		Do your friends fight with other kids? ^a
39B.	2.	.68		How true are these statements about you and your feelings? I am quick tempered. ^a
40B.	3.	.67		How true are these statements about you and your feelings? I get mad. ^a
43D.	4.	.77		How true are these statements about you and your feelings? I lose my temper. ^a
45C.	5.	.68		How true are these statements about you and your feelings? I am hotheaded. ^a
46B.	6.	.43		How true are these statements about you and your feelings? I do bad things. ^a
46C.	7.	.76		How true are these statements about you and your feelings? I get angry. ^a
48A.	8.	.67		When I get angry I...Throw things. ^b
48B.	9.	.42		When I get angry I...Make sarcastic remarks. ^b
48C.	10.	.70		When I get angry I...Hit others. ^b
48D.	11.	.63		When I get angry I...Bang things around. ^b
48E.	12.	.41		When I get angry I...Swear (cuss). ^b
48F.	13.	.65		When I get angry I...Shove people around. ^b
48G.	14.	.47		When I get angry I...Do things like slam doors. ^b
48H.	15.	.49		When I get angry I...Tell people off. ^b
48I.	16.	.67		When I get angry I...Try to physically hurt people. ^b
48J.	17.	.45		When I get angry I...Stomp around. ^b
48K.	18.	.43		When I get angry I...Say nasty things. ^b
48L.	19.	.58		When I get angry I...Get into fist fights. ^b
<i>.81 Factor 2 = Positive Family Values/Discipline</i>				
13B	1.	.77		How much would your family care if you...got drunk. ^a
14B	2.	.76		How much would your family try to stop you from...getting drunk. ^a
32A	3.	.46		How much would your family care if you...skipped school. ^a
32B	4.	.43		How much would your family care if you...got a bad grade. ^a
32C	5.	.49		How much would your family care if you...did not do your homework. ^a
36A	6.	-.50		My parents...allow me to go out as often as I want? ^{c,d}
36B	7.	-.40		My parents...let me go any place I want without asking? ^{c,d}
36D	8.	-.47		My parents...let me stay out as late as I want to? ^{c,d}
40C	9.	.42		How true are these statements about you and your feelings? It's bad to cheat. ^a
42A	10.	.59		How true are these statements about you and your feelings? It's bad to steal. ^a
42B	11.	.47		How true are these statements about you and your feelings? It's bad to skip school. ^a
<i>.81 Factor 3 = Student Empathetic and Liked/Respected^a</i>				
23	1.	.58		Do your friends care about you?
24	2.	.48		How much do you care about your friends?
38E	3.	.44		If I need help...other kids will help me.
39A	4.	.45		How true are these statements about you and your feelings? I care about other people.
39E	5.	.68		How true are these statements about you and your feelings? Other kids respect me.
41A	6.	.60		How true are these statements about you and your feelings? Other people my age like me.
41B	7.	.44		How true are these statements about you and your feelings? I care about people's feelings.
43A	8.	.60		How true are these statements about you and your feelings? Other people my age like to be with me.
45D	9.	.72		How true are these statements about you and your feelings? Other people respect me.
<i>.78 Factor 4 = Parent Cares</i>				
14C	1.	.42		How much would your family try to stop you from...using inhalants like glue or gas. ^a
14E	2.	.47		How much would your family try to stop you from...using other drugs. ^a
33	3.	.83		Does your family care about you? ^a
34	4.	.74		How much do you care about your family? ^a
35	5.	.61		Does your family care what you do? ^a
36G	6.	.41		My parents...respect me. ^c
38A	7.	.61		If I need help...my parents will help me. ^a

Table 3.3. (Continued) Prevention Planning Survey and Exploratory Analyses with PROMAX ($N = 193$)

Overall Item Number	Factor Item Number	Standardized Coefficient Loadings	Cronbach alpha	Factor and Description
.90 Factor 5 = Family Communicates Dangers of Drug Use ^a				
37A	1.	.71		How much has your family talked to you about the dangers of the following...smoking cigarettes.
37B	2.	.63		How much has your family talked to you about the dangers of the following...getting drunk.
37C	3.	.78		How much has your family talked to you about the dangers of the following...using inhalants like glue or
37D	4.	.85		How much has your family talked to you about the dangers of the following...using marijuana.
37E	5.	.91		How much has your family talked to you about the dangers of the following...using other drugs.
.79 Factor 6 = Positive School Beliefs/Experiences ^a				
1	1.	.70		I like school.
4	2.	.45		I like my teachers.
6	3.	.71		School is fun.
16A	4.	.73		Do your friends...like school.
16C	5.	.70		Do your friends...think school is fun.
.86 Factor 7 = Family Cares if Student Using Drugs ^a				
13C	1.	.92		How much would your family care if you...used inhalants like glue or gas.
13D	2.	.60		How much would your family care if you...used marijuana.
13E	3.	.98		How much would your family care if you...used other drugs.

^a Rating scale: 0 = "not at all"; 1 = "not much"; 2 = "some"; 3 = "a lot."

^b Rating scale: 0 = "never"; 1 = "not much"; 2 = "some"; and 3 = "a lot."

^c Rating scale: 0 = "not at all true"; 1 = "somewhat true"; 2 = "mostly true"; and 3 = "very true."

^d Due to standardized coefficient loadings being negative, these three items will be reverse scored for factor scores.

Factor 1: Fights/Reaction to Anger

Factor 1 consisted of 19 items with standardized coefficient loadings ranging from .41 ["When I get angry I...swear (cuss)"] to .77 ("How true are these statements about you and your feelings? I get mad."). The Cronbach alpha (or internal consistency) for the 19 items was relatively high at .91. The 19 items typically related to things a student does in reaction to anger or whether the student was easily angered. Therefore, the items making up the 19 items were entitled, *Fights/Reaction to Anger*.

Factor 2: Positive Family Values/Discipline

When the first factor analysis was conducted, Factor 2 consisted of 10 items, with five negatively loaded items and two items that loaded on two factors. When the two items that double-loaded on two factors were deleted and exploratory factor analysis was conducted once again, Factor 2 consisted of 11 items. Two of the five negatively loaded items dropped out between the first factor analysis and the second. In addition, three

items that had not previously met the .40 cutoff in the first exploratory factor analysis was now included with Factor 2. Standardized regression coefficients ranged from a -.40 (“My parents...let me go any place I want without asking”) to .77 (“How much would your family care if you...got drunk”). The Cronbach alpha for Factor 2 was .81 and the questions within this factor related to family values and discipline and was thus labeled, *Positive Family Values/Discipline*.

Factor 3: Student Empathetic and Liked/Respected

Factor 3 consisted of 9 items with standardized regression coefficients ranging from .44 (“How true are these statements about you and your feelings? I care about other people”) to .72 (“How true are these statements about you and your feelings? Other people respect me”). The Cronbach alpha was .81 and the items related to the student either caring for others or being cared and respected by others. Therefore, Factor 3 was entitled, *Student Empathetic and Liked/Respected*.

Factor 4: Parent Cares

Originally, when the first factor analysis was conducted, Factor 4 consisted of 8 items, with 1 item double-loading on another factor. After dropping the double-loaded item and rerunning the factor analysis, Factor 4 consisted of 7 items and standardized regression coefficients ranged from .42 (“How much would your family try to stop you from...using inhalants like glue or gas”) to a high of .83 (“Does your family care about you?”). The Cronbach alpha was .78 for this factor and was the lowest internal consistency reported across all seven factors. Items falling on this factor related to the student’s family caring about the student and was thus entitled, *Parent Cares*.

Factor 5: Family Communicates Dangers of Drug Use

Factor 5 consisted of five items and standardized regression coefficients were relatively high, ranging from .63 (“How much has your family talked to you about the dangers of the following...getting drunk”) to .91 (“How much has your family talked to you about the dangers of the following...using other drugs”). The Cronbach alpha for this factor was .90 and all five items related to the student’s family speaking to the student about the dangers of drug use. Therefore Factor 5 was labeled, *Family Communicates Dangers of Drug Use*.

Factor 6: Positive School Beliefs/Experiences

In the first factor analysis, Factor 6 consisted of six items. However, after the two double-loaded items were dropped and the factor analysis was conducted once more, one item (“My teachers like me”) dropped out of the factor. Therefore, Factor 6 consisted of five items and standardized regression coefficients ranged from .45 (“I like my teachers”) to .73 (“Do your friends...think school is fun”). The Cronbach alpha for this factor was .79 and the items related to liking school. Thus, the factor was entitled, *Positive School Beliefs/Experiences*.

Factor 7: Family Cares if Student Using Drugs

The last factor, Factor 7, originally consisted of four items, with one item being a double-loaded item. After the double loaded item was dropped, Factor 7 consisted of three items (the fewest number of items across all seven Factors). Although Factor 7 consisted of three items, the Cronbach alpha for Factor 7 was .86. The lowest standardized regression coefficient (.60) related to the question that asked, “How much would your family care if you...used marijuana,” to a high of .98 (“How much would

your family care if you...used other drugs"). Therefore, Factor 7 was labeled, *Family Cares if Student Using Drugs*.

Composite Factor Scores

Factor scores were obtained by computing the mean of the items for each of the seven factors. Factor 1 (Fights/Reaction to Anger) consisted of the mean of 19 items and higher scores were associated with "bad" or negative reactions to anger (e.g., "throw things" or "hit others" when getting angry).

Factor 2 consisted of the mean of 11 items. However, 3 items were reverse-scored, prior to computing the overall mean of the Factor, in order to ensure that the responses for each item were appropriately accounted for. That is, the direction of the responses were all in the same direction (e.g., higher scores for all 11 items related to having a greater amount of Family Values/Discipline).

For Factors 3-7, higher scores were associated with having a greater amount of "positive" attributes that included, "Student Empathetic and Liked/Respected," Parent Cares," "Family Communicates Dangers of Drug Use," "Positive School Beliefs/Experiences," and "Family Cares if Student Using Drugs."

Interfactor Correlations Among the Seven Factors

The interfactor correlations (please refer to Table 3.4) were utilized to determine whether concurrent validity (or the associations of all seven factors with one another) could be demonstrated.

There were 13 (out of a total of 21) interfactor correlations that were statistically significant in the predicted direction among the seven factors. There were negative as well as positive correlations which would be expected as the seven factors included items

that were positively as well as negatively worded. The general trend for the associations occurred with Factor 1 (Fights/Reaction to Anger) being negatively correlated with the other factors (i.e., interfactor correlations ranging from .00 to a high of -.28). This finding makes intuitive sense as Factors 2-6 consisted of somewhat positively based items, while items within Factor 1 represented negatively viewed concepts or associations of anger. Another general trend was found for Factor 2 (Positive Family Values/Discipline), which was positively and significantly associated with Factors 3-7. However, 4 of the remaining 10 correlations were low (.00-.14) and nonsignificant suggesting that some of the factors were not highly associated with one another, which was somewhat unexpected given that the Prevention Planning Survey had a theoretical basis (i.e., based, in part, on Primary Socialization Theory). However, all of the statistically significant correlations were expected.

Table 3.4. Intercorrelations among the Prevention Planning Survey Factors

Factors	1	2	3	4	5	6
1. Factor 1 = Fights/Reaction to Anger						
2. Factor 2 = Positive Family Values/Discipline	-.28 ****					
3. Factor 3 = Student Empathetic and Liked/Respected	-.00	.20 **				
4. Factor 4 = Parent Cares	-.26 ***	.21 **	.23 **			
5. Factor 5 = Family Communicates Dangers of Drug Use	-.05	.23 **	.14	.37 ****		
6. Factor 6 = Positive School Beliefs/Experiences	-.19 **	.22 **	.20 **	.15 *	.12	
7. Factor 7 = Family Cares if Student Using Drugs	-.07	.27 ****	.14 *	.12	-.05	.11

Note: With the exception of Factor 5 (N = 195), all correlations were based on 196 participants.

*p < .05; **p < .01; ***p < .001; ****p < .0001

The seven-factor structure was used (in addition to other independent variables) to build a model for predicting substance use in adolescents. This will be explained in the next section.

Univariate and Multiple Logistic Regression for Each Substance Item

After conducting the exploratory factor analyses, univariate logistic regression analyses were conducted in order to examine the relationship between each independent

variable with each dependent variable. Logistic regression analyses were conducted due to the independent variables being dichotomous (e.g., gender, grade level, and main wage earner's educational level) or categorical (ethnicity) and the dependent variables being dichotomous (i.e., substance use present or absent). (Please refer to Table 3.5.)

Overall, the univariate logistic regressions showed that Factors 1 (Fights/Reaction to Anger), 2 (Positive Family Values/Discipline), and 6 (Positive School Beliefs/Experiences) were significantly associated with the six substance use outcomes and in the expected directions. None of the other PPS factors were found to be significantly associated with substance use, with the exception of Factor 7, whereby Family Cares if Student Using Drugs was found to be significantly and negatively associated with DISC Marijuana Abuse or Dependence (p value $<.05$). Grade level and ethnicity were found to be significant for ADAS Any Alcohol or Marijuana Use and ADAS Any Alcohol Use. Ethnicity was significant for ADAS Any Marijuana Use but grade level was not.

The odds ratio for Factor 1 (Fights/Reaction to Anger) was found to be significant for all of the univariate logistic regressions and ranged from 3.63 (for ADAS Any Marijuana Use) to 7.49 (for DISC Marijuana Abuse or Dependence). This means that for every unit increase in Factor 1, the prevalence of ADAS Any Marijuana Use increased by 3.63 fold and the prevalence of DISC Marijuana Abuse or Dependence increased by 7.49 fold. It should be noted that Factor 1 was rated on a four-point scale resulting in three possible unit increases.

Table 3.5. Univariate and Multiple Logistic Regression of Each Substance Item

Independent Variables	Univariate						Multiple						
	Substance Items						All IV's & Substance Items						
	N	χ^2	R ^{2a}	OR ^b	OR CI ^c	p	N	Wald	χ^2	R ^{2a}	OR ^b	OR CI ^c	p
<i>DISC Alcohol or Marijuana Abuse or Dependence</i>													
Gender (0 = male; 1 = female)	194	0.5	.004	1.33	0.6-2.9	.4807	191	1.5	.011	1.91	0.7-5.4	.2220	
Grade (1 = 9th Grade; 2 = 12th Grade)	194	1.2	.010	1.54	0.7-3.4	.2835	191	2.0	.015	2.07	0.8-5.6	.1565	
Ethnicity	194	6.3	.055			.0999	191	1.9	.014			.5909	
Main Wage Earner's Educational Level	192	0.2	.002	0.93	0.6-1.3	.6875	191	0.9	.006	0.80	0.5-1.3	.3346	
Factor 1 = Fights/Reaction to Anger	194	21.3	.180	5.54	2.5-12.0	<.0001	191	10.0	.082	4.70	1.8-12.3	.0016	***
Factor 2 = Positive Family Values/Discipline	194	16.9	.145	0.18	0.1-0.4	<.0001	191	4.0	.030	0.34	0.1-1.0	.0463	**
Factor 3 = Student Empathetic and Liked/Respected	194	0.2	.002	0.77	0.2-2.4	.6546	191	0.0	.000	0.83	0.2-4.1	.8233	
Factor 4 = Parent Cares	194	0.1	.001	0.84	0.3-2.5	.7579	191	3.7	.031	4.75	1.0-23.4	.0555	
Factor 5 = Family Communicates Dangers of Drug Use	193	1.1	.010	0.79	0.5-1.2	.2865	191	1.3	.000	0.70	0.4-1.3	.2519	
Factor 6 = Positive School Beliefs/Experiences	194	13.3	.115	0.27	0.1-0.6	.0003	191	5.7	.044	0.31	0.1-0.8	.0165	*
Factor 7 = Family Cares if Student Using Drugs	194	2.0	.018	0.53	0.2-1.2	.1570	191	0.6	.004	0.64	0.2-1.9	.4240	
Total							191	43.4	.354			<.0001	****
<i>DISC Alcohol Abuse or Dependence</i>													
Gender (0 = male; 1 = female)	194	0.5	.003	1.37	0.6-3.3	.4872	191	1.0	.009	1.75	0.6-5.3	.3266	
Grade (1 = 9th Grade; 2 = 12th Grade)	194	3.7	.036	2.42	0.9-6.2	.0550	191	5.1	.050	3.77	1.2-12.0	.0243	*
Ethnicity	194	4.5	.044			.2152	191	1.9	.016			.6011	
Main Wage Earner's Educational Level	192	0.0	.000	0.97	0.6-1.5	.8894	191	0.7	.005	0.81	0.5-1.3	.4125	
Factor 1 = Fights/Reaction to Anger	194	14.4	.138	4.60	2.0-10.5	.0002	191	8.1	.077	4.42	1.6-12.3	.0045	**
Factor 2 = Positive Family Values/Discipline	194	11.0	.107	0.23	0.1-0.5	.0009	191	2.0	.018	0.43	0.1-1.4	.1539	
Factor 3 = Student Empathetic and Liked/Respected	194	0.1	.001	0.86	0.2-3.1	.8149	191	0.0	.000	0.94	0.2-5.2	.9397	
Factor 4 = Parent Cares	194	0.4	.004	0.69	0.2-2.2	.5398	191	1.2	.011	2.46	0.5-12.4	.2767	
Factor 5 = Family Communicates Dangers of Drug Use	193	0.6	.006	0.82	0.5-1.3	.4300	191	0.5	.000	0.78	0.4-1.5	.4721	
Factor 6 = Positive School Beliefs/Experiences	194	10.5	.102	0.28	0.1-0.6	.0012	191	4.2	.038	0.35	0.1-1.0	.0394	*
Factor 7 = Family Cares if Student Using Drugs	194	1.1	.011	0.59	0.2-1.4	.2874	191	0.4	.003	0.69	0.2-2.2	.5307	
Total							191	31.4	.297			.0029	**
<i>DISC Marijuana Abuse or Dependence</i>													
Gender (0 = male; 1 = female)	194	0.2	.003	1.30	0.4-3.8	.6331	191	0.4	.005	1.68	0.4-7.8	.5069	
Grade (1 = 9th Grade; 2 = 12th Grade)	194	0.1	.002	0.83	0.3-2.4	.7248	191	0.1	.001	0.82	0.2-3.5	.7808	
Ethnicity	194	7.1	.085			.0693	191	3.1	.037			.3814	
Main Wage Earner's Educational Level	192	2.1	.026	1.44	0.9-2.3	.1433	191	1.6	.017	1.58	0.8-3.2	.2062	
Factor 1 = Fights/Reaction to Anger	194	16.9	.199	7.49	2.7-21.1	<.0001	191	6.5	.081	7.10	1.6-32.1	.0110	*
Factor 2 = Positive Family Values/Discipline	194	16.1	.190	0.11	0.0-0.3	<.0001	191	2.6	.027	0.29	0.1-1.3	.1071	
Factor 3 = Student Empathetic and Liked/Respected	194	0.0	.000	1.17	0.2-5.7	.8503	191	0.2	.002	0.58	0.0-7.1	.6711	
Factor 4 = Parent Cares	194	0.8	.010	2.28	0.3-16.6	.3723	191	5.3	.091	49.94	1.8->99.0	.0208	*
Factor 5 = Family Communicates Dangers of Drug Use	193	0.5	.006	0.81	0.4-1.5	.4855	191	3.0	.006	0.41	0.1-1.1	.0810	
Factor 6 = Positive School Beliefs/Experiences	194	4.4	.053	0.38	0.2-0.9	.0367	191	0.7	.007	0.55	0.1-2.3	.4083	
Factor 7 = Family Cares if Student Using Drugs	194	3.9	.047	0.38	0.2-0.9	.0497	191	4.1	.032	0.25	0.1-1.0	.0426	*
Total							191	39.0	.452			.0002	***
<i>ADAS Any Alcohol or Marijuana Use</i>													
Gender (0 = male; 1 = female)	196	0.2	.001	1.13	0.6-2.0	.6792	193	0.9	.004	1.46	0.7-3.3	.3518	
Grade (1 = 9th Grade; 2 = 12th Grade)	196	12.9	.087	2.95	1.6-5.4	.0003	193	12.2	.062	4.06	1.9-8.9	.0005	***
Ethnicity	196	15.5	.103			.0015	193	10.3	.052			.0165	*
Main Wage Earner's Educational Level	194	3.1	.022	0.78	0.6-1.0	.0779	193	2.8	.020	0.71	0.5-1.1	.0938	
Factor 1 = Fights/Reaction to Anger	196	19.5	.129	3.78	2.0-7.2	<.0001	193	6.4	.032	2.87	1.3-6.5	.0113	*
Factor 2 = Positive Family Values/Discipline	196	41.7	.261	0.08	0.0-0.2	<.0001	193	24.0	.162	0.04	0.0-0.1	<.0001	****
Factor 3 = Student Empathetic and Liked/Respected	196	0.3	.002	0.79	0.3-1.9	.5861	193	0.5	.002	1.63	0.4-6.1	.4710	
Factor 4 = Parent Cares	196	1.3	.009	0.59	0.2-1.5	.2460	193	0.8	.004	1.77	0.5-6.4	.3829	
Factor 5 = Family Communicates Dangers of Drug Use	195	0.1	.001	0.96	0.7-1.3	.7936	193	1.9	.006	1.38	0.9-2.2	.1715	
Factor 6 = Positive School Beliefs/Experiences	196	5.9	.040	0.49	0.3-0.9	.0155	193	3.1	.015	0.45	0.2-1.1	.0776	
Factor 7 = Family Cares if Student Using Drugs	196	0.9	.007	0.63	0.2-1.8	.3298	193	2.3	.010	2.19	0.8-6.1	.1322	
Total							193	86.1	.491			<.0001	****
<i>ADAS Any Alcohol Use</i>													
Gender (0 = male; 1 = female)	196	0.0	.000	1.04	0.6-1.9	.8853	193	0.3	.002	1.27	0.6-2.8	.5619	
Grade (1 = 9th Grade; 2 = 12th Grade)	196	12.9	.086	2.92	1.6-5.3	.0003	193	12.3	.062	4.05	1.9-8.8	.0005	***
Ethnicity	196	15.8	.105			.0013	193	10.4	.053			.0158	*
Main Wage Earner's Educational Level	194	3.0	.021	0.79	0.6-1.0	.0830	193	2.6	.019	0.72	0.5-1.1	.1100	
Factor 1 = Fights/Reaction to Anger	196	19.5	.129	3.74	2.0-7.0	<.0001	193	5.9	.029	2.71	1.2-6.1	.0154	*
Factor 2 = Positive Family Values/Discipline	196	42.7	.266	0.07	0.0-0.2	<.0001	193	23.6	.157	0.04	0.0-0.2	<.0001	****
Factor 3 = Student Empathetic and Liked/Respected	196	0.7	.005	0.70	0.3-1.7	.4110	193	0.3	.001	1.40	0.4-5.2	.6137	
Factor 4 = Parent Cares	196	1.7	.012	0.55	0.2-1.4	.1903	193	0.5	.002	1.55	0.4-5.5	.4970	
Factor 5 = Family Communicates Dangers of Drug Use	195	0.1	.001	0.95	0.7-1.3	.7522	193	1.9	.006	1.38	0.9-2.2	.1690	
Factor 6 = Positive School Beliefs/Experiences	196	7.2	.049	0.45	0.2-0.8	.0075	193	4.0	.019	0.41	0.2-1.0	.0449	*
Factor 7 = Family Cares if Student Using Drugs	196	1.1	.008	0.60	0.2-1.7	.2880	193	2.2	.009	2.14	0.8-5.9	.1420	
Total							193	86.5	.491			<.0001	****

Table 3.5. (Continued) Univariate and Multiple Logistic Regression of Each Substance Item

Independent Variables	Univariate						Multiple						
	<i>N</i>	χ^2	<i>R</i> ^{2a}	OR ^b	OR CI ^c	<i>p</i>	<i>N</i>	Wald	χ^2	<i>R</i> ^{2a}	OR ^b	OR CI ^c	<i>p</i>
<i>ADAS Any Marijuana Use</i>													
Gender (0 = male; 1 = female)	196	0.1	.001	0.91	0.5-1.7	.7832	193	0.2	.001	1.19	0.5-2.7	.6846	
Grade (1 = 9th Grade; 2 = 12th Grade)	196	2.4	.018	1.66	0.9-3.2	.1229	193	2.8	.016	2.04	0.9-4.7	.0923	
Ethnicity	196	18.6	.133			.0003 ***	193	11.1	.073			.0111 *	
Main Wage Earner's Educational Level	194	0.2	.001	0.94	0.7-1.3	.6858	193	0.6	.003	0.86	0.6-1.2	.4322	
Factor 1 = Fights/Reaction to Anger	196	17.8	.127	3.63	1.9-6.8	<.0001 ****	193	7.6	.046	3.22	1.4-7.4	.0058 **	
Factor 2 = Positive Family Values/Discipline	196	25.2	.177	0.17	0.1-0.4	<.0001 ****	193	12.2	.081	0.16	0.1-0.4	.0005 ***	
Factor 3 = Student Empathetic and Liked/Respected	196	1.7	.013	0.53	0.2-1.4	.1932	193	1.7	.010	0.43	0.1-1.5	.1893	
Factor 4 = Parent Cares	196	0.1	.001	1.16	0.4-3.0	.7663	193	3.9	.024	4.25	1.0-18.0	.0493 *	
Factor 5 = Family Communicates Dangers of Drug Use	195	0.5	.004	1.14	0.8-1.6	.4754	193	1.1	.000	1.32	0.8-2.2	.3001	
Factor 6 = Positive School Beliefs/Experiences	196	9.2	.067	0.39	0.2-0.7	.0024 **	193	1.4	.008	0.61	0.3-1.4	.2385	
Factor 7 = Family Cares if Student Using Drugs	196	0.9	.006	0.68	0.3-1.5	.3536	193	0.5	.003	1.45	0.5-4.1	.4898	
Total							193	59.9	.392			<.0001 ****	

^a Maximum variance accounted for (*R*²).

^b Odds Ratio

^c Odds Ratio 95% Confidence Interval

Notes:

DISC = Diagnostic Interview Schedule for Children

ADAS = American Drug and Alcohol Scale

p* < .05; *p* < .01; ****p* < .001; *****p* < .0001

Another significant odds ratio related to Factor 6 (Positive School Beliefs/Experiences), whereby for every unit increase in Factor 6, the prevalence of substance use decreased 2- to 4-fold for all six univariate logistic regressions.

With regards to the univariate logistic regressions, students in grade 12 were three times more likely to meet criteria for ADAS Any Alcohol or Marijuana Use and ADAS Any Alcohol Use, with all of the findings being statistically significant.

The most startling odds ratios were found for Factor 2 (Positive Family Values/Discipline) and was found to be significant for all of the univariate logistic regressions. Factor 2 was found to have relatively high odds ratios, particularly for DISC Marijuana Abuse or Dependence (9.09; i.e., reciprocal of 0.11), ADAS Any Alcohol or Marijuana Use (12.5; i.e., reciprocal of 0.08), and ADAS Any Alcohol Use (14.29; i.e., reciprocal of 0.07). The findings indicated that for every unit increase in Factor 2, the prevalence of DISC Marijuana Abuse or Dependence decreased by 9 fold; decreased by ~13 fold for ADAS Any Alcohol or Marijuana Use, and decreased by 14 fold for ADAS Any Alcohol Use.

The variance accounted for by Factor 1 (i.e., Fights/Reaction to Anger) ranged from approximately 13% (for the three ADAS outcome variables) to 14% for DISC Alcohol Abuse or Dependence, 18% for DISC Alcohol or Marijuana Abuse or Dependence, and 20% for DISC Marijuana Abuse or Dependence. The variance accounted for by Factor 2 (i.e., Positive Family Values/Discipline) was also relatively large across all six outcome variables, ranging from approximately 11% for DISC Alcohol Abuse or Dependence to 27% for ADAS Any Alcohol Use. The variance accounted for by Factor 6 (Positive School Beliefs/Experiences) was also found to be significant for all six dependent variables and ranged from 4% (for Any ADAS Any Alcohol or Marijuana Use) to a high of approximately 12% (for DISC Any Alcohol or Marijuana Abuse or Dependence). Factor 7 (Family Cares if Student Using Drugs) was also found to be significant and accounted for approximately 5% of the variance for DISC Marijuana Abuse or Dependence.

Grade level and ethnicity were also found to be significant for two dependent variables (i.e., ADAS Any Alcohol or Marijuana Use and ADAS Any Alcohol Use). Grade level accounted for 9% and ethnicity accounted for approximately 10% of the variance accounted for with the two ADAS dependent variables. Ethnicity was also found to be significant for ADAS Any Marijuana Use, with approximately 13% of the variance being accounted for.

In addition to univariate logistic regressions, multiple logistic regressions were conducted in an effort to build a model (including gender, grade level, ethnicity, main wage earner's educational level, and the seven factors of the Prevention Planning Survey associated with adolescent substance use. Exploratory multiple logistic regressions were

conducted, whereby all 11 independent variables were entered into the model to allow the variables to compete with one another and to determine the *unique* variance associated with each dependent variable. Exploratory multiple logistic regressions were conducted due to there being categorical (i.e., gender, grade level, and ethnicity) and continuous (i.e., main wage earner's educational level, Factors 1-7) independent variables and each of the six dependent variables being dichotomous. Grade level was included in the model due to the significant differences in the association between grade level and some of the dependent variables.

The overall model (with all 11 independent variables) predicting the prevalence of each of the six dependent variables was reported in Table 4.5. The unique variance accounted for by each independent variable was calculated by subtracting the variance accounted for the entire 11-variable model from the variance accounted for of the 10-variable model that excluded the independent variable in question.

The overall model (including 11 independent variables) was found to be statistically significant in predicting all six dependent variables, with the variance accounted for ranging from 30% (when predicting DISC Alcohol Abuse or Dependence) to a high of 49% (when predicting ADAS Any Alcohol or Marijuana Use and ADAS Any Alcohol Use).

When examining associations between the independent variables and dependent variables, Factor 1 (Fights/Reaction to Anger) was found to be significant for all six dependent variables, accounting for approximately 8% of the variance for the 3 DISC-based dependent variables and about 5% of the variance for ADAS Any Marijuana Use.

Ethnicity was also found to be significantly associated with the three ADAS dependent variables, accounting for 5-7% of the variance. In addition to Factor 1 and ethnicity, grade level was also found to be significantly associated with DISC Alcohol Abuse or Dependence, ADAS Any Alcohol or Marijuana Use, and ADAS Any Alcohol Use, accounting for approximately 5% of the variance.

Lastly Factor 2 (Positive Family Values/Discipline) was found to be significantly associated with four of the six dependent variables, accounting for 3% of the variance for DISC Alcohol or Marijuana Abuse or Dependence, 8% of the variance for ADAS Any Marijuana Use, and 16% of the variance for ADAS Any Alcohol or Marijuana Use and ADAS Any Alcohol Use.

The odds ratio for Factor 1 (Fights/Reaction to Anger) was found to be significant for all multiple logistic regressions and ranged from an odds ratio of 2.71 for ADAS Any Alcohol Use, to a high of 7.10 for DISC Marijuana Abuse or Dependence. This means that for every unit increase in Factor 1, the prevalence of ADAS Any Alcohol Use increased by 2.71 fold and the prevalence of DISC Marijuana Abuse or Dependence increased by 7.10 fold. It should be noted that Factor 1 was rated on a four-point scale resulting in three possible unit increases.

Another significant odds ratio related to Factor 6 (Positive School Beliefs/Experiences), whereby for every unit increase in Factor 6, the prevalence of substance use decreased 3- to 4-fold for the three DISC dependent variables (i.e., DISC Alcohol or Marijuana Abuse or Dependence, DISC Alcohol Abuse or Dependence, and DISC Marijuana Abuse or Dependence).

Based on the multiple logistic regression analyses conducted, students in Grade 12 were approximately three to four times more likely to meet criteria for DISC Alcohol Abuse or Dependence, ADAS Any Alcohol or Marijuana Use, and ADAS Any Alcohol Use. These findings were found to be statistically significant.

Similar to the univariate regression analyses, Factor 2 was found to have relatively high odds ratios, particularly for ADAS Any Alcohol or Marijuana Use (25.0; i.e., reciprocal of 0.04) and ADAS Any Alcohol Use (25.0; i.e., reciprocal of 0.04). The findings indicated that for every unit increase in Factor 2, the prevalence of DISC Marijuana Abuse or Dependence decreased by 25 fold for both ADAS Any Alcohol or Marijuana Use and ADAS Any Alcohol Use.

While statistically significant findings are important to note, it is also important to report patterns that changed or remained the same when comparing univariate and multiple logistic regressions. For two outcome variables, DISC Alcohol or Marijuana Abuse or Dependence and ADAS Any Alcohol Use, there were no differences with regards to the independent variables being significantly associated with DISC Alcohol or Marijuana Abuse or Dependence and ADAS Any Alcohol Use. However differences were found between the univariate and multiple logistic regressions for the remaining four outcome variables. The first difference occurred with ADAS Any Alcohol or Marijuana Use, whereby Factor 6 did not remain significant for the multiple logistic regression analysis. The second difference occurred for DISC Alcohol Abuse or Dependence, whereby Factor 2 (Positive Family Values/Discipline) dropped out of the multiple logistic regression analysis and grade level was found to be significant for the multiple logistic regression analysis. The third difference was found for DISC Marijuana

Abuse or Dependence, with Factors 2 (Positive Family Values/Discipline) and 6 (Positive School Beliefs/Experiences) dropping out of the multiple logistic regression analysis and Factor 4 (Parent Cares) being found significant. Lastly, for ADAS Any Marijuana Use, Factor 6 (Positive School Beliefs/Experiences) dropped out of the multiple logistic regression analysis and Factor 4 (Parent Cares) was found to be significant.

While this chapter reported the findings generated by analyzing the independent and dependent variables, the next chapter will provide a discussion with regards to the highlighted findings.

CHAPTER 4: DISCUSSION

National and state research in the last decade indicates that while substance abuse rates have decreased among adolescents, there continues to be a significant level of involvement with substances by this population. In particular, alarming rates are reported for substance use in Hawai'i as 20% of 8th graders, 35% of 10th graders, and nearly half of 12th graders indicate use; and 3% of 8th graders, 11% of 10th graders, and 16% of 12th graders meet the criteria for needing substance abuse treatment (Klinge, 2001; Pearson, 2003). Further, students of different ethnic backgrounds report differential patterns of use, with Native Hawaiians and Caucasians having the highest rates. This study extends the literature in this very important area by: (a) reporting more current data on prevalence rates across four ethnic groups based on the criteria of DSM-IV, the gold standard for substance abuse assessment and (b) examining the relationship of demographic variables (e.g., gender and main wage earner's educational level) and risk/protective factors associated with adolescent substance use. In addition, an exploratory factor analysis was done on the Prevention Planning Survey in order to make it more appropriate for application with populations in Hawai'i. This chapter briefly summarizes the findings for ethnic comparisons and substance use prevalence, and then draws broad implications for practice, research, and policy.

Ethnic Comparisons

The first research question of the dissertation focused on whether there were differences in substance use across the four ethnic groups (Native Hawaiian, Japanese, Filipino, and Caucasian) and consisted of six hypotheses that compared one ethnic group to another ethnic group. The six hypotheses were based on findings from previous data

(based on data from the Hawai'i Student Alcohol, Tobacco, and Other Drug Use Survey and other studies that disaggregate ethnic groups). Most of the hypotheses were partially supported by the dissertation data in that some of the substance use rates for Native Hawaiian students were found to be higher than Filipino and Japanese students and some of the rates for Caucasian students were found to be higher than Filipino and Japanese students. Although some of the rates for the Filipino students were found to be higher in comparison to the Japanese students, there were no statistically significant differences between the two groups. The findings for the dissertation rejected one hypothesis that had to do with the differences in prevalence rates between Native Hawaiian and Caucasian students. It was hypothesized that Native Hawaiian and Caucasian substance use rates would be similar for these two ethnic groups. The results of the analyses for the dissertation found that in fact, more Native Hawaiian students reported ADAS Any Alcohol or Marijuana Use and ADAS Any Alcohol Use in comparison to Caucasian students. The implications to this finding will be discussed within the "Implications" section of the dissertation.

Substance Use Prevalence

The second research question had to do with the relationship between the independent variables and the six dependent variables. However, prior to conducting any analyses, exploratory factor analyses were conducted on the Prevention Planning Survey (which was a questionnaire that had not been previously used with a predominantly Asian and Pacific Islander population) in an effort to decrease the number of independent variables being studied. A seven factor solution was generated for the sample and was retained for further analysis.

In addition to the seven factors of the Prevention Planning Survey, gender, grade, ethnicity, and main wage earner's educational level were included in the univariate and multiple logistic regression analyses conducted. For the univariate logistic regression analyses, Factors 1 (Fights/Reaction to Anger), 2 (Positive Family Values/Discipline), and 6 (Positive School Beliefs/Experiences) were found to be significantly associated with substance use. A positive relationship was found between Factor 1 and the six outcome variables, in that as Factor 1 scores increased, substance use also increased (or can be viewed as a risk factor associated with substance use). Factors 2 and 6 consisted of a negative relationship or as scores increased for Factors 2 and 6, substance use prevalence rates decreased. Findings for Factors 2 and 6 support the notion that these two factors were found to be protective factors relating to adolescent substance use. The findings (i.e., Factors 1, 2 and 6 being significantly associated with the prevalence rates of substance use) held for all six outcome variables.

Ethnicity was also found to be significant for the three ADAS outcome variables (ADAS Any Alcohol or Marijuana Use, ADAS Any Alcohol Use, and ADAS Any Marijuana Use) and grade level (with more 12th grade students reporting substance use in comparison to 9th grade students) was found to be significant for two ADAS outcome variables (i.e., ADAS Any Alcohol or Marijuana Use and ADAS Any Alcohol Use). Lastly, Factor 7 (Family Cares if Student Using Drugs) barely attained significance (p value of .0497) for DISC Marijuana Abuse or Dependence, with higher scores on Factor 7 relating to lower scores of DISC Marijuana Abuse or Dependence.

With regards to the multiple logistic regressions, the overall model (that included gender, grade, ethnicity, main wage earner's educational level, and the seven factors of

the Prevention Planning Survey) was found to be significant for all six outcome variables (i.e., three DISC and three ADAS outcome variables), with the variance being accounted for ranging from 30% (for DISC Alcohol Abuse or Dependence) to 49% (for ADAS Any Alcohol or Marijuana Use and ADAS Any Alcohol Use). This was a significant finding in that approximately one-half of the variance for ADAS Any Alcohol or Marijuana Use and ADAS Any Alcohol Use was accounted for by the independent variables studied.

Similar to the univariate logistic regression analyses, Factors 1 (Fights/Reaction to Anger), 2 (Positive Family Values/Discipline), and 6 (Positive School Beliefs/Experiences) were also found to be significantly associated with DISC Alcohol or Marijuana Abuse or Dependence and ADAS Any Alcohol Use. Combinations of Factors 1 (Fights/Reaction to Anger) and 2 (Positive Family Values/Discipline) were found to be significant for the remaining four outcome variables. Grade level was also found to be significantly associated with DISC Alcohol Abuse or Dependence, ADAS Any Alcohol or Marijuana Use, and ADAS Any Alcohol Use and accounted for approximately 1% of the variance. Ethnicity was found to be significantly associated with the three ADAS outcome variables, accounting for approximately 1% of the variance. Interestingly, Factor 4 (Parent Cares) and Factor 7 (Family Cares if Student Using Drugs) were found to be significantly associated with DISC Marijuana Abuse or Dependence. In addition, Factor 7 achieved significance, with a *p* value of .0426. The implications relating to these findings will be discussed in the implications section of this section.

Overall, substance use prevalence rates were typically higher for the three ADAS dependent variables in comparison to the three DISC dependent variables. This finding is appropriate as DISC rates are based on whether students meet criteria for substance abuse

or dependence. Substance abuse or dependence entails substance use that leads to *impairment or distress* with a 12-month period. Therefore, it would be more difficult (and perhaps take a longer period of time) to achieve substance abuse or dependence than to report that a student has ever tried alcohol or marijuana use in their lifetime.

The overall model (which included gender, grade, ethnicity, main wage earner's educational level, and the seven factors of the Prevention Planning Survey) was found to be significantly associated with all six outcome variables (i.e., DISC Alcohol or Marijuana Abuse or Dependence, DISC Alcohol Abuse or Dependence, DISC Marijuana Abuse or Dependence, American Drug and Alcohol Scale Any Alcohol or Marijuana Use, American Drug and Alcohol Scale Any Alcohol Use, and American Drug and Alcohol Scale Any Marijuana Use). The variance accounted for by the model ranged from 30%, when predicting DISC Alcohol Abuse or Dependence) to 49% when predicting ADAS Any Alcohol or Marijuana Use and ADAS Any Alcohol Use. The variance accounted for, especially for ADAS Any Alcohol or Marijuana Use and ADAS Any Alcohol Use, is high especially considering that the model did not include cultural factors or considerations or peer influences.

While the overall model was found to be significant, it is important to note that several factors were found to be significant when both univariate and multiple logistic regressions were conducted. More specifically, Factors 1 (Fights/Reaction to Anger), 2 (Positive Family Values/Discipline), and 6 (Positive School Beliefs/Experiences) either individually or in combination with other factors seemed to be consistently significant in predicting the prevalence of substance use. Factor 1 was found to be a risk factor in that higher scores on Factor 1 related to an increase in substance prevalence rates, while

Factors 2 and 6 were found to be protective factors or higher scores on Factors 2 and 6 were related to a decrease in substance prevalence rates. These factors relate to the individual student (i.e., Fights/Reaction to Anger), home (Positive Family Values/Discipline), and school (Positive School Beliefs/Experiences). While negative beliefs with regards to Fights/Reaction to Anger is associated with an increase in substance use (this was seen as a risk factor), Positive Family Values/Discipline and Positive School Beliefs/Experiences were associated with a decrease in substance use (i.e., protective factors).

Implications

Implications for Practice

Substance use can be accompanied by tremendous individual costs (e.g., health problems) and financial costs to the individual, communities, and society. More than half (62%) of the students who participated in the dissertation pilot study reported having used alcohol or marijuana at least once in their lifetime and 16% of the students sampled met criteria for DISC Alcohol or Marijuana Abuse or Dependence. Based on the findings of this study, along with findings from national and local or State data, it is evident that social workers, as well as other professionals (e.g., teachers, counselors, physicians, coaches, etc.) that work with adolescents and their families will likely be involved with cases of adolescent substance use and the impact substance use has upon the individual and family.

Social learning theory and primary socialization theory provided the conceptual frameworks that guided this study. These theories indicate that social behaviors are learned behaviors and that culture provides the context for learning. Primary

socialization theory proposed that strong bonds with the family and school typically served as protective factors against deviance or substance use. Further, the theories proposed that when there are problems in the three primary socialization sources (school, family and peer clusters), there is an increased probability for individuals to get involved with substance use or delinquent behaviors. Based on such theoretical tenets, the following implications are drawn for students in the school system, their families, and social workers.

Students

Based on the dissertation findings (i.e., prevalence rates being different for the four ethnic groups, the overall model being significant for all six outcome variables, and specific factors alone or in combination with other factors being associated with adolescent substance use) educational programs (for adolescents as well as adults), treatment-oriented programs (focusing on the adolescent but including family members), and parent involvement in school activities are recommended. Educational programs are recommended for students to ensure that students understand the ramifications of substance use. Educational programs could occur during health classes, for example, or could occur as a topic of study within elective classes for students (such as ethnic studies or psychology classes). Some schools have programs whereby freshmen students attend school one day earlier or previous to the beginning of the regular school year. This allows the freshmen some time to acclimate to the new school and for school staff to review expectations of the students and rules the student must abide by. This would be a good opportunity for students to be provided with an educational overview of substance use and perhaps vignettes or skits could be shown to students, with group discussions

occurring after the vignettes are shown. The discussion could allow students the opportunity to discuss what they viewed and how the students might react to the situations they viewed. Discussion could also occur about what may be alternative responses or appropriate reactions to the situations. By allowing students to discuss their feelings, beliefs, and behaviors related to adolescent substance use, school staff can begin to address factors such as Fights/Reaction to Anger that was found to be significant for all six outcome variables studied and accounted for approximately 8% of the variance for the three DISC-based dependent variables. Anger management information or appropriate ways to react to anger could also be discussed with students so students are aware of appropriate versus inappropriate ways to react to anger. On a related note, it is suggested that perhaps programs are needed that teach or train students how to react to negative situations or anger in order for students to possess the knowledge that fights or reactions to anger are things that can be self-controlled or taught, in order to try to decrease the association between fights or reaction to anger and adolescent substance use (which was found to be significant). In addition, discussions that occur with school staff could foster Positive School Beliefs/Experiences (which was found to be a protective factor for adolescent substance use prevalence).

Families

In addition to educational programs for students, if a student is identified as using substances, outreach counseling to students as well as family members may be helpful. Based on focus group data from students in Hawai'i (Else, 2006), programs for students should be school-based and counselors or staff of the programs should be culturally sensitive or aware of cultural differences that students may possess. Cultural values and

beliefs are core to students and having someone respect who they are, what they have to say, and work with the students to navigate and develop a program for the student that includes culture may be beneficial and help to decrease substance use. In addition, including parents or family members into the program to ensure a positive, supportive, and caring environment for the student can help to educate both the student and parent about the factors that may lead a student to use drugs (e.g., Fights/Reaction to Anger) and protective factors that have been shown to be associated with a decline in adolescent substance use (e.g., Positive Family Values/Discipline).

Social service programs and social workers that work with students who utilize substances should ensure the home is a safe and healthy environment for students. Programs that encourage healthy family relationships and educate parents on positive family values/discipline may be helpful to address the adolescent substance user. Perhaps the educational program or services provided to the parent can include teaching parents about the dangers of substance use, how to speak to children who are taking drugs, how to find help for children who are taking drugs, how to cope in the home with a child who is taking drugs, etc. Encouraging parents to take an active role at the school (e.g., being actively involved in parent teacher associations, attending parent teacher conferences to be updated on the progress of a child, asking students to discuss their day at school or concerns they may have at school, etc.) can also be discussed with parents. Prevention and educational messages can also be made available to parents at parent teacher conferences or school meetings (such as parent teacher associations). Perhaps more involved or interactive conferences or meetings could occur, whereby parents, school officials, as well as the child are able to communicate and learn from each other,

which would all be in the best interest of the adolescent. This may help students attain Positive School Beliefs/Experiences, which was shown to be a protective factor with the dissertation pilot study.

Social Workers

Many social workers and other human service workers are employed in substance abuse treatment agencies (Kirst-Ashman & Hull, 1993) as administrators of programs, advocates (lobbying the legislature for more programs and/or resources), educators (educating clients' and their families about the consequences of substance use), and facilitators (facilitating individual and/or group counseling sessions). A social worker's role includes (but may not be limited to) conducting substance use assessments, case managing, and providing educational materials and interventions for the client as well as the client's family. As stated in the National Association of Social Workers Code of Ethics (1999), the principal task for the profession of social work is to provide for the basic needs and enhance the well-being of people. Thus, comprehensive training in the area of substance use and appropriate application of social work interventions (e.g., case management, family therapy, and social support) will be needed and should be encouraged by the profession (Jenson, Howard, & Yaffe, 1995). While the State of Hawai'i currently offers certification for substance abuse counselors (i.e., CSAC), it may be prudent for future social workers to be required to have a minimum amount of training in the area of substance use. This would ensure that social workers or counselors entering the work force would have a working knowledge of issues (e.g., health issues, financial issues, co-occurring disorders associated with substance use, assessment, treatment, and prevention techniques) relating to substance use. Unfortunately, there

remains a concern as to the lack of a course being offered throughout the University of Hawai'i system that specifically focuses on adolescent substance use.

In addition to education in substance abuse, social workers must also be trained in cultural competence. One way of ensuring that social workers are aware of culturally appropriate ways to communicate and work with Asian and Pacific Islander students as well as family members may be conducted by developing a course for social work students specifically focusing on culture and culturally appropriate ways to work with Asian and Pacific Islander clients or to ensure that each class taught at the University level addresses cultural values and knowledge when working with Asian and Pacific Islander clients.

Implications for Research

Based on the exploratory factor analysis that was conducted on the Prevention Planning Survey, it is imperative that researchers continue to ensure that measures utilized in studies are psychometrically sound for ethnically diverse populations, especially in Hawai'i. For example, if an exploratory factor analysis was not conducted on the students who participated in the dissertation pilot study, the original 24-factor solution would have been utilized as independent variables, rather than the seven-factor solution that was found to be the most meaningful and valid for the sample. This would have resulted in utilizing an instrument that was not culturally appropriate for the sample. Thus, it is important to ensure that measures are psychometrically sound and culturally appropriate for the sample being studied.

Research Question 1

There was one hypothesis that was not supported by the dissertation findings and that was significantly higher prevalence rates were found for Native Hawaiian students in comparison to Caucasian students. This finding may imply that there may be a new trend with regards to Native Hawaiian students beginning to utilize more substances than Caucasian students at the two high schools being studied. If this was the case, then it will be important to begin looking at what factors may have contributed to an increase in Native Hawaiian students reporting alcohol or marijuana use.

Since the Hawai'i Student Alcohol, Tobacco, and Other Drug Use Survey has not been administered since 2003, it was difficult to determine whether the trend for substance use across ethnic groups has changed across the State of Hawai'i or if the findings were due to the students that attended the two selected high schools in Hawai'i. However, in comparing the 2003 Hawai'i Student Alcohol, Tobacco, and Other Drug Use Survey data for lifetime use of alcohol across the four ethnic groups studied in comparison to the findings from the dissertation, there were differences in rates of substance use. For the 2003 Hawai'i Student Alcohol, Tobacco, and Other Drug Use Survey data, 80.9% of Native Hawaiian, 70.3% of Japanese, 75.9% of Filipino, and 79.8% of Caucasian students reported lifetime use of alcohol in comparison to 82.0% of Native Hawaiian, 44.9% of Japanese, 60.0% of Filipino, and 57.5% Caucasian students within the dissertation data. While the rates for Native Hawaiian students remained relatively the same for both studies, lower rates were found for the dissertation data for Japanese, Filipino, and Caucasian students. Again, caution must be emphasized when comparing the data between the two studies as the Hawai'i Student Alcohol, Tobacco,

and Other Drug Use Survey rates were based on 2003 data and the dissertation study data were collected across two years (i.e., 2006 and 2006-2007 school year).

In addition, the Hawai'i Student Alcohol, Tobacco, and Other Drug Use Survey data consisted of students across the state of Hawai'i, included other ethnic groups (e.g., Chinese) when reporting prevalence rates of substance use across ethnicity, and students in Grades 6, 8, 10, and 12 participated in the study. For the dissertation data, the pilot study was conducted on four ethnic groups across two high schools on the island of O'ahu and focused on students in Grades 9 and 12. Given the differences between the two studies, the finding for Native Hawaiian rates of lifetime alcohol use being similar (just a little higher) in comparison to the rate reported by the Hawai'i Student Alcohol, Tobacco, and Other Drug Use Survey is disconcerting. The finding suggests that perhaps rates for Native Hawaiian students have increased, especially considering that two thirds of the Native Hawaiian students who were approached to be included in the study did not participate in the study. Ultimately, the dissertation data (as well as the prevalence rate reported by the 2003 Hawai'i Student Alcohol, Tobacco, and Other Drug Use Survey) showed that approximately four out of five Native Hawaiian students reported using alcohol in their lifetime.

With regards to ethnicity and the rates of DISC Alcohol or Marijuana Abuse or Dependence, DISC Alcohol Abuse or Dependence, and DISC Marijuana Abuse or Dependence, consistently more Native Hawaiian and Caucasian students met criteria for the three outcome variables in comparison to Japanese and Filipino students. The Native Hawaiian and Caucasian students' rates were approximately double that of the Japanese and Filipino students for all three outcome variables. This finding supports the results

that were found in past studies, in that Native Hawaiian and Caucasian rates were found to be similar to one another. On the other hand, these findings are also disconcerting as 22.5% of Native Hawaiian students and 21.3% of Caucasian students met criteria for DISC Alcohol or Marijuana Abuse or Dependence. This translates to a little over one in five students meeting criteria for substance abuse or dependence disorder.

Another finding related to ethnicity was that pairwise logistic regressions remained significant when gender and grade level were used as covariates in predicting ADAS Any Alcohol or Marijuana Use, ADAS Any Alcohol Use, and ADAS Any Marijuana Use. This finding provided support that substance use rates for students were different across ethnic groups and the ethnic differences were not due to unequal cell sizes (i.e., the number of students by gender and grade level that participated in the study) but due to actual differences in substance use rates across ethnic groups.

Research Question 2

In addition to ethnic differences, there were also significant findings related to the six outcome variables. Based on findings from the 2006 National Survey on Drug Use and Health (Substance Abuse and Mental Health Services Administration, 2007), 22.6 million people aged 12 years or older or 9.2% of the individuals surveyed met criteria for substance abuse or dependence. Findings from the pilot study indicated that approximately 16% of the students met criteria for DISC Alcohol or Marijuana Abuse or Dependence, thus indicating a higher disorder rate than the national sample. To make matters worse, the 16% is likely a lower-end estimate because abuse and dependence rates were not included for other drugs such as amphetamines, cocaine, ecstasy, and so on. In addition, taking into consideration the fact that two-thirds of Native Hawaiian and

Filipino students did not participate in the pilot study, the rates may actually be higher than reported, had all of the students participated. This finding may suggest that substance use prevalence rates across heterogeneous ethnic groups such as *Asian/Pacific Islanders* should be disaggregated as important distinctions across ethnic groups exist.

Grade level was found to be significant for ADAS Any Alcohol or Marijuana Use and ADAS Any Alcohol Use, with more 12th grade students reporting higher rates in comparison to 9th grade students. One reason for this finding could be due to 12th grade students being older than 9th grade students and thus having more exposure to substances or know others who have used or use substances. The 9th grade students were just beginning high school and therefore, exposure to substances (i.e., by peers, older classmates, etc.) may have been minimized in intermediate or middle school. The 12th grade students have also experienced three years of high school and may be affiliated with people or friends who are older (i.e., high school graduates) and who may expose the students to substances. Lastly, perceptions between the 9th and 12th grade students may also differ, in that older students may have a tendency to down play the impact of drug use, based on what they have witnessed throughout the three years of high school or based on perceptions of fellow peers. Further analyses based on perceptions/beliefs of student and peer use of substances should be further examined in order to determine the variables that contribute to the differences found for grade level.

In the past, gender differences were found for substance use, with males reporting higher rates of substance use in comparison to females. Over time, the gender gap has contracted, so much so that data from the 2005 Youth Risk Behavior Survey (Centers for Disease Control and Prevention, 2005) reported that 74.8% of females and 73.8% of

males reported having at least one drink in their lifetime. Data from the dissertation pilot study also supported the contraction in the gender gap, as there were no gender differences with regards to substance use prevalence rates. Research should take into consideration the reasons for the decline in the gender gap and an attempt to better understand the reasons for female substance use rates being similar to rates reported by males should be addressed.

Another important issue to consider is the relationship that substance use has upon the independent variables. While the implications address the findings for the pilot study, one thing to keep in mind is that the findings represent associations between the independent variables and dependent variables (i.e., adolescent substance use). Therefore, one should also consider the impact that substance use may have on the independent variables studied. For example, perhaps the use of substances impacts the way a student reacts to anger or fights (i.e., Factor 1 of the Prevention Planning Survey), rather than the reaction to anger or fights impacting whether a student utilizes substances or not. Based on the findings, there is a significant relationship between specific independent variables and substance use. However, more experimental studies are needed in order to thoroughly understand the relationship between the independent variables studied and adolescent substance use.

While significant findings based on the univariate and multiple logistic regression analyses are important, the findings with regards to the variables that either remained significant or dropped out of the model across both the univariate and multiple logistic regressions are also important to note and understand. While significant findings for two

outcome variables (DISC Alcohol or Marijuana Abuse or Dependence and ADAS Any Alcohol Use) remained the same, there were four outcome variables that changed.

The first difference was found for ADAS Any Alcohol or Marijuana Use, whereby Factor 6 (Positive School Beliefs/Experiences) dropped out of the model. This finding may be due to the Factor 6 being correlated with another independent variable and thus did not hold up in the multivariate analyses, whereby the variable's unique variance was not found to be significant.

The second difference was found for DISC Alcohol Abuse or Dependence, whereby Factor 2 (Positive Family Values/Discipline) dropped out of the model and grade level was found to be significant ($p = .0243$). Similar to the finding above, Factor 2 was probably correlated with another independent variable for the univariate analysis and the unique variance of Factor 2 did not hold up in the multivariate analysis. However, grade level was found to be significant, with more 12th grade students in comparison to 9th grade students that met criteria for DISC Alcohol Abuse or Dependence. This finding may be due to the student growing and transitioning into adulthood, whereby the student may feel that he or she is beginning to become his or her own person and the use of alcohol may be a part of the student transitioning into adulthood.

The third difference was found for DISC Marijuana Abuse or Dependence, whereby Factors 2 (Positive Family Values/Discipline) and 6 (Positive School Beliefs/Expectations) were not found to be significant but Factor 4 (Parent Cares) was found to be significant when multiple logistic regression analysis was conducted. This finding implies that Factors 2 and 6 covary (i.e., correlate) with each other or with other variables and the unique variance for the factors is not associated with DISC Marijuana

Abuse or Dependence (as the factors dropped out of the multivariate analyses).

However, Factor 4, was found to be significant and this factor consists of questions relating to how much parents would try to stop a student from using drugs, how much parents care and love the student, how much the student cares for and loves the family, etc. Therefore, if a student feels he or she is cared for or loved and knows that his or her parents will try to stop the student from using substances, the student is less likely to utilize substances (or meet criteria for DISC Marijuana Abuse or Dependence).

The last difference was found for ADAS Any Marijuana Use, whereby Factor 6 (Positive School Beliefs/Expectations) dropped out of the model and Factor 4 (Parent Cares) was found to be significantly associated with ADAS Any Marijuana Use. This finding is similar to the finding above, in that, having a family that cares and having parents that would likely stop a student from using drugs are related to students who are less likely to meet criteria for ADAS Any Marijuana Use.

Implications for Policy

Public policy relating to adolescent substance use can be expressed through legislation (e.g., development of laws) or executive directives (e.g., President's National Drug Control Strategy) and actions can be carried out through National or State agencies (e.g., the Drug Enforcement Agency or the State of Hawai'i, Department of Health, Alcohol and Drug Abuse Division). Legislative means is one way to impact public policies relating to drugs. Policies can be enacted that place taxes on the price of drugs, prohibit the use of drugs, enforce tough penalties on drug sellers and drug users, and attempt to limit the supply and availability of drugs (Durrant & Thakker, 2003). The

goals of public policy have been and continue to focus on controlling drug use and reducing the detrimental consequences associated with drug use (Akers, 1992).

Nationally, Congress determines the operating budgets of programs and agencies that impact education, treatment, and research. Based on the dissertation research findings, the key factors that were associated with adolescent substance use were Fights/Reaction to Anger, Positive Family Values/Discipline, and Positive School Beliefs/Experiences. Therefore, enacting policies at the federal level that helps to develop and/or enhance educational programs in the school systems that address the three factors listed above may be beneficial to reduce adolescent substance use. Locally, the State of Hawai'i legislature could also fund local programs that address not only the three factors listed above but include culturally appropriate or sensitive ways to educate students and their families about substance use.

On both the national and local level, issues related to treatment should continue to receive attention and funding. Issues related to treatment include, but are not limited to, insurance coverage (e.g., whether insurance will pay for substance-related services) and ensuring appropriate, effective, and efficacious treatment for adults as well as adolescents and their families (e.g., not simply applying adult treatment to adolescent substance users but ensuring that appropriate and proven techniques are utilized with adolescent substance users).

In addition, funding to continue or increase research on adolescent substance use should continue to be a priority. For example, the National Institute on Alcohol Abuse and Alcoholism has increased their focus on adolescent substance use (in the past several years). Continued funding of research projects at the national and local (i.e., State level)

is needed to ensure that the knowledge base on adolescent substance use (which includes substance use prevalence, treatment, and understanding the impact culture has upon an individual) continues.

The dissertation pilot findings suggest that when developing prevention, intervention, and treatment services for Asian and Pacific Islander adolescents in Hawai'i, it is imperative to focus on the child, family, and school relationships. Despite the findings and implications reported above, there are limitations to the pilot study.

Limitations

Several limitations concerning the dissertation pilot study should be noted. First, national data (e.g., the Youth Risk Behavior Survey) as well as local data (e.g., the Hawai'i Student Alcohol, Tobacco, and Other Drug Use Survey and the dissertation pilot study) relating to adolescent substance use were gathered via students who attended school or who were at school on the day of survey administration. Although obtaining data via schools has been extremely convenient and a relatively inexpensive means to collect data on adolescent substance use, the technique evokes methodological concerns. That is, students who do not attend school on the day of the survey, truant students, or students who dropped out of school or no longer attend school were not included in the surveys. Thus an accurate prevalence rate of adolescent substance use remains difficult to obtain. In addition, higher prevalence rates were typically reported for runaways, homeless youth, and those involved with the criminal justice system (Milin et al., 1991). Therefore, by not including students who were absent, runaways, homeless or truant, the prevalence rates obtained through studies administered via schools may be lower estimates of the prevalence of substance use for adolescents.

Another limitation of the study was that the prevalence rates reported for the Native Hawaiian and Filipino adolescents may be underestimated, as two-thirds of these students did not participate in the study. Although Native Hawaiian adolescent substance use rates were found to be higher than prevalence rates for other ethnic groups, the rates may actually be higher had more Native Hawaiian students participated in dissertation pilot study. The same can be said for the Filipino students.

In addition, the data were collected over a two-year span due to unforeseen circumstances (i.e., requirement to obtain approvals from government agencies such as the University of Hawai'i's Committee on Human Studies, the Department of Education, the National Institute on Alcohol Abuse and Alcoholism, the Centers for Disease Control and Prevention, in addition to approval from school staff). While a two-year span may not seem to be a long period of time, substance use rates for adolescents can dramatically change over a short period of time. For example, substance use rates may change across semesters as students get familiar or make friends with other students and are exposed to different things. Lifetime rates of substance use increase as students' progress through high school and newer drugs may enter the scene/school culture. In addition, there was a different pool of students who began 9th and 12th grade during the second year of the study. However, logistic regressions were conducted to determine whether there were differences across years and the findings were not significant.

There is also the issue of having low power with regards to the statistical analyses being conducted on DISC abuse or dependence rates, the latter being relatively low to begin with. Due to the low prevalence rates for DISC abuse or dependence rates, lifetime prevalence use of alcohol and marijuana was included in the dissertation study.

While four major ethnic groups were included in the dissertation pilot study (i.e., Native Hawaiian, Japanese, Filipino, and Caucasian), there is the limitation that students were “forced” to choose one ethnicity, regardless of the number of ethnicities a student may have actually reported. While this “forced” choice for adolescents makes it easier for researchers to analyze data, there is also the possibility that students of mixed ethnicity are different than students who are of one ethnicity. The pilot study did not take this into consideration and future studies should delve into comparisons between students of mixed ethnicity and students who are of one ethnicity.

Another limitation to the study is that students were interviewed face-to-face. There is the issue of social desirability to consider, in that some students may have responded based on what they thought would be the appropriate answer rather than the answer that best suits the student. Perhaps higher rates of substance use may be found when students complete a survey on their own (e.g., paper-pencil survey or computer based survey), rather than having another person (who is older than the student) ask personal questions.

Lastly, the data gathered for the dissertation pilot study were obtained from two high schools on the island of O’ahu. Therefore, caution must be taken into consideration when comparing substance use prevalence rates for this dissertation pilot study to other schools throughout the State of Hawai‘i. That is, students from the neighbor islands or students who live in rural areas were not surveyed.

Future Research

Despite the limitations listed above, this dissertation pilot study was unique in that substance use for disaggregated adolescent ethnic groups were studied, utilizing an

instrument that was based on DSM-IV criteria, rather than on DSM-III-R criteria (which was utilized by the only statewide assessment of substance use for adolescents throughout Hawai'i – the Hawai'i Student Alcohol, Tobacco, and Other Drug Use Survey). With that said, more empirical studies, with a greater number of students being included in the studies (in order to increase power for statistical analyses) should be conducted to address the controversy over the diagnostic criteria by the DSM-IV being applied to adolescents and to determine whether the criteria (which was based on adults) remain applicable and/or appropriate for adolescents. Studies either supporting the diagnostic criteria or showing the diagnostic criteria to be inadequate for adolescents will help to provide a universal approach to assess and diagnose adolescents with substance related problems.

Other statistical analyses, e.g., structural equation modeling, would also be something to consider across ethnic groups within the Asian and Pacific Islander population in an effort to determine whether there are differences or similarities in risk and protective factors predicting substance use for adolescents. For example, structural equation modeling for the Native Hawaiian and Caucasian groups is suggested in order to determine whether the same or different factors contribute to the outcome of ADAS Any Alcohol or Marijuana Use and ADAS Any Alcohol Use. This might help to address whether the difference in rates for the two ethnic groups should be attributed to ethnic differences or due to other factors associated with adolescent substance use.

Aspects of social learning theory and primary socialization theory were supported by the findings from the dissertation pilot study. For example, social learning theory and primary socialization theory basically posits that adolescents learn from or are influenced by role models, close friends, and/or parents. The data showed that significant

associations were found between Factors 1 (Fights/Reaction to Anger), 2 (Positive Family Values/Discipline), and 6 (Positive School Beliefs/Experiences) and the prevalence of substance use. Therefore, students are being impacted by family, friends, and experiences obtained at school. While, peer influence was not studied as a sole independent variable and family members' experience of substance use was also not considered, the overall model accounted for approximately one-half of the variance of ADAS Any Alcohol or Marijuana Use. Future studies can add other aspects of the theories to the model that was utilized for the dissertation pilot study and it is hypothesized that a higher amount of the variance will be accounted for.

The abuse of alcohol and other drugs remain a significant public health concern (Cohen et al., 1993; Winters, 2001). Future research, as suggested by Weinberg et al. (1998), should include conducting studies focusing on the natural history, incidence, prevalence, and comorbidity patterns of adolescent substance abuse and dependence; further testing of assessment and diagnostic systems used to categorize adolescent drug use disorders; studies on patient-centered treatment approaches including pharmacological interventions; and studies on interventions with high-risk youth (e.g., high school drop outs, etc.). Typically, adolescent substance use has been comorbid with other conditions and the presence of multiple problems may require multiple interventions. More treatment studies utilizing rigorous experimental designs and methodology must be conducted. The studies should include comprehensive standardized assessments and thorough inventories of treatment content (e.g., kind of modalities used and the intensity of the modalities). Similarly, prevention efforts should target multiple areas.

Many studies have methodological limitations whereby adolescents who are absent on the day of survey administration or adolescents who have been presumed to have the most problems with substance use (e.g., the homeless, runaways, school drop-outs) have often not been included to the study sample. More studies must be conducted on these populations because they may benefit the most from interventions and services.

Another factor to consider in future studies has to do with methodological concerns, such as the type of survey administration (i.e., face-to-face, computer based, student filling out a questionnaire on their own, etc.). More research across various ethnic groups should address whether different substance use prevalence rates are found based on the type of survey administration.

Although ethnic minority groups account for 29.4% of the nation's population (Henderson & Ma, 2002), there remains a lack of understanding with regards to the unique differences across ethnic groups and a lack of information relating to health status and health service utilization (including information specific to substance use) among Asian American children and adolescents (Yu, Huang, & Singh, 2004). More studies that disaggregate data (with regards to ethnic groups that make up the broader term of Asian and Pacific Islanders) must be conducted in order to determine whether similarities or differences occur for prevalence rates, risk and protective factors, and etiology of substance use for adolescents. Assessment, intervention, and prevention programs for adolescent substance users should reflect the unique contributions for each ethnic group under consideration.

Another important factor to consider in Hawai'i relates to the increasing numbers of mixed non Hawaiian adolescents. Although the mixed non Hawaiian group has been

studied as a homogenous group, more studies must be conducted in order to determine whether the group may be more heterogeneous than previously thought. Studies that focus on this diverse group would help to determine if differences and/or similarities exist *within* the larger group. More research must be conducted to gain a better understanding of the mixed non Hawaiian group as well as to determine whether different patterns of drug use exist for this group of adolescents.

Conclusion

The dissertation pilot study attempted to fill the gap in knowledge with regards to ethnicity and adolescent substance use prevalence rates utilizing DSM-IV criteria. In addition, the dissertation pilot study examined the relationships between demographic variables, as well as risk and protective factors (that were developed based on a factor analyses of the Prevention Planning Survey) with adolescent substance use across four ethnic groups in Hawai'i. The dissertation reported that substance use prevalence rates were higher for Native Hawaiian students in comparison to Caucasian students, which is inconsistent with findings from previous studies (i.e., Hawai'i Student Alcohol, Tobacco, and Other Drug Use Survey). However, substance use prevalence rates were higher for Native Hawaiian students in comparison to Japanese and Filipino students, which are consistent with findings from previous studies (i.e., Hawai'i Student Alcohol, Tobacco, and Other Drug Use Survey). Additionally, Factors 1 (Fights/Reaction to Anger), 2 (Positive Family Values/Discipline), and 6 (Positive School Beliefs/Experiences) were significantly associated with DISC Alcohol or Marijuana Abuse or Dependence, DISC Alcohol Abuse or Dependence, DISC Marijuana Abuse or Dependence, American Drug and Alcohol Scale Any Alcohol or Marijuana Use, American Drug and Alcohol Scale

Any Alcohol Use, and American Drug and Alcohol Scale Any Marijuana Use. Lastly, the overall model (which included gender, grade level, ethnicity, main wage earner's educational level, and the seven Factors of the Prevention Planning Survey) was found to be statistically significant in predicting all six outcome variables, with approximately 50% of the variance being accounted for when predicting ADAS Any Alcohol or Marijuana Use and ADAS Any Alcohol Use.

Adolescent substance use has been of great concern because the use of substances may have detrimental long-term consequences for the adolescent. Adolescents involved with drugs have been more likely to be associated with delinquency issues (e.g., residing in juvenile correctional facilities or detention homes), have histories of child abuse (including physical, sexual, and emotional abuse or neglect), and have co-occurrence with other psychiatric disorders (e.g., Conduct Disorder) and behavioral problems (Segal & Stewart, 1995; Weinberg et al., 1997). Although substance use may be a critical problem for an adolescent, substance use may seldom be the only problem.

Unfortunately, there seems to be a lack of a coordinated and systematic approach to address all of the problems associated with adolescent substance use. Due to adolescent care not being centralized, it may be imperative to have collaboration between schools, mental health facilities, child welfare programs, and juvenile justice agencies in order to provide adolescents with appropriate services across these agencies to better meet their treatment needs (Jenson, Howard, & Yaffe, 1995).

In addition to the lack of a coordinated and systematic approach to addressing adolescent substance use, there have been a number of factors associated with substance use and developing adequate and effective interventions that address all problem areas

should be essential. However, several issues (presented throughout this dissertation) provide additional concerns that must be taken into consideration. First, there have been no clear universally accepted definitions relating to adolescent substance abuse due to the abuse of substances by adolescents being a “multidimensional phenomenon” (Newcomb & Bentler, 1989, p. 242). Secondly, although adolescent substance abuse may be similar (in some respects) to substance abuse in adults, there may be differences between the two groups and developmental considerations should be considered. There have also been situations whereby adolescents (e.g., diagnostic orphans) experience problems relating to substance use but do not meet the required criteria to be diagnosed with substance abuse or dependence disorders. Substance use negatively impacts the lives of the adolescents. However, adolescents may not receive services because insurance companies will only cover formally diagnosed adolescents. The issues listed above as well as the information provided throughout the dissertation provide the reader with the knowledge to understand that assessment, treatment, prevention, and intervention programs associated with adolescent substance use remains an area that must be examined in further detail.

Research on adolescent substance use for Asian and Pacific Islander adolescents has been very limited and problematic (Austin, 1999; Yu, Huang, & Singh, 2004) in that most national epidemiological research was based on relatively small numbers of Asian and Pacific Islander respondents. Further, this research has historically aggregated groups of the Asian and Pacific Islander category (not taking into consideration unique differences across the heterogeneous ethnic groups) or have generalized findings gathered for the Asian and Pacific Islander group to all others (Austin, 1999). Overall, few studies have focused specifically on conducting research with Asian and Pacific Islanders and

fewer studies have explored variations and similarities among Asian and Pacific Islander populations with regards to adolescent substance use. This dissertation added to the dearth of studies focusing specifically on Asian and Pacific Islander students and also disaggregated the data so Japanese as well as Filipino students were examined separately (rather than combining both ethnic groups under the term of “Asian”).

Not all adolescents who experiment with substances go on to develop substance abuse disorders, suggesting that even without formal interventions, some adolescents possess skills and strengths that help them through their adolescent years. Promoting the positive attributes of an adolescent rather than focusing on their deficits can only enhance their self-efficacy abilities, while promoting the opportunity for problem solving and skills building. Despite the issues that have been discussed or debated within the field of adolescent substance use, one thing remains constant: adolescent substance use assessments, considerations, needs, cognitive processes, and treatment modalities must be better understood in order to develop appropriate and effective education, prevention, and treatment programs for adolescents.

APPENDIX A: DSM-IV CRITERIA FOR SUBSTANCE ABUSE AND DEPENDENCE

Criteria for Substance Abuse

1) A maladaptive pattern of substance use leading clinically significant impairment or distress, as manifested by one (or more) of the following, occurring within a 12-month period:

A) recurrent substance use resulting in a failure to fulfill major role obligations at work, school, or home (e.g., repeated absences or poor work performance related to substance use ; substance-related absences, suspensions, or expulsions from school; neglect of children or household)

B) recurrent substance use in situations in which it is physically hazardous (e.g., driving an automobile or operating a machine when impaired by substance use)

C) recurrent substance-related legal problems (e.g., arrests for substance-related disorderly conduct)

D) continued substance use despite having persistent or recurrent social or interpersonal problems caused or exacerbated by the effects of the substance (e.g., arguments with spouse about consequences of intoxication, physical fights)

2) The symptoms have never met the criteria for Substance Dependence for this class of substance.

Criteria for Substance Dependence

A maladaptive pattern of substance use, leading to clinically significant impairment or distress, as manifested by three (or more) of the following, occurring at any time in the same 12-month period:

1) tolerance, as defined by either of the following:

A) a need for markedly increased amounts of the substance to achieve intoxication or desired effect

B) markedly diminished effect with continued use of the same amount of the substance.

2) withdrawal, as manifested by either of the following:

A) the characteristic withdrawal syndrome for the substance (refer to Criteria A and B of the criteria sets for Withdrawal from the specific substances)

B) the same (or a closely related) substance is taken to relieve or avoid withdrawal symptoms

3) the substance is often taken in larger amounts or over a longer period than was intended

4) there is a persistent desire or unsuccessful efforts to cut down or control substance use

5) a great deal of time is spent in activities necessary to obtain the substance (e.g., visiting multiple doctors or driving long distances), use the substance (e.g., chain-smoking), or recover from its effects

6) important social, occupational, or recreational activities are given up or reduced because of substance use

7) the substance use is continued despite knowledge of having a persistent or recurrent physical or psychological problem that is likely to have been caused or exacerbated by the substance (e.g., current cocaine use despite recognition of cocaine-induced depression, or continued drinking despite recognition that an ulcer was made worse by alcohol consumption)

Source: Adapted from American Psychiatric Association. (1994). *Diagnostic and statistical manual of mental disorders – fourth edition*. Washington, D.C.: Author.

REFERENCES

- Aarons, G. A., Brown, S. A., Coe, M. T., Myers, M. G., Garland, A. F., Ezzet-Lofstrom, R., Hazen, A. L., & Hough, R. L. (1999). Adolescent alcohol and drug abuse and health. *Journal of Adolescent Health, 24*, 412-421.
- Adams, G., Canwell, A., & Matheis, S. (2002). Substance use and adolescence. In C. Essau (Ed.), *Substance abuse and dependence in adolescence: Epidemiology, risk factors, and treatment*. New York: Taylor & Francis Inc.
- Akers, R. L. (1977). *Deviant behavior: A social learning approach* (2nd edition). Belmont, CA: Wadsworth.
- Akers, R. L. (1992). *Drugs, alcohol and society: Social structure, process, and policy*. Belmont, CA: Wadsworth Publishing Company.
- Akers, R. L., & Cochran, J. K. (1985). Adolescent marijuana use: A test of three theories of deviant behavior. *Deviant Behavior, 6*, 323-346.
- Akers, R. L., Krohn, M. D., Lanza-Kaduce, L., & Radosevich, M. (1979). Social learning and deviant behavior: A specific test of general theory. *American Sociological Review, 44*, 636-655.
- Akers, R. L., & Lee, G. (1996). A longitudinal test of social learning theory: Adolescent smoking. *Journal of Drug Issues, 26*(2), 317-344.
- American Psychiatric Association. (1987). *Diagnostic and statistical manual of mental disorders – third edition - revised*. Washington, D.C.: Author.
- American Psychiatric Association. (1994). *Diagnostic and statistical manual of mental disorders – fourth edition*. Washington, D.C.: Author.

- Ammerman, R. T., Ott, P. J., Tarter, R. E., & Blackson, T. C. (1999). Critical issues in prevention of substance abuse. In R. T. Ammerman, P. J. Ott, & R. E. Tarter (Eds.), *Prevention and societal impact of drug and alcohol abuse* (pp. 3-20). Mahwah, New Jersey: Lawrence Erlbaum Associates, Inc.
- Andrade, N. N., Hishinuma, E. S., McDermott Jr., J. F., Johnson, R. C., Goebert, D. A., Makini Jr., G. K., Nahulu, L. B., Yuen, N. Y. C., McArdle, J. J., Bell, C. K., Carlton, B. S., Miyamoto, R. H., Nishimura, S. T., Else, I. R. N., Guerrero, A. P. S., Darmal, A., Yates, A., & Waldron, J. A. (2006). The National Center on Indigenous Hawaiian Behavioral Health Study of prevalence of psychiatric disorders in Native Hawaiian adolescents. *Journal of the American Academy of Child and Adolescent Psychiatry, 45*(1), 26-36.
- Arnett, J. (1992). Reckless behavior in adolescence: A developmental perspective. *Developmental Review, 12*, 339-373.
- Ary, D. V., Tildesley, E., Hops, H., & Andrews, J. (1993). The influence of parent, sibling, and peer modeling and attitudes on adolescent use of alcohol. *International Journal of the Addictions, 28*(9), 853-880.
- Austin, G. (1999). Current evidence on substance abuse among Asian American youth. In B. Yee, N. Mokuau, & S. Kim (Eds.), *Developing cultural competence in evaluation and substance abuse prevention for Asian and Pacific Islander communities*. Rockville, MD: Center for Substance Abuse Prevention and Office of Primary Health.
- Bailey, S., & Hubbard, R. L. (1990). Developmental variation in the context of marijuana initiation among adolescents. *Journal of Health and Social Behavior, 31*, 58-70.

- Bandura, A. (1969). *Principles of behavior modification*. New York: Hold, Rinehart & Winston.
- Bandura, A. (1986). *Social foundations of thought and action: A social cognitive theory*. Englewood Cliffs, NJ: Prentice Hall.
- Bauman, A. & Phongsavan, P. (1999). Epidemiology of substance use in adolescence: Prevalence, trends, and policy implications. *Drug and Alcohol Dependence, 55*, 187-207.
- Bell, T. (1996). Abuse or addiction? *Professional Counselor, 11*(5), 12.
- Berry, J. W. & Annis, R. C. (1974). Acculturative stress. *Journal of Cross-Cultural Psychology, 5*, 382-406.
- Blake, S., Ledsky, R., Goodenow, C., & O'Donnell, L. (2001). Recency of immigration, substance use, and sexual behavior among Massachusetts adolescents. *American Journal of Public Health, 91*, 794-798.
- Brook, J. S., Brook, D. W., Gordon, A. S., Whiteman, M., & Cohen, P. (1990). The psychosocial etiology of adolescent drug use: A family interactional approach. *Genetic, Social, and General Psychology Monographs, 116* (whole No. 2).
- Bukstein, O., & Kaminer, Y. (1994). The nosology of adolescent substance abuse. *The American Journal on Addictions, 3*, 1-13.
- Caudill, B. D., & Marlatt, G. A. (1975). Modeling influences in social drinking: An experimental analogue. *Journal of Consulting and Clinical Psychology, 43*, 405-415.

- Centers for Disease Control. (2003). Youth Risk Behavior Surveillance System. [data file]. Available from Centers for Disease Control Web site, <http://www.cdc.gov/nccdphp/dash/yrbs/>
- Chassin, L., Curran, P., Hussong, A., & Colder, C. (1996). The relation of parent alcoholism to adolescent substance use: A longitudinal follow-up study. *Journal of Abnormal Psychology, 105*, 70-80.
- Chicago Tribune. (June 3, 1929).
- Clayton, R. R. (1992). Transitions in drug use: Risk and protective factors. In M. D. Glantz and R. Pickens (Eds.). *Vulnerability to drug abuse*. (pp. 15-52). Washington, D.C.: American Psychological Association.
- Cohen, P., Cohen, J., Kasen, S., Velez, C. M., Hartmark, C., Johnson, J., Rojas, M., Brook, J., & Streuning, E. L. (1993). An epidemiological study of disorders in late childhood and adolescence—I. Age and gender-specific prevalence. *Journal of Child Psychology and Psychiatry and Allied Disciplines, 34*, 851-867.
- Deas, D., Roberts, J. S., & Grindlinger, D. (2005). The utility of DSM-IV criteria in diagnosing substance abuse/dependence in adolescents. *Journal of Substance Use, 10(1)*, 10-21.
- Department of Education. (2005, August 8). *State of Hawai'i, Department of Education Superintendent's 15th Annual Report*. Retrieved from <http://doe.k12.hi.us/reports/suptsannualreport/2004SuptRpt.pdf>.
- Doweiko, H. E. (2002). *Concepts of chemical dependency, 5th edition*. Pacific Grove, CA: Brooks/Cole

- Durrant, R., & Thakker, J. (2003). *Substance use and abuse: Cultural and historical perspectives*. Thousand Oaks, CA: Sage Publications, Inc.
- Epstein, J. F. (2002). *Substance dependence, abuse, and treatment: Findings from the 2000 National Household Survey on Drug Abuse* (NHSDA Series A-16, DHHS Publication No. SMA 02-3642). Rockville, MD: Substance Abuse and Mental Health Services Administration, Office of Applied Studies.
- Fergusson, D., & Horwood, L. (1997). Early onset of cannabis use and psychosocial adjustment in young adults. *Addiction, 92*, 279-296.
- Fulkerson, J. a., Harrison, P. A., & Beebe, T. J. (1999). DSM-IV substance abuse and dependence: Are there really two dimensions of substance use disorders in adolescents? *Addiction, 94*, 495-506.
- Garnezy, N. (1985). Stress-resistant children: The search for protective factors. In J. E. Stevenson (Ed.). *Recent research in developmental psychopathology* (pp. 213-233). *Journal of Child Psychology and Psychiatry, 4* (Book suppl.).
- Giancola, P. R., & Tarter, R. E. (1999). What constitutes a drug of abuse? In R. T. Ammerman, P. J. Ott, & R. E. Tarter (Eds.), *Prevention and societal impact of drug and alcohol abuse* (pp. 21-28). Mahwah, New Jersey: Lawrence Erlbaum Associates, Inc.
- Giannini, A. J. (1997). *Drugs of abuse*. Los Angeles, CA: Practice Management Information Corporation.
- Gilvarry, E. (2000). Substance abuse in young people. *Journal of Child Psychology and Psychiatry, 41*(1), 55-80.

- Goebert, D., Nahulu, L., Hishinuma, E., Bell, C., Yuen, N., Carlton, B., Andrade N. N., Miyamoto, R., & Johnson, R. (2000). Cumulative effect of family environment on psychiatric symptomatology among multiethnic adolescents. *Journal of Adolescent Health, 27*, 34-42.
- Goodwin, D. W., & Gabrielli, W. F., Jr. (1997). Alcohol: Clinical aspects. In J. H. Lowinson, P. Ruiz, R. B. Millman, & J. G. Langrod (Eds.), *Substance abuse: A comprehensive textbook* (pp. 142-148). Baltimore: Williams & Wilkins.
- Greene, J., Ennett, S., & Ringwalt, C. (1997). Substance use among runaway and homeless youth in three national samples. *American Journal of Public Health, 87*, 229-235.
- Griffin, K. W. (2003). Contemporary school-based prevention approaches and the perceived risks and benefits of substance use. In D Romer (Ed.), *Reducing adolescent risk: Toward an integrated approach* (pp. 93-98). Thousand Oaks, CA: Sage Publications, Inc.
- Grinspoon, L. & Bakalar, J. B. (1995). Marijuana as medicine. *Journal of the American Medical Association, 273*, 1875-1876.
- Grunbaum, J. A., Lowry, R., Kann, L., & Pateman, B. (2000). Prevalence of health risk behaviors among Asian American/Pacific Islander high school students. *Journal of Adolescent Health, 27*, 322-330.
- Hahm, H. C., Lahiff, M., & Guterman, N. B. (2003). Acculturation and parental attachment in Asian-American adolescents' alcohol use. *Journal of Adolescent Health, 33*, 119-129.

- Harachi, T. W., Catalano, R. F., Kim, S., & Choi, Y. (2001). Etiology and prevention of substance use among Asian American youth. *Prevention Science, 2*(1), 57-65.
- Hasin, D., Trautman, K., & Endicott, J. (1998). Psychiatric interview for substance and mental disorders: Phenomenologically based diagnosis in patients who abuse alcohol or drugs. *Psychopharmacology Bulletin, 34*(1), 3-8.
- Hawkins, J. D., Catalano, R. F., & Miller, J. Y. (1992). Risk and protective factors for alcohol and other drug problems in adolescence and early adulthood: Implications for substance abuse prevention. *Psychological Bulletin, 112*(1), 64-105.
- Hawkins, J. D., Catalano, R. F., Morrison, D. M., O'Donnell, J., Abbott, R., & Day, L. E. (1992). The Seattle social development project; effects of the first four years on protective factors and problem behaviours. In J. McCord & R. Tremblay (Eds.), *The prevention of antisocial behavior in children* (pp. 139-161). New York: Guilford Press.
- Hasin, D. & Pakin, A. (1998). Dependence symptoms but no diagnosis: Diagnostic "orphans" in a community sample. *Drug and Alcohol Dependence, 50*, 19-26.
- Hasin, D. & Pakin, A. (1999). Dependence symptoms but no diagnosis: Diagnostic "orphans" in a 1992 national sample. *Drug and Alcohol Dependence, 53*, 215-222.
- Hendricks, R. D., Sobell, M. B., & Cooper, A. M. (1978). Social influences on human ethanol consumption in an analogue situation. *Addictive Behaviors, 3*, 253-259.
- Hishinuma, E. S., Nishimura, S. T., Miyamoto, R. H., & Johnson, R. C. (2000). Alcohol use in Hawai'i. *Hawaii Medical Journal, 59*, 329-335.

- Jenson, J. M., Howard, M. O., & Yaffe, J. (1995). Treatment of adolescent substance abusers: Issues for practice and research. *Social Work in Health Care, 21*(2), 1-18.
- Johnston, L. D., O'Malley, P. M., & Bachman, J. G. (2003). *Monitoring the Future national results on adolescent drug use: Overview of key findings, 2002*. (NIH Publication No. 03-5374). Bethesda, MD: National Institute on Drug Abuse.
- Johnston, L. D., O'Malley, P. M., Bachman, J. G., & Schulenberg, J. E. (December 11, 2007). *Overall, illicit drug use by American teens continues gradual decline in 2007*. University of Michigan News Service: Ann Arbor, MI. Retrieved January 9, 2007 from www.monitoringthefuture.org.
- Kaminer, Y. (1994). *Adolescent substance abuse: A comprehensive guide to theory and practice*. New York: Plenum Publishing Corporation.
- Kandel, D. B., Kessler, R. C., & Margulies, R. Z. (1978). Antecedents of adolescent initiation into stages of drug use: A developmental analysis. In D. B. Kandel (Ed.). *Longitudinal research on drug use: Empirical findings and methodological issues* (pp. 73-99). Washington, DC: Hemisphere.
- King, G. R. & Ellinwood, E. H. (1997). Amphetamines and other stimulants. In J. H. Lowinson, P. Ruiz, R. B. Millman, & J. G. Langrod (Eds.). *Substance abuse: A comprehensive textbook (3rd edition)*. New York: Williams & Wilkins.
- Kipke, M., Montgomery, S., Simon, T., & Iverson, E. (1997). "Substance abuse" disorders among runaway and homeless youth. *Substance Use and Misuse, 32*, 969-986.

Kirst-Ashman, K. K., & Hull, G. H. (1993). *Understanding generalist practice*.

Chicago: Nelson-Hall Publishers.

Klingle, R. (2001). *The 2000 Hawaii Student Alcohol, Tobacco, and Other Drug Use Study (1987-2000): Hawaii adolescent prevention and treatment needs assessment*. Hawai'i: Hawai'i Department of Health, Alcohol and Drug Abuse Division.

Lahey, B. B., Flagg, E. W., Bird, H. R., Schwab-Stone, M. E., Canino, G., Dulcan, M. K., Leaf, P. J., Davies, M., Brogan, D., Bourdon, K., Horwitz, S. M., Rubio-Stipec, M., Freeman, D. H., Lichtman, J. H., Shaffer, D., Goodman, S. H., Narrow, W. E., Weissman, M. M., Kandel, D. B., Jensen, P. S., Richters, J. E., & Regier, D. A. (1996). The NIMH methods for the Epidemiology of Child and Adolescent Mental Disorders (MECA) study: Background and methodology. *Journal of the American Academy of Child & Adolescent Psychiatry*, 35, 855-864.

Lewinsohn, P. M., Rohde, P., & Seeley, J. R. (1996). Alcohol consumption in high school students: Frequency of use and dimensional structure, of associated problems. *Addiction*, 91, 375-390.

Lopez, J. S., Martinez, J. M., Martin, A., Martin, J., Martin, M., & Scandroglio, B. (2001). An exploratory multivariate approach to drug consumption patterns in young people based on primary socialization theory. *Substance Use and Misuse*, 36(12), 1611-1649.

McCarty, D. (1985). Environmental factors in substance abuse: The microsetting. In M. Galizio & S. A. Maisto (Eds.), *Determinants of substance abuse* (pp. 247-282). New York: Guilford Press.

- Makini Jr., G. K., Hishinuma, E. S., Kim, S. P., Carlton, B. S., Miyamoto, R. H., Nahulu, L. B., Johnson, R. C., Andrade, N. N., Nishimura, S. T., & Else, I. R. N. (2001). Risk and protective factors related to Native Hawaiian adolescent alcohol use. *Alcohol and Alcoholism, 36*(3), 235-242.
- Milin, R., Halikas, J. A., Meller, J. E., & Morse, C. (1991). Psychopathology among substance abusing juvenile offenders. *Journal of the American Academy of Child and Adolescent Psychiatry, 30*, 569-574.
- Miyamoto, R. H., Hishinuma, E. S., Nishimura, S. T., Nahulu, L. B., Andrade, N. N., & Goebert, D. (2000). Variation in self-esteem among adolescents in an Asian/Pacific-Islander sample. *Personality and Individual Differences, 29*(1), 13-25.
- Miyamoto, R. H., Hishinuma, E. S., Nishimura, S. T., Nahulu, L. B., Andrade, N. N., & Goebert, D. (2001a). Path models linking the correlates of self-esteem in a multiethnic adolescent sample. *Personality and Individual Differences, 31*, 701-712.
- Miyamoto, R. H., Hishinuma, E. S., Nishimura, S. T., Nahulu, L. B., Andrade, N. N., Johnson, R. C., Makini, Jr., G. K., Yuen, N. Y. C., Kim, S. P., Goebert, D. A., Carlton, B. S., & Bell, C. K. (2001b). Equivalencies regarding the measurement and constructs of self-esteem and major life events in an Asian/Pacific Islander sample. *Cultural Diversity and Ethnic Minority Psychology, 7*(2), 152-163.
- Mokuau, N. (2002). Culturally based interventions for substance use and child abuse among Native Hawaiians. *Public Health Reports, 117*(supplement 1), 582-587.

- National Association of Social Workers. (1999). *Code of ethics of the National Association of Social Workers*. Washington, D.C.: Author.
- Newcomb, M. D. (1995). Identifying high-risk youth: Prevalence and patterns of adolescent drug abuse. In E. Radhert & D. Czechowicz (Eds.), *Adolescent drug abuse: clinical assessment and therapeutic interventions* (pp. 7-38). Rockville, MD: US Department of Health and Human Services.
- Newcomb, M. D., & Bentler, P. M. (1989). Substance use and abuse among children and teenagers. *American Psychologist*, *44*(2), 242-248.
- Nishimura, S. T., Hishinuma, E. S., Miyamoto, R. H., Goebert, D. A., Johnson, R. C., Yuen, N. Y. C., & Andrade, N. N. (2001). Prediction of DISC substance abuse and dependency for ethnically diverse adolescents. *Journal of Substance Abuse*, *13*(4), 597-607.
- Oetting, E. R., Donnermeyer, J. F., Trimble, J. E., & Beauvais, F. (1998). Primary socialization theory: Culture, ethnicity, and cultural identification. The links between culture and substance use. IV. *Substance Use and Misuse*, *33*(10), 2075-2107.
- Oetting, E. R., Edwards, R. W., Kelly, K., & Beauvais, F. (1997). Risk and protective factors for drug use among rural American youth. In E. Robertson, Z. Sloboda, G. Boyd, L. Beatty, & N. Kozel (Eds.), *Rural substance abuse: State of knowledge and issues (NIDA Research Monograph No. 168)*. Rockville, MD: National Institute on Drug Abuse.
- Office of Hawaiian Affairs. (1998). *Native Hawaiian Data Book, 1998*. Honolulu, HI: Office of Hawaiian Affairs.

- Pearson, R. (2003). *Ka leo na keiki, The 2002 Hawai`i Student Alcohol, Tobacco, and Other Drug Use Study (1987-2002) Hawai`i adolescent prevention and treatment needs assessment*. Kapolei, HI: Hawai`i Department of Health, Alcohol and Drug Abuse Division.
- Pearson, R. S. (2004). *Ka leo na keiki, The 2003 Hawai`i Student Alcohol, Tobacco, and Other Drug Use Study (1987-2003) Hawai`i adolescent prevention and treatment needs assessment*. Kapolei, HI: Hawai`i Department of Health, Alcohol and Drug Abuse Division.
- Peterson, J. V., Nisenholz, B., & Robinson, G. (2003). *A nation under the influence: America's addiction to alcohol*. Boston, MA: Pearson Education, Inc.
- Petraitis, J., Flay, B. R., & Miller, T. Q. (1995). Reviewing theories of adolescent substance use: Organizing pieces in the puzzle. *Psychological Bulletin, 117*(1), 67-86.
- Piaget, J. (1962). *The moral judgment of the child*. New York: Collier.
- Pollock, N. K. & Martin, C. S. (1999). Diagnostic orphans: Adolescents with alcohol symptoms who do not qualify for DSM-IV abuse or dependence diagnoses. *American Journal of Psychiatry, 156*, 897-901.
- Prescott, C.A., McArdle, J.J., Hishinuma, E., Johnson, R.C., Miyamoto, R.H., Andrade, N.N., Edman, J.L., Makini, G.K., Nahulu, L.B., Yuen, N.Y.C., & Carlton, B.S. (1998). Prediction of major depression and dysthymia from CES-D scores among ethnic minority adolescents. *Journal of American Child Adolescent Psychiatry, 37*(5):495-503.

- Price, R. K., Risk, N. K., Wong, M. M., & Klinge, R. S. (2002). Substance use and abuse by Asian American and Pacific Islanders: Preliminary results from four National epidemiologic studies. *Public Health Reports, 117*(Supplement 1), S39-S50.
- Radloff, L.S. (1991). The use of the Center for Epidemiologic Studies Depression Scale in adolescents and young adults. *Journal of Youth and Adolescence, 20*, 149-166.
- Reinherz, H. Z., Giaconia, R. M., Lefkowitz, E. S., Pakiz, B., & Frost, A. K. (1993). Prevalence of psychiatric disorders in a community population of older adolescents. *Journal of the American Academy of Child and Adolescent Psychiatry, 32*, 369-377.
- Rhee, S. H., Hewitt, J. K., Young, S. E., Corley, R. P., Crowley, T. J., & Stallings, M. C. (2003). Genetic and environmental influences on substance initiation, use and problem use in adolescents. *Archives of General Psychiatry, 60*, 1256-1264.
- Ridenour, T. A., Cottler, L. B., Robins, L. N., Campton, W. M., Spitznagel, E. L., & Cunningham-Williams, R. M. (2002). Test of the plausibility of adolescent substance use playing a causal role in developing adulthood antisocial behavior. *Journal of Abnormal Psychology, 111*(1), 144-155.
- Robins, L. N., & McEvoy, L. (1990). Conduct problems as predictors of substance abuse. In L. Robins & M. Rutter (Eds.), *Straight and devious pathways from childhood to adulthood*. (pp. 182-204). Cambridge: Cambridge University Press.
- Rosenberg, M. (1965). *Society and the adolescent self-image*. Princeton, NJ: Princeton University Press.
- Rounsaville, B. J., Bryant, K., Babor, T., Kranzler, H., & Kadden, R. (1993). Cross system agreement for substance use disorders: DSM-III-R, DSM-IV and DSM-10. *Addiction, 88*, 337-348.

- Rutter, M. (1985). Resilience in the face of adversity: Protective factors and resistance to psychiatric disorder. *British Journal of Psychiatry, 147*, 598-611.
- Schwab-Stone, M. E., Shaffer, D., Dulcan, M. K., Jensen, P. S., Fisher, P., Bird, H. R., Goodman, S. H., Lahey, B. B., Lichtman, J. H., Canino, G., Rubio-Stipec, M., & Rae, D. S. (1996). Criterion validity of the NIMH Diagnostic Interview Schedule for Children version 2.3 (DISC 2.3). *Journal of the American Academy of Child & Adolescent Psychiatry, 35*, 878-888.
- Segal, J. C., & Stewart, J. C. (1996). Substance use and abuse in adolescence: An overview. *Child Psychiatry and Human Development, 26*(4), 193-210.
- Sells, C. W. & Blum, R. (1996). Current trends in adolescent health. In: R. J. DiClemente, W. B. Hansen, & L. E. Ponton (Eds.). *Handbook of adolescent health risk behavior*. (pp. 5-29). New York: Plenum.
- Shaffer, D., Fisher, P., Dulcan, M. K., Davies, M., Placentini, J., Schwab-Stone, M. E., Lahey, B. B., Bourdon, K., Jensen, P. S., Bird, H. R., Canino, G., & Regier, D. A. (1996). The NIMH diagnostic interview schedule for children version 2.3 (DISC-2.3): Description, acceptability, prevalence rates, and performance in the MECA study. *Journal of the American Academy of Child & Adolescent Psychiatry, 35*, 865-877.
- Shaffer, D., Fisher, P., Lucas, C. P., Dulcan, M. K., & Schwab-Stone, M. E. (2000). NIMH diagnostic interview schedule for children version IV (NIMH DISC-IV): Description, difference from previous versions, and reliability of some common diagnoses. *Journal of the American Academy of Child & Adolescent Psychiatry, 39*(1), 28-38.

- Shaffer, D., Gould, M., Fisher, P., Trautman, P., Moreau, D., Kleinman, M., & Flory, M. (1996). Psychiatric diagnosis in child and adolescent suicide. *Archives of General Psychiatry*, 53, 339-348.
- Skager, R., & Austin, G. (1993). *Fourth biennial statewide survey of drug and alcohol use among California students in grades 7, 9, and 11: Winter 1991-1992: Report to the attorney general*. Sacramento, CA: Department of Justice.
- Sloboda, Z. (2002). Changing patterns of "drug abuse" in the United States: Connecting findings from macro- and microepidemiologic studies. *Substance Use and Misuse*, 37(8-10), 1229-1251.
- State of Hawai'i Department of Business, Economic Development and Tourism. *Profile of General Demographic Characteristics: 2000*. Retrieved December 14, 2007, from http://factfinder.census.gov/servlet/QTTable?_bm=y&-geo_id=04000US15&-qr_name=DEC_2000_SF1_U_DP1&-ds_name=DEC_2000_SF1_U.
- Substance Abuse and Mental Health Services Administration. (2007). *Results from the 2006 National Survey on Drug Use and Health: National Findings*. (Office of Applied Studies, NSDUH Series H-32, DHHS Publication No. SMA 07-4293). Rockville, MD.
- Sullivan, T. N. & Farrell, A. D. (2002). Risk Factors. In C. Essau (Ed.). *Substance abuse and dependence in adolescence: Epidemiology, risk factors, and treatment*. New York: Taylor & Francis Inc.
- United States Census Bureau, (2000). American fact finder. Retrieved April 1, 2004, from <http://factfinder.census.gov/>.

United States Census Bureau, (2001). *Statistical abstract of the United States, 2001*.

Washington, DC: US Census Bureau.

Weinberg, N. Z., Rahdert, E., Colliver, J. D., & Glantz, M. D. (1998). Adolescent substance abuse: A review of the past 10 years. *Journal of the American Academy of Child and Adolescent Psychiatry, 37*(3), 252-261.

Werner, E. E. (1989). High-risk children in young adulthood: A longitudinal study from birth to 32 years. *American Journal of Orthopsychiatry, 59*, 72-81.

Werner, E. E., & Smith, R. S. (1982). *Vulnerable but invincible*. New York: McGraw-Hill.

White, H. R. (1996). Empirical validity of theories of drug abuse: Introductory comments. *Journal of Drug Issues, 26*(2), 279-289.

Winters, K. C. (2001). Assessing adolescent substance use problems and other areas of functioning. In P. M. Monti, S. M. Colby, & T. A. O'Leary (Eds.). *Adolescents, alcohol, and substance abuse*. (pp. 80-108). New York, New York: The Guilford Press.

Wong, M. M., Klingle, R. S., & Price, R. K. (2004). Alcohol, tobacco, and other drug use among Asian American and Pacific Islander adolescents in California and Hawaii. *Addictive Behaviors, 29*, 127-141.

World Health Organization. (1993). *The ICD-10 classification of mental and behavioural disorders: Diagnostic criteria for research*. Geneva, Switzerland: Author.

World Health Organization. (2005, August). *Implementation of ICD*. Retrieved from <http://www.who.int/classifications/icd/implementation/en/index.html>.

- Yee, B. W. K. (1999). Lifespan development of Asian-Americans and Pacific Islanders: The impact of gender and age roles. In B. Yee, N. Mokuau, & S. Kim (Eds.), *Developing cultural competence in evaluation and substance abuse prevention for Asian and Pacific Islander communities*. Rockville, MD: Center for Substance Abuse Prevention and Office of Primary Health.
- Yu, S. M., Huang, Z. J., & Singh, G. K. (2004). Health status and health services utilization among US Chinese, Asian Indian, Filipino, and other Asian/Pacific Islander children. *Pediatrics*, *113*(1), 101-107.
- Yuen, N. Y. C., Nahulu, L. B., Hishinuma, E. S., & Miyamoto, R. H. (2000). Cultural identification and attempted suicide in Native Hawaiian adolescents. *Journal of the American Academy of Child and Adolescent Psychiatry*, *39*(3), 360-367.