

# COLLEGE STUDENT DRUG PREVENTION: A REVIEW OF INDIVIDUALLY-ORIENTED PREVENTION STRATEGIES

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*The current paper highlights the college years as a risk period for development, continuation, and escalation of illicit substance use and substance use disorders and reviews the literature related to the prevention and treatment of these disorders in college populations. Despite widespread implementation of college drug prevention programs, a review of the literature reveals few controlled trials targeting this population. However, alcohol prevention has been extensively studied, and many efficacious interventions for college drinking share theoretical and methodological underpinnings with interventions shown to be efficacious in drug prevention and treatment with other populations (i.e., school-based prevention, adolescent and adult drug treatment). These interventions could be adapted to target drug prevention on college campuses. Barriers to implementation and evaluation of these interventions on campus are discussed, and suggestions are made for future research and programmatic directions.*

## INTRODUCTION

Although alcohol is the primary drug of choice among college students, particularly those of traditional college age (i.e., 18 to 25 years), over half of all college students and young adults have tried an illicit drug at least once in their lifetime (Johnston, O'Malley, Bachman, & Schulenberg, 2004). Experimentation with substance use increases during this period, particularly for those enrolled full time in college. A majority of individuals between the ages of 18 and 25 (over 65%) graduate from high school and attend some form of postsecondary education

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(Bureau of Labor Statistics, 2003). In addition, although noncollege bound 12th graders use marijuana more than their college-bound peers, marijuana use for college students between 18 and 22 increases faster than for noncollege students the same age (Schulenberg, O'Malley, Bachman, & Johnston, 2000), and rates become equal within three to four years of high school graduation (Bachman, Wadsworth, O'Malley, Johnston, & Schulenberg, 1997), suggesting college may be a unique opportunity to prevent or intervene with substance use.

College represents a period where students typically postpone adult roles and responsibilities (e.g., full-time work, marriage, parenting) while working on normative developmental tasks (e.g., making new friends, developing autonomy). College students are faced with many new interpersonal, academic, and societal demands and expectations, and substance use may serve both constructive, as well as destructive, functions for students (e.g., Schulenberg & Maggs, 2002). Substance use may provide students with an opportunity to facilitate the transition to college (e.g., facilitating interpersonal relations or feelings of maturity, or helping to cope with new demands and expectations). Often viewed as a rite of passage for college students, drug experimentation is seen as normative by many students (Kilmer et al., under review; Perkins, Meilman, Leichliter, Cashin, & Presley, 1999). Many students who experiment with substance use during college will cease or reduce use once they leave college and take on full-time adult roles (Bachman et al., 2002). However, substance use can have many negative consequences for the college student, which may ultimately inhibit the successful transition through college and young adulthood and possibly have lasting consequences on the individual and society.

Marijuana is one of the most widely used and abused illicit substances by adolescents, young adults, and college students in the United States (Johnston et al., 2004; Substance Abuse & Mental Health Administration [SAMHSA], 2002); however 28% to 34% of college students and young adults (19 to 28 years old) have used an illicit drug other than marijuana at least once in their lifetime (Johnston et al., 2004). In several studies, 28% to 34% of students reported using marijuana in the past year and between 13% to 18% used illicit drugs other than marijuana in the past year (Gledhill-Hoyt, Lee, Strote, & Wechsler, 2000; Johnston et al., 2004). Based on the Monitoring the Future study (Johnston et al., 2004), prevalence of illicit drugs for college students decreased from the 1980s to the early to mid 1990s, but this trend then reversed until a recent leveling off in 2002. Similarly, Gledhill-Hoyt and colleagues (2000) reported that rates of marijuana use in the past 30 days increased by 22% between 1993 and 1999 and that marijuana use increased in two thirds of a sample of 119 colleges. The most recent survey of college students indicates the most prevalent drugs used in the past year (other than marijuana) are hallucinogens (7.4%), amphetamines (7.1%), cocaine (5.4%), and MDMA or ecstasy (4.4%) (Johnston

et al., 2004). While the lifetime and past-year prevalence is cause for alarm, more serious concern may be raised for those who use substances daily. In 2003, 4.7% of college students used marijuana daily (30-day prevalence rates), and that rate was higher for males (6.3%) than for females (3.7%) (Johnston et al., 2004).

College students and college-aged individuals are also at risk for the development of substance use disorders and negative consequences related to drug use. Approximately 8% of 18 year olds meet criteria for marijuana dependence and 3% meet dependence criteria for illicit drugs other than marijuana (Young et al., 2002). Marijuana use is related to increased risk for accidents and injuries, a leading cause of death in this age group (SAMHSA, 2002). Similarly, marijuana is the most frequently reported substance in drug-related emergency room visits among young adults, and this rate has been increasing for both youth and young adults (Office of Applied Studies, 2003). Additionally, in 2001, young adults were disproportionately represented in visits involving club drugs (i.e., MDMA/ecstasy, GHB, LSD, and methamphetamines), and visits involving LSD and MDMA tended to be highest among those 18 and 19 years of age (Office of Applied Studies, 2002).

Research indicates risk for initiation of marijuana use peaks around the age of 18 (when most students are transitioning into college) (Chen & Kandel, 1995; Wagner & Anthony, 2002), and highest use occurs between the ages of 19 to 22 (Chen & Kandel, 1995), during the traditional college years. Additionally, 50% of individuals report their first opportunity to use marijuana at 14 to 19 years of age (Van Etten & Anthony, 1999). It is estimated that of 18 year olds given their first opportunity to use marijuana, over 40% will begin using within one year, and over 65% will eventually try marijuana (Van Etten, Neumark, & Anthony, 1997). The time from first use of marijuana to regular use occurs typically within one year for adolescents and young adults (Crowley, Macdonald, Whitmore, & Mikulich, 1998; Van Etten et al., 1997). The median age of first opportunity for drug use for hallucinogens and heroin is 18 for males and 17 for females, while for cocaine it is 20 for males and 19 for females. Fifty percent of individuals with their first opportunity to use hallucinogens (36% for cocaine, and 17% for heroin) will make the transition to first use within one year (Van Etten & Anthony, 1999). As these data suggest, first-year college students appear to be at particular risk for initiation and escalation of marijuana and illicit drug use and consequences. Gledhill-Hoyt and colleagues (2000) found more than 18% of first year college students reported current marijuana use (i.e., using in the past 30 days), and first-year students had the highest prevalence of past 30 day use compared to other college students. Students who used marijuana were also more likely to use other illicit drugs, smoke cigarettes, and drink heavily (Gledhill-Hoyt et al., 2000).

Recent data from our lab confirm high rates of use and negative consequences in a college sample. During the 2002-2003 academic year, college students ( $N = 16,485$ ) from three northwestern colleges were randomly selected to complete a survey of alcohol and drug use, alcohol- and drug-related consequences, and perceptions of substance use by others (final  $n = 6,055$  participants, response rate = 37%). Three quarters of the sample self-categorized as Caucasian, and 36% identified as female. The mean age of participants was 21 years old, with 20% being freshmen, 25% each being sophomores and juniors, and 30% being seniors (see Kilmer et al., under review, for methodological details).

Information about drug use was obtained from the Customary Drinking and Drug Use Record (CDDR: Brown et al., 1998). The CDDR contains questions regarding frequency and quantity of use, psychological/behavioral dependence, and consequences/behaviors associated with drug use. Items on the CDDR assess lifetime use [e.g., "Have you ever used (specific drug name)?"] and past three-month use [e.g., "In the past three months, how many days per month did you use (specific drug name)?"]. Test-retest reliability correlations range from .72 to .92 for all domains of the measure.

Consistent with previous research, the most frequently endorsed illicit substance was marijuana. Fifty-one percent of students endorsed use of marijuana in their life, with 23% listing use on at least one day per month in the past three months. Lifetime use of hallucinogens was reported by 22% of the sample, and lifetime use of opiates was endorsed by 16.0%, though monthly use was endorsed by fewer than 4% for each substance.

To assess the impact of substance use, the 16 behaviors/consequences associated with substance use measured by the CDDR were examined among those who reported lifetime use of at least one of the seven primary drug categories ( $N = 3271$ ). Forty-four percent of participants endorsed having ever driven a car while stoned, 34% said they had found themselves thinking of, looking for, or remembering using drugs, 31% endorsed that they have wanted or tried to limit, cut down, or stop using, 26% endorsed having used when they have gone to school, work, or were supposed to be doing something, and 24% said they had taken drugs in larger amounts or more often than they planned. Of note is that almost one third of college students who have used drugs endorsed wanting to cut down or stop use. To meet that need, prevention and treatment approaches targeting substance use by this population are needed.

## REVIEW OF PREVENTION AND TREATMENT APPROACHES

### *COLLEGE STUDENT DRUG PREVENTION PROGRAMS*

Unfortunately, while substance abuse prevention programs abound on college campuses (Werch, Pappas, & Castellon-Vogel, 1996), very few programs have

been systematically evaluated using strong research designs. For example, Werch and colleagues evaluated 336 substance abuse prevention programs sponsored by the Fund for Improvement of Post-Secondary Education (FIPSE), through mailing questionnaires to program administrators asking them to describe their program, evaluation design, and outcomes. Although 70% of these programs reported conducting student surveys for program evaluation, only 34% reported conducting outcome studies or using any sort of statistical tests to evaluate these outcomes. There was no indication of whether these outcome studies included pre- and post-test or post-test only assessments. There was also no indication of the use of control groups. Based on administrator reports, the majority of these programs reported no changes in drug use or alcohol use outcomes, while others reported a decrease or increase in use following the intervention on their campus. Unfortunately, without the original data, and in the absence of details regarding evaluation designs and statistical tests (if any) used to analyze and interpret the data, it is impossible to judge the accuracy of these administrator reports. Few of these evaluations have been published in the academic literature. Those that have been published have tended to be purely descriptive in nature (Grossman, Canterbury, Lloyd, & McDowell, 1994; Juhnke et al., 2002); involve pre-post assessment only in the absence of a control group (Bennett, McCrady, Keller, & Paulus, 1996); or involve inadequate sample sizes, unmatched control groups, or follow-ups of too short a duration to assess changes in drug use (Gonzalez, 1989).

More recently, 97 FIPSE-funded programs from the 1990 and 1991 cohorts (representing 46.9% of the funded programs in those years) were evaluated using CORE Alcohol and Other Drug Survey data collected from representative student samples both before and after the programs (Licciardone, 2003; Presley, Harrold, Scouten, Lyerla, & Meilman, 1994; Presley, Meilman, Cashin, & Lyerla, 1996). Of these, 82 institutions agreed to the release of aggregate data for use in an overall evaluation of FIPSE program impacts on alcohol and other drug (AOD) use outcomes (Licciardone, 2003). Program components varied by institution, but a majority of campuses reported distributing flyers, brochures, and other educational materials, increasing student drug-free activities, peer education, curriculum inclusion, policy review and administrative interventions, and a variety of alcohol and drug awareness events, among others. Effect sizes representing standardized change scores prior to and after intervention were calculated, and results were adjusted for two year AOD use trends based on results of the Monitoring the Future study (Johnston, O'Malley, & Bachman, 1996). Results indicated that although students in FIPSE-funded programs reported an increase in awareness of AOD prevention programs, they also reported an increase in marijuana and cocaine use after controlling for national trends in use among college students and an increased desire for availability and use of drugs

at parties. Few programs reported decreased AOD use; however, those programs including curriculum infusion, administrative response, and faculty and community activities were more likely to report favorable outcomes. Unfortunately, it is not possible from this evaluation to draw conclusions regarding the process and content of interventions likely to be efficacious, as the broad description of intervention components yields insufficient information about specific interventions, including the theoretical underpinnings and practical strategies utilized in these interventions. In addition, while large-scale evaluations using aggregate data such as this one are an important addition to the scientific literature in the field, the use of aggregate data and analytic techniques can obscure the trajectory of intervention response for participating individuals or for particularly successful institutions within the larger group. Unfortunately, these large-scale evaluations (Licciardone, 2003; Werch et al., 1996) have only rarely been complemented by smaller-scale, longitudinal controlled interventions designed to evaluate particular intervention strategies for college drug use.

Only two controlled studies identified in the literature in the past decade specifically addressed drug abuse prevention for college populations. The first of these (Miller, Toscova, Miller, & Sanchez, 2001) was a FIPSE-funded program utilizing a multi-component, campus-wide intervention to target five levels of intervention simultaneously (including individual, small group, organization, community, and policy targets), based on a self-regulation model of motivation and behavior change. Intervention components included extensive print media focusing on increasing risk perception regarding drug and alcohol use, driving under the influence, and riding with impaired drivers; videotapes designed to encourage students to enroll in courses focusing on drug and alcohol prevention; several campus-wide events such as alcohol and drug awareness weeks; distribution of referral information and availability of individual "drinkers check-ups" (Miller & Sovereign, 1989) and Computerized Lifestyle Assessments (Skinner, 1994) for interested individuals, among other interventions. Results indicated that, in comparison to a control campus where drinking and drug use increased over time, use rates for several classes of illicit drugs and some high-risk drinking behaviors stabilized or underwent a modest decrease on the intervention campus following the intervention. There were several limitations to the design of the research that limit any conclusions drawn from it. These include lack of comparability between control and intervention campuses on several dimensions prior to the intervention, use of anonymous population-based surveys before and after testing (thus the inability to link responses of individuals before and after intervention to control for baseline differences between conditions), timing differences between the baseline assessment for the control group and for the intervention group, use of multiple statistical tests

without controlling for experiment error rate, and the large number of intervention components tested, making it difficult to attribute differences in outcomes to any particular intervention component.

The second study (McCambridge & Strang, 2004) utilized a cluster randomization design to evaluate a 60-minute motivational intervention regarding alcohol, tobacco, and drug use with students recruited from 10 further education colleges (similar to vocational/technical schools or community colleges in the US) in London. Participants were 200 individuals (46% women) aged 16 to 20 who were recruited primarily by peer interviewers on each campus. Results indicated participants in the motivational intervention ( $n = 105$ ) significantly reduced their marijuana, other drugs, tobacco, and alcohol use at three-month follow-up relative to control participants ( $n = 95$ ) who received "education as usual" (assessment only). Results were encouraging, although follow-up was of relatively short duration. In addition, similar to the Miller et al., study (2001), the cluster randomization procedure failed to yield equivalent groups at baseline on many variables of potential relevance to outcomes, and multiple analyses were conducted without controlling for experiment error rate, thus results of this study should be interpreted with caution.

#### *COLLEGE STUDENT ALCOHOL PREVENTION PROGRAMS*

Although research on prevention of drug use and abuse by college students has been relatively limited both in quantity and scientific rigor, extensive research has been conducted on alcohol prevention strategies targeting college students and college-aged populations. Recently, the National Advisory Council of the National Institute on Alcohol Abuse and Alcoholism established a task force comprised of researchers, college presidents, and students, in order to develop recommendations for prevention approaches and future research needs to address college drinking (National Institute on Alcohol Abuse and Alcoholism [NIAAA], 2002a). Based on an extensive review of the literature including 24 commissioned papers (18 of which were published in a special issue of the *Journal of Studies on Alcohol*, NIAAA, 2002b), the task force recommended a three-tiered approach to college drinking prevention. Tier I strategies were those found to have evidence of effectiveness with college populations (two or more studies with favorable findings). Tier II strategies were those with documented evidence of efficacy in a general population, which could be applied to college populations. Tier III strategies were those with logical and theoretical promise, but without sufficient evidence of efficacy.

Three Tier I strategies were specifically recommended in the task force report (NIAAA, 2002a). All three were interventions targeting individual drinkers. In part, this reflects the fact that far more controlled research has been conducted evaluating these individual-oriented interventions than other types of interventions focusing on policy changes or campus-community interventions. However, it also reflects

an increasing attendance in individual-oriented interventions to basic research on risk factors influencing heavy drinking by college students, and the theoretical processes involved in behavior change. This increasing sophistication of intervention content and process has resulted in several interventions with documented evidence of efficacy. The first strategy recommended by the task force was "combining cognitive-behavioral skills with norms clarification and motivational enhancement interventions" (NIAAA, 2002b, p. 16). In a review of the literature supporting the task-force recommendations, Larimer and Cronce (2002) reviewed ten multi-component interventions targeting these factors, and 7 of 10 interventions had favorable impact on alcohol use, negative consequences, or both.

The second strategy recommended by the task force was to offer "...brief motivational enhancement interventions" (p. 17). These interventions, based on the work of Miller and colleagues in New Mexico (Miller & Rollnick, 2002) and Marlatt and colleagues at the University of Washington (Dimeff, Baer, Kivlahan, & Marlatt, 1999; Marlatt et al., 1998), typically combine individual feedback about alcohol use, expectations about alcohol, normative comparisons, and risks and consequences of use with specific therapeutic strategies (such as directive use of reflective listening techniques and a nonjudgmental therapeutic stance) to increase motivation to change behavior. Larimer and Cronce (2002) reviewed eight studies of in-person motivational enhancement interventions with college and college-aged individuals, and all studies reported reductions in alcohol use, negative consequences, or both in comparison to controls. In addition, several recent studies suggest motivational feedback alone, delivered through mail or computer, has similar positive effects on drinking behavior (Agostinelli, Brown, & Miller, 1995; Borsari & Carey, 2000; Neighbors, Larimer, & Lewis, 2004; Walters, 2000; Walters, Bennett, & Miller, 2000).

The third strategy recommended by the task force was "challenging alcohol expectancies" (p. 17). Alcohol expectancies refer to the expected effects of alcohol, which are often related to positive social, sexual, and mood-enhancing effects (Brown, Christiansen, & Goldman, 1987; Fromme, Stroot, & Kaplan, 1993). Research suggests many of these effects are at least partially influenced by environmental setting and cues present in the drinking situation as well as societal and individual expectations or messages about what is supposed to happen when one drinks, and thus may occur even in the absence of actual alcohol consumption (i.e., placebo effects). Larimer and Cronce (2002) reviewed three studies of alcohol expectancy challenge and found two (Darkes & Goldman, 1993, 1998) had positive effects on drinking behavior at short-term follow-up. Both studies involved experiential challenges (i.e., alcohol and placebo administration in combination with information and education regarding placebo effects of drinking). However, didactic



education regarding expectancy challenge is typically included in multi-component and motivational enhancement interventions as well (Kivlahan, Marlatt, Fromme, Coppel, & Williams, 1990; Marlatt et al., 1998).

Many of the hypothesized etiologic and maintaining factors for alcohol misuse targeted by these interventions (misperceived norms and other social influence factors, positive expectations for drug effects, motivation to change) have also been identified as relevant to college student illicit drug use. For example, recent research indicates most college students misperceive the rates at which their peers use drugs, leading to a consistent overestimation of the percentage of students who use drugs on college campuses (Page & Scanlan, 1999; Perkins et al., 1999; Wolfson, 2000). Similarly, recent research on marijuana, cocaine, and stimulant expectancies indicates college students report expectations of both positive and negative effects from marijuana, cocaine, and stimulants and these expectations are related to different patterns of drug preference and use (Aarons, Brown, Stice, & Coe 2001; Schafer & Brown, 1991). These findings suggest interventions targeting these factors may be similarly efficacious for prevention and intervention with college student drug use.

#### *ADOLESCENT DRUG PREVENTION APPROACHES*

In fact, a growing body of research supports the application of strategies similar to those identified in Tier I to the prevention and treatment of drug problems outside the college context. A review of these interventions suggests similar strategies may also be efficacious in the college setting. The majority of drug prevention programs with published outcomes fall into the category of universal prevention (Institute of Medicine, 1990) targeting primarily school-aged children or young adolescents and focusing on risk and protective factors related to the initiation of drug use.

In one of the most comprehensive meta-analyses of universal school-based drug prevention programs, Tobler et al. (2000) categorized and compared 207 prevention programs ranging from programs noninteractive to interactive in nature and focusing on one or more components (e.g., increasing knowledge, refusal skill training). Similar to evaluations of early alcohol prevention efforts and the FIPSE programs described earlier (Werch et al., 1996; Larimer & Cronce, 2002), early school-based drug prevention programs tended to be atheoretical and focused on either increasing knowledge, increasing affective insight, or promoting alternatives to drug use (Botvin, 2000). Many of these programs were noninteractive in nature and have evidenced very small effects, if any (see Tobler et al. for review). More recent drug prevention programs have been based on psychosocial theories and are interactive in nature, targeting those factors related to substance use (Tobler et al.). Social influence models are based on the belief that children and adolescents are placed at risk for engaging in drug use due to both the direct and indirect pressures

to use drugs, and these pressures increase over time or with age. Current social influence approaches to drug prevention typically provide basic information about the consequences of drug use, normative education about actual prevalence of drug use, and skills training to resist pressures to use drugs (Botvin, 2000; Donaldson et al., 1996) and are interactive, with opportunities for discussion and to practice resistance skills. For example, D'Amico and Fromme (2000) randomly assigned 300 high school students to one of three conditions: (1) risk skills training group (RSTG), including skills training and motivational feedback; (2) a brief version of the DARE program; or (3) a no-treatment control group. After treatment, students in the RSTG significantly reduced drug use as well as heavy drinking, drinking and driving, and riding with an intoxicated driver.

Tobler et al. (2000) adds two additional types of programs, both of which fall into the interactive categories: comprehensive life skills and system-wide change programs. Comprehensive life skills (or competence enhancement approaches, Botvin, 2000) typically include elements of social influence programs, but also target development of generic self-management skills (e.g., goal setting) and social skills (e.g., communication, assertiveness) (Botvin, 2000; Tobler et al., 2000). System- (or community-) wide change programs focus on adding components of community or family change in addition to the elements of social influence programs. Consistent with the alcohol prevention literature, these types of prevention programs have shown efficacy in reducing substance use in adolescent populations (e.g., Botvin, Baker, Dusenbury, Tortu, & Botvin, 1990; Ellickson, McCaffrey, Ghosh-Dastidar, & Longshore, 2003; O'Donnell, Hawkins, Catalano, Abbot, & Day, 1995; Skara & Sussman, 2003). These programs shown to be more effective for drug prevention are similar in nature to the programs identified as Tier I strategies for college alcohol prevention.

### **DRUG TREATMENT APPROACHES**

There is also a growing body of research on treatment for drug dependence for both adolescents and young adults, and this research also supports the efficacy of approaches based on cognitive behavioral, motivational, and social influence models. As indicated, motivational strategies for therapy help clients explore and resolve their ambivalence about their behavior and behavior change (Miller & Rollnick, 2002). Drug treatments based on motivational interviewing (MI) typically provide personalized feedback (e.g., about participant's marijuana use, consequences, pros and cons of using) to the individual based on pretreatment surveys. Feedback is generally reviewed by the therapist with the client, and the therapist utilizes skillful reflective listening and directive and nondirective therapeutic techniques to help the individual clarify and resolve their ambivalence in order to enhance readiness

for and commitment to change. Treatments based on cognitive-behavioral therapy (CBT) have included coping skills training, anger management, assertiveness training, and such relapse prevention (Marlatt & Gordon, 1985) techniques as planning for high-risk situations and dealing with cravings and urges to use. Multiple marijuana outpatient programs incorporating CBT and MI have been efficacious with adults. McRae, Budney and Brady (2003) reviewed five published adult marijuana dependence treatment studies. Four of the published studies include treatments using MI (or motivational enhancement therapy) either alone (Stephens, Roffman, & Curtin, 2000) or in conjunction with CBT (Copeland, Swift, Roffman, & Stephens, 2001; Stephens, 1999) or coping skills therapy (Budney, Higgins, Radonovich, & Novy, 2000). Overall, treatments including MI and/or CBT have been efficacious in reducing marijuana use, consequences, or both (McRae et al., 2003; Stephens et al., 2000). Similar results have been obtained with heroin, cocaine, and amphetamine use (Baker, Boggs, & Lewin, 2001; Budney et al., 2000; Carroll, 1999; Dunn, DeRoo, & Rivara, 2001; Longshore & Grills, 2000; Stephens et al.; Roffman, Stephens, & Simpson, 1989). In addition, recent research suggests similar treatment components have been related to improved outcome for adolescent marijuana treatment (Dennis et al., 2002).

#### *BARRIERS TO IMPLEMENTING EFFECTIVE INTERVENTIONS ON COLLEGE CAMPUSES*

Identification of potentially efficacious drug interventions for college student populations is an important goal, and it is possible that working from the existing knowledge base regarding efficacious alcohol prevention approaches for college students, as well as efficacious drug prevention and treatment approaches utilized in other populations, will yield several potential avenues for success. Research to date suggests that many of the etiologic and maintaining factors for college student drug abuse are similar to those for alcohol, supporting the adaptation of promising alcohol interventions to drug prevention in this population. Further, research supports the potential for both upward extension of adolescent drug prevention approaches targeting these factors and for downward extension of drug treatment programs that incorporate similar strategies. The convergence of these three sources of evidence provides favorable indication of the possibilities for promoting change in college student drug use.

Unfortunately, once efficacious programs have been identified, there are additional barriers to the diffusion of these programs on college campuses. There are potential administrative barriers or challenges to implementation and evaluation, similar challenges related to student participation and evaluation of student behavior and responses, and potential barriers to transferring empirically tested approaches to applied settings, which are briefly reviewed here.

*TRANSFERRING AN APPROACH TO THE COLLEGE SETTING*

Rogers (1995) outlines a four-step process for the transfer or diffusion of an approach: (1) dissemination, (2) adoption, (3) implementation, and (4) maintenance. In each of these stages, potential barriers to implementing empirically tested approaches in a college setting can be identified. Through the process of dissemination, program developers aim to make other colleges and universities aware of the program. One barrier to dissemination in clinical settings is that, often, published findings appear in journals not oriented to clinicians and with little description of steps to applying a treatment or intervention (Sobell, 1996). Backer (2000) also describes the impact of publications or evaluations that are not "user friendly" and calls for an examination of unaddressed dissemination opportunities. Consequently, researchers evaluating and making suggestions about interventions in the college or university setting should consider the audience they are addressing and provide clear directions for obtaining program materials, content, and curriculum.

The second step of the transfer process, adoption, refers to the encouragement of colleges to commit to substance prevention on their campuses. DeJong and Langenbahn (1996) note that reactions from key individuals involved in the process of setting and altering policies could range from the extremes of lenient (e.g., "students will be students") to punitive. This diversity of opinion may apply to adoption of interventions as well, with uncertainty about how to proceed possibly leading to difficulty in committing to a prevention approach. Concerns about possible mixed messages that could arise (e.g., having a dry campus yet allowing tailgating to occur on weekends by alumni) are frequently a source of debate among campus administrators. To deal with any problems associated with adoption, colleges could be encouraged to empirically evaluate the impact of any newly adopted programs or policies to identify strengths and possible problems. Diversity of opinion can also be an issue with support for a particular direction a college is moving. Liddle et al. (2002) state that unreasonable expectations and insufficient "buy-in" can be problems in transferring a program. Thus, taking time initially to work with directors, administrators, and staff, in addition to students, prior to implementing a program or intervention may be essential to success.

Implementation is the proper training of those who will be delivering the program. Rohrbach, D'Onofrio, Backer, & Montgomery (1996) describe the literature detailing a tendency to "reinvent" innovations and suggest that programs be flexible so that those implementing an approach can make modifications without hindering or compromising intervention effectiveness. Additionally, Simpson (2002) concludes that problems in implementing researched approaches into a clinical setting are frequently due to organizational factors such as resources, issues within the organization impacting effective delivery (e.g., stressful situations), and attitudes

among leaders. As interventions addressing drug use are evaluated in the college and university setting, research teams could consider publishing adherence and compliance guidelines for intervention delivery to allow other teams to replicate and compare findings. That said, any modifications made to an intervention protocol should be documented clearly in evaluation efforts so that any extensions of or adjustments to existing interventions can be better understood.

Liddle and colleagues (2002) also suggest that resistance, particularly among staff more familiar and comfortable with a prior approach, should be expected but can be reframed and understood. They stress the importance of having adequate staffing, and this should be kept in mind when considering the transfer of empirically supported approaches to college populations.

Finally, maintenance refers to universities and program staff continuing to use the program. Here, the need for ongoing assessment and continued training is important as well.

#### *POSSIBLE ADMINISTRATIVE BARRIERS*

Administrative barriers can likely be addressed by working closely with key stakeholders and those who could impact and influence change. With a limited budget (both financial and of staff time), and with increasing awareness of what the scientific literature suggests about how to proceed, there can be a tendency to move toward the "next best thing." Unfortunately, this can lead to one prevention approach (i.e., targeting high-risk individuals) being pursued at the expense of another (i.e., targeting the environment or the broader campus community), or the belief that engaging in one must mean not doing the other. Recognizing that approaches to prevention can include and target at-risk or high-risk individuals, the campus as a whole, or the surrounding community, it is likely that multiple approaches to addressing the problem are needed (Stokols, Allen, & Bellingham, 1996). In disseminating research findings, it is important to highlight any continuing needs or to focus on ways in which a particular approach can be a component of an overall prevention strategy. With budget limitations, considering training and implementation costs so that prevention efforts can be realistically packaged is also of importance.

Concerns about alcohol use seem to be shared across colleges and universities, and, therefore, taking steps to address alcohol consumption is expected. However, acknowledgement of the need for interventions targeting other drugs is less common, and there may be more stigma associated with illicit drug use on the college campus. Thus, one possible barrier to pursuing drug prevention approaches could be the concern that directing attention or funds toward this behavior indicates that a "problem" exists. Additionally, many approaches that acknowledge that light to moderate alcohol use may occur (e.g., approaches attempting to correct misperceived

norms or teach moderation skills) may be difficult to implement with other drugs. In essence, even if most students do not use or use a substance infrequently, describing norms of infrequent use would reveal that use of an illegal drug is occurring on a campus, and focusing on reducing frequent or heavy use may be seen as tolerating or promoting illegal behavior. Administrative concerns may be significant because of legal, liability, and federal funding implications.

#### *POLICY AS A MEANS OF INTERVENTION*

An additional barrier can arise when policy is utilized as a form of intervention. Several studies have demonstrated that policy can have unintended repercussions, such as increasing the risk associated with use by changing where use occurs (George, Crowe, Abwender, & Skinner, 1989) or by seeing risky behavior accompany attempts to circumvent policy guidelines (Kilmer, Larimer, Parks, Dimeff, & Marlatt, 1999). Efforts to evaluate the impact of policy, to include students in the development of policy and to be sensitive to unintended repercussions could allow campuses to minimize the likelihood of additional problems arising because of a policy change.

#### *CHALLENGES ASSOCIATED WITH ASSESSMENT OR EVALUATION*

Potential barriers to evaluating an intervention with students can start with assessment concerns. Particularly if a campus has experienced recent high-profile drug-related incidents, students may distrust the intent or reason behind an assessment (i.e., questioning if it is being done to "find the trouble makers" or to set the stage for implementing new rules or policies). This could lead to a reluctance to participate or introduce a response bias to evaluation results. Student concerns about confidentiality of evaluation data and the reasons for the evaluation are valid. Research indicates that efforts to address these concerns up front by assuring confidentiality of responses (perhaps through obtaining a Certificate of Confidentiality) and the lack of any negative outcomes related to reporting illegal behavior result in more valid self-reports (Babor, Steinberg, Anton, & Del Boca, 2000; Marlatt et al., 1998). These findings highlight the need to work with the target population to address any emerging concerns. Finally, continued developments in measurement tools and assessment materials are needed, as even well-intentioned and honest reporting is sometimes inaccurate due to measurement error and lack of sensitivity or specificity of the assessment measures available. Crome (1999) indicates that the range and diversity of outcome measures creates particular difficulty in evaluating drug interventions.

*THE IMPACT OF COLLABORATION*

Sobell (1996) describes a successful integration characterized by involving practitioners in several aspects of clinical trials (e.g., planning, development, and implementation), tailoring the intervention to fit specific needs within the setting, providing ongoing clinical support from the research team, conducting ongoing training workshops, and making relevant clinical materials available to practitioners. When feasible, this type of collaboration seems to heighten the chances for a successful transfer of science into practice.

A potentially valuable source of information for intervention development could be those individuals who stop using drugs without treatment. Crome (1999) points out that most young people achieve reductions in their substance use (including abstinence) with no formal intervention services. Implications from the natural recovery literature suggest that this group of emerging adults would be a worthwhile target of research efforts by attempting to understand predictors of successful behavior change. Learning from this group could impact the development of prevention and intervention approaches with their peers.

**DISCUSSION**

The current paper was designed to highlight risks related to illicit drug use and abuse by college students and to suggest potential individually oriented intervention strategies to prevent or reduce substance use and abuse in this population. Over the past two decades, there have been considerable advances in the development, implementation, and evaluation of individual prevention and intervention efforts targeting risky alcohol consumption by college students. However, much less is understood about the efficacy of similar efforts with drugs other than alcohol, despite data suggesting relatively high rates of drug use and negative consequences in the college population. Recent data from our lab showed that prevalence data for lifetime use exceeded 10% for four drug categories (marijuana, hallucinogens, opiates, or barbiturates), and seven different behavior/consequence items were endorsed by at least 10% of those reporting recent substance use. Interestingly, nearly a third of the sample of current users indicated they had tried to limit, cut down, or stop their use. This suggests that when developing interventions for college students, a portion of these may be ready and willing to consider change.

In the general population, including both adolescents and adults, studies evaluating motivational interviewing and motivational enhancement approaches have demonstrated reductions in use of heroin, cocaine, amphetamines, and marijuana (Baker et al., 2001; Budney et al., 2000; Carroll, 1999; Dunn et al., 2001; McCrae et al., 2003). Relapse prevention strategies and other CBT and coping skills approaches have successfully been implemented, and these interventions have demonstrated efficacy in both prevention and treatment contexts for drug abuse and dependence

(Carroll, 1996). Therefore, as an initial step in identifying efficacious approaches to reducing college student drug use and its related risks, campuses should consider extending these existing approaches to the college population.

With data demonstrating that drug use is an issue on college campuses, many colleges and universities have implemented prevention programs or, within counseling centers, intervention efforts to meet the needs of the institution and its students (Bennett et al., 1996; Licciardone, 2003; Werch et al., 1996). However, not only implementing but also evaluating the impact of these approaches is necessary to allow the prevention and treatment field to identify effective approaches and cost- and time-efficient strategies. There is a compelling need for strong evaluation designs in the study of college drug prevention, including randomized controlled trials with sufficient sample sizes and length of follow-up to detect effects on initiation and cessation/reduction of different drugs of abuse. There is also a need to conduct additional research on measurement development and strategies for reducing barriers to research and intervention participation among college students. Support for colleges and universities to participate in clinical trials of drug prevention programs is necessary to increase access to technical assistance in developing and evaluating intervention approaches, and disseminating the findings. The National Institute on Drug Abuse has the opportunity to demonstrate important leadership in this area.

Based on the issues discussed above, several recommendations can be made. First, advancing the assessment of drug use and consequences through measurement development will allow for a better understanding of these issues and, with meaningful outcome data, will strengthen evaluation efforts. Second, results from interventions with college drinking as well as drug prevention and treatment in the general population suggest evaluating the effectiveness of motivational interviewing and CBT approaches (including relapse prevention) for college drug prevention is indicated. It is important to consider that these efficacious individual interventions should be implemented in the context of other sound campus and community interventions and that ideally individual and environmental management strategies complement one another. Finally, as various interventions and programs are developed, implemented, and evaluated, attention should be paid from the outset to overcoming barriers to the diffusion of these interventions.

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## REFERENCES

- Aarons, G.A., Brown, S.A., Stice, E., & Coe, M.T.  
2001 Psychometric evaluation of the marijuana and stimulant effect expectancy questionnaires for adolescents. *Addictive Behaviors*, 26, 219-236.
- Agostinelli, G., Brown, J.M., & Miller, W.R.  
1995 Effects of normative feedback on consumption among heavy drinking college students. *Journal of Drug Education*, 25, 31-40.
- Babor, T.F., Steinberg, K., Anton, R., & Del Boca, F.  
2000 Talk is cheap: Measuring drinking outcomes in clinical trials. *Journal of Studies on Alcohol*, 61, 55-63.
- Bachman, J.G., Wadsworth, K.N., O'Malley, P.M., Johnston, L.D., & Schulenberg, J.  
1997 *Smoking, drinking and drug use in young adulthood: The impacts of new freedoms and responsibilities*. Mahwah, NJ: Lawrence Erlbaum Associates.
- Bachman, J.G., O'Malley, P.M., Schulenberg, J.E., Johnston, L.D., Bryant, A.L., & Merline, A.C.  
2002 The decline of substance use in young adulthood: Changes in social activities, roles and beliefs. Mahwah, NJ: Lawrence Erlbaum Associates.
- Backer, T.E.  
2000 The failure of success: Challenges of disseminating effective substance abuse prevention programs. *Journal of Community Psychology*, 28, 363-373.
- Baker, A., Boggs, T.G., & Lewin, T.J.  
2001 Randomized controlled trial of brief cognitive-behavioural interventions among regular users of amphetamine. *Addiction*, 96, 1279-1287.
- Bennett, M.E., McCrady, B.S., Keller, D.S., & Paulus, M.D.  
1996 An intensive program for collegiate substance abusers. Progress six months after treatment entry. *Journal of Substance Abuse Treatment*, 13, 219-225.
- Borsari, B., & Carey, K.B.  
2000 Effects of a brief motivational intervention with college student drinkers. *Journal of Consulting and Clinical Psychology*, 68, 728-733.
- Botvin, G.J.  
2000 Preventing drug abuse in schools: social and competence enhancement approaches targeting individual-level etiologic factors. *Addictive Behaviors*, 25, 887-897.
- Botvin, G.J., Baker, E., Dusenbury, L., Tortu, S., & Botvin, E.M.  
1990 Preventing adolescent drug abuse through a multimodal cognitive-behavioral approach: Results of a 3-year study. *Journal of Consulting and Clinical Psychology*, 58, 437-446.

Brown, S.A., Christiansen, B.A., & Goldman, M.S.

1987 The Alcohol Expectancy Questionnaire: An instrument for the assessment of adolescent and adult alcohol expectancies. *Journal of Studies on Alcohol*, 48, 483-491.

Brown, S.A., Myers, M.G., Lippke, L., Tapert, S.F., Stewart, D.G., & Vik, P.W.

1998 Psychometric evaluation of the Customary Drinking and Drug Use Record (CDDR): A measure of adolescent alcohol and drug involvement. *Journal of Studies on Alcohol*, 59, 427-438.

Budney, A.J., Higgins, S.T., Radonovich, K.J., & Novy, P.L.

2000 Adding voucher-based incentives to coping skills and motivational enhancement improves outcomes during treatment for marijuana dependence. *Journal of Consulting and Clinical Psychology*, 68, 1051-1061.

Bureau of Labor Statistics

2003 *College enrollment and work activity of 2002 high school graduates*. Retrieved March 20, 2004, from <http://www.bls.gov/news.release/hsgec.nr0.htm>.

Carroll, K.

1996 Relapse prevention as a psychosocial treatment: A review of controlled clinical trials. *Experimental and Clinical Psychopharmacology*, 4, 46-54.

Carroll, K.

1999 Behavioral and cognitive behavioral treatments. In B.S. McCrady, E.E. Epstein (Eds.), *Addictions: A comprehensive guidebook* (pp. 250-267). New York: Oxford University Press.

Chen, K., & Kandel, D.B.

1995 The natural history of drug use from adolescence to the mid-thirties in a general population sample. *American Journal of Public Health*, 85, 41-47.

Copeland, J., Swift, W., Roffman, R., & Stephens, R.

2001 A randomized controlled trial of brief cognitive-behavioral interventions for cannabis use disorder. *Journal of Substance Abuse Treatment*, 21, 55-64.

Crome, I.B.

1999 Treatment interventions - looking toward the millennium. *Drug and Alcohol Dependence*, 55, 247-263.

Crowley, T.J., Macdonald, M.J., Whitmore, E.A., & Mikulich, S.K.

1998 Cannabis dependence, withdrawal, and reinforcing effects among adolescents with conduct symptoms and substance use disorders. *Drug and Alcohol Dependence*, 50, 27-37.

## COLLEGE DRUG PREVENTION

D'Amico, E.J., & Fromme, K.

2000 Implementation of the Risk Skills Training Program: A brief intervention targeting adolescent participation in risk behaviors. *Cognitive and Behavioral Practice*, 7, 101-117.

Darkes, J., & Goldman, M.S.

1993 Expectancy challenge and drinking reduction: Experimental evidence for a meditational process. *Journal of Consulting and Clinical Psychology*, 61, 344-353.

Darkes, J., & Goldman, M.S.

1998 Expectancy challenge and drinking reduction: Process and structure in the alcohol expectancy network. *Experimental Clinical Psychopharmacology*, 6, 64-76.

DeJong, W., & Langenbahn, S.

1996 *Setting and improving policies for reducing alcohol and other drug problems on campus: A guide for administrators*. Washington, DC: U.S. Department of Education, Higher Education Center for Alcohol and Other Drug Prevention.

Dennis, M., Titus, J.C., Diamond, G., Donaldson, J., Godley, S.H., Tims, F.M., Webb, C., Kaminer, Y., Babor, T., Roebuck, M.C., Godley, M.D., Hamilton, N., Liddle, H., & Scott, C.K.

2002 The Cannabis Youth Treatment (CYT) experiment: Rationale, study design and analysis plans. *Addiction*, 97 Suppl 1, 16-34.

Dimeff, L.A., Baer, J.S., Kivlahan, D.R., & Marlatt, G.A.

1999 *Brief alcohol screening and intervention for college students*. New York: Guilford Publications.

Donaldson, S.I., Sussman, S., MacKinnon, D.P., Severson, H.H., Glynn, T., Murray, D.M., & Stone, E.

1996 Drug abuse prevention programming: Do we know what content works? *American Behavioral Scientist*, 39, 868-883.

Dunn, C., Deroo, L., & Rivara, F.P.

2001 The use of brief interventions adapted from motivational interviewing across behavioral domains: a systematic review. *Addiction*, 96, 1725-1742.

Ellickson, P.L., McCaffrey, D.F., Ghosh-Dastidar, B., & Longshore, D.L.

2003 New inroads in preventing adolescent drug use: Results from a large-scale trial of project ALERT in middle schools. *American Journal of Public Health*, 93, 1830-1836.

Fromme, K., Stroot, E.A., & Kaplin, D.

1993 Comprehensive effects of alcohol: Development and psychometric assessment of a new expectancy questionnaire. *Psychological Assessment*, 5, 19-26.

George, W.H., Crowe, L.C., Abwender, D., & Skinner, J.B.

1989 Effects of raising the drinking age to 21 years in New York State on self-reported consumption by college students. *Journal of Applied Social Psychology*, 19, 623-635.

Gledhill-Hoyt, J., Lee, H., Strote, J., & Wechsler, H.

2000 Increased use of marijuana and other illicit drugs at US colleges in the 1990s: Results of three national surveys. *Addiction*, 95, 1655-1667.

Gonzalez, G.M.

1989 An integrated theoretical model for alcohol and other drug abuse prevention on the college campus. *Journal of College Student Development*, 30, 492-503.

Grossman, S., Canterbury, R.J., Lloyd, E., & McDowell, M.

1994 A model approach to peer-based alcohol and other drug prevention in a college population. *Journal of Alcohol and Drug Education*, 39, 50-61.

Institute of Medicine

1990 *Broadening the base of treatment for alcohol problems*. Washington, DC: National Academy Press.

Johnston, L.D., O'Malley, P.M., & Bachman, J.G.

1996 *National survey results on drug use from the Monitoring the Future study, 1975-1994. Volume II: College students and young adults*. NIH Publication No. 96-4027, Rockville, MD: National Institute on Drug Abuse.

Johnston, L.D., O'Malley, P.M., Bachman, J.G., & Schulenberg, J.E.

2004 *Monitoring the Future national survey results on drug use, 1975-2003. Volume II: College students and adults ages 19-45* (NIH Publication No. 04-5508). Bethesda, MD: National Institute on Drug Abuse.

Juhnke, G.A., Huffman, S.B., Nilsen, K.A., Adams, J.R., Dew, B.J., Jordan, J.P., Charkow, W.B., Curtis, R.C., Gmutza, B.M., Long, J.A., Booth, C.S., Hagedorn, W.B., Rubio, P., & Schroat, D.A.

2002 Establishing an alcohol and other drug assessment and intervention program within an on-site counselor education research and training clinic. *Journal of Addictions and Offender Counseling*, 22, 83-90.

Kilmer, J.R., Larimer, M., Parks, G.A., Dimeff, L.A., & Marlatt, G.A.

1999 Liability management or risk management: Evaluation of a Greek system alcohol policy. *Psychology of Addictive Behavior*, 13, 269-278.

## COLLEGE DRUG PREVENTION

Kilmer, J.R., Walker, DD., Palmer, R.S., Mallett, K.A., Fabiano, P., & Larimer, M.E. (In review.)

*Misperceptions of college student marijuana use: Implications for prevention.*

Kivlahan, D.R., Marlatt, G.A., Fromme, K., Coppel, D.B., & Williams, E.

1990 Secondary prevention with college drinkers: evaluation of an alcohol skills training program. *Journal of Consulting and Clinical Psychology, 58*, 805-810.

Larimer, M.E., & Cronce, J.M.

2002 Identification, prevention, and treatment: A review of individual-focused strategies to reduce problematic alcohol consumption by college students. *Journal of Studies on Alcohol, Supplement, 14*, 148-163.

Licciardone, J.D.

2003 Outcomes of a federally funded program for alcohol and other drug prevention in higher education. *American Journal of Drug and Alcohol Abuse, 29*, 803-827.

Liddle, H.A., Rowe, C.L., Quille, T.J., Dakof, G.A., Mills, D.S., Sakran, E., & Biaggi, M.D.

2002 Transporting a research-based adolescent drug treatment into practice. *Journal of Substance Abuse Treatment, 22*, 231-243.

Longshore, D., & Grills, C.

2000 Motivating illegal drug use recovery: Evidence for a culturally congruent intervention. *Journal of Black Psychology, 26*, 288-301.

Marlatt, G.A., Baer, J.S., Kivlahan, D.R., Dimeff, L.A., Larimer, M.E., Quigley, L.A., Somers, J.M., & Williams, E.

1998 Screening and brief intervention for high-risk college student drinkers: Results from a 2-year follow-up assessment. *Journal of Consulting and Clinical Psychology, 66*, 604-615.

Marlatt, G.A., & Gordon, J.R.

1985 *Relapse prevention: Maintenance strategies in the treatment of addictive behaviors*. New York, NY: The Guilford Press.

McCambridge, J., & Strang, J.

2004 The efficacy of single-session motivational interviewing in reducing drug consumption and perceptions of drug-related risk and harm among young people: Results from a multi-site cluster randomized trial. *Addiction, 99*, 39-52.

McRae, A.L., Budney, A.J., & Brady, K.T.

2003 Treatment of marijuana dependence: A review of the literature. *Journal of Substance Abuse Treatment, 24*, 369-376.

- Miller, W.R., & Rollnick, S.  
2002 *Motivational interviewing: Preparing people for change* (2nd ed.). New York: Guilford Press.
- Miller, W.R., & Sovereign, R.G.  
1989 The check-up: A model for early intervention in addictive behaviors. In T. Loberg, W.R. Miller, P.E. Nathan, & G.A. Marlatt (eds), *Addictive behaviors: Prevention and early intervention* (pp. 219-231). Amsterdam: Swets & Zeitlinger.
- Miller, W.R., Toscova, R.T., Miller, J.H., & Sanchez, V.  
2001 A theory-based motivational approach for reducing alcohol/drug problems in college. *Health Education and Behavior*, 27, 744-759.
- National Institute on Alcohol Abuse and Alcoholism  
2002a *A call to action: Changing the culture of drinking at U.S. colleges*. NIH Publication No. 02-5010. Bethesda, MD: National Institute on Alcohol Abuse and Alcoholism
- National Institute on Alcohol Abuse and Alcoholism  
2002b *Journal of Studies on Alcohol. College drinking, what it is, and what to do about it: A review of the state of the science*. Piscataway, NJ: Rutgers Center of Alcohol Studies.
- Neighbors, C., Larimer, M.E., & Lewis, M.A. (In press.)  
2004 Efficacy of a computer delivered personalized normative feedback intervention. *Journal of Consulting and Clinical Psychology*.
- O'Donnell, J., Hawkins, J., Catalano, R., Abbott, R., & Day L.  
1995 Preventing school failure, delinquency among low-income children: Long-term intervention in elementary schools. *American Journal of Orthopsychiatry*, 65, 87-100
- Office of Applied Studies  
2002 *The DAWN report - club drugs, 2001 update*. Rockville, MD: Substance Abuse and Mental Health Services Administration.
- Office of Applied Studies  
2003 *The DAWN report - marijuana-related emergency department visits by youth*. Rockville, MD: Substance Abuse and Mental Health Services Administration.
- Page, M.R., & Scanlan, A.  
1999 Perceptions of the prevalence of marijuana use among college students: A comparison between current users and nonusers. *Journal of Child Adolescent Substance Abuse*, 9, 1-13.

- Perkins, H.W., Meilman, P.W., Leichliter, J.S., Cashin, J.R., & Presley, C.A.  
1999 Misperceptions of the norms for the frequency of alcohol and other drug use on college campuses. *Journal of American College of Health*, 47, 253-258.
- Presley, C.A., Harrold, R., Scouten, E., Lyerla, R., & Meilman, P.W.  
1994 *Core alcohol and drug survey: User's manual* (5<sup>th</sup> ed.). Carbondale, IL: Core Institute, Southern Illinois University.
- Presley, C.A., Meilman, P.W., Cashin, J.R., & Lyerla, R.  
1996 *Alcohol and drugs on American college campuses*. Carbondale, IL: Core Institute, Southern Illinois University.
- Roffman, R.A., Stephens, R.S., & Simpson, E.E.  
1989 Relapse prevention with adult chronic marijuana smokers. *Journal of Chemical Dependency Treatment*, 2, 241-257
- Rogers, E.M.  
1995 *Diffusion of innovations* (4<sup>th</sup> ed.). New York: Free Press.
- Rohrbach, L.A., D'Onofrio, C.N., Backer, T.E., & Montgomery, S.B.  
1996 Diffusion of school-based substance abuse prevention programs. *American Behavioral Scientist*, 39, 919-934.
- Schafer, J., & Brown, S.A.  
1991 Marijuana and cocaine effect expectancies and drug use patterns. *Journal of Consulting and Clinical Psychology*, 59, 558-565.
- Schulenberg, J., & Maggs, J.L.  
2002 A developmental perspective on alcohol use and heavy drinking during adolescence and the transition to young adulthood. *Journal of Studies on Alcohol*, S14, 54-70.
- Schulenberg, J., O'Malley, P.M., Bachman, J.G., & Johnston, L.D.  
2000 Spread your wings and fly: The course of well-being and substance use during the transition to young adulthood. In L.J. Crockett & R.K. Silbereisen (Eds.), *Negotiating adolescence in times of social change* (pp. 224-255). New York: Cambridge University Press.
- Simpson, D.D.  
2002 A conceptual framework for transferring research to practice. *Journal of Substance Abuse Treatment*, 22, 171-182.
- Skara, S., & Sussman, S.  
2003 A review of 25 long-term adolescent tobacco and other drug use prevention program evaluations. *Preventive Medicine*, 37, 451-474.
- Skinner, W.F.  
1994 The prevalence and demographic predictors of illicit and licit drug use among lesbians and gay men. *American Journal of Public Health*, 84, 1307-1310.

Sobell, L.C.

1996 Bridging the gap between scientists and practitioners: The challenge before us. *Behavioral Therapy*, 27, 297-320.

Stephens, R.S.

1999 Cannabis and hallucinogens. In B.S. McCrady & E.E. Epstein (Eds.), *Addictions: A comprehensive guidebook* (pp. 121-140). New York: Oxford University Press.

Stephens, R.S., Roffman, R.A., & Curtin, L.

2000 Comparison of extended versus brief treatments for marijuana use. *Journal of Consulting and Clinical Psychology*, 68, 898-908.

Stokols, D., Allen, J., & Bellingham, R.L.

1996 The social ecology of health promotion: implications for research and practice. *American Journal of Health Promotion*, 10, 247-251.

Substance Abuse & Mental Health Administration (SAMHSA)

2002 *National Household Survey on Drug Abuse*. Rockville, MD.

Tobler, N.S., Roona, M.R., Ochshorn, P., Marshall, D.G., Streke, A.V., & Stackpole, K.M.

2000 School-based adolescent drug prevention programs: 1998 meta-analysis. *Journal of Primary Prevention*, 20, 275-336.

Van Etten, L.M., & Anthony, J.C.

1999 Comparative epidemiology of initial drug opportunities and transition to first use: Marijuana, cocaine, hallucinogens and heroin. *Drug and Alcohol Dependence*, 54, 117-125.

Van Etten, L.M., Neumark, D.Y., & Anthony, J.C.

1997 Initial opportunity to use marijuana and the transition to first use: United States, 1979-1994. *Drug and Alcohol Dependence*, 49, 1-7.

Wagner, F.A., & Anthony, J.C.

2002 From first drug use to drug dependence: Developmental periods of risk for dependence upon marijuana, cocaine, and alcohol. *Neuropharmacology*, 26, 479-488.

Walters, S.T.

2000 In praise of feedback: An effective intervention for college students who are heavy drinkers. *Journal of American College of Health*, 48, 235-238.

Walters, S.T., Bennett, M.E., & Miller, J.H.

2000 Reducing alcohol use in college students: A controlled trial of two brief interventions. *Journal of Drug Education*, 30, 361-372

Werch, C.E., Pappas, D.M., & Castellon-Vogel, E.A.

1996 Drug use prevention efforts at colleges and universities in the United States. *Substance Use and Misuse*, 31, 65-80.



**COLLEGE DRUG PREVENTION**

Wolfson, S.

2000 Students' estimates of the prevalence of drug use: Evidence for a false consensus effect. *Psychology of Addictive Behaviors*, 14, 295-298.

Young, E.S., Corley, P.R., Stallings, C.M., Rhee, H.S., Crowley, J.T., & Hewitt, K.J.

2002 Substance use, abuse and dependence in adolescence: Prevalence, symptom profiles and correlates. *Drug and Alcohol Dependence*, 68, 309-322.

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