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# **CONTEXTUAL AND OTHER FACTORS RELATED TO WORKPLACE-BASED SUBSTANCE ABUSE PREVENTION AND EARLY INTERVENTION FOR ADOLESCENTS AND YOUNG ADULTS**

Prepared by:

Kathy R. Batts, M.P.E. (RTI)  
Todd C. Grabill, B.A. (RTI)  
Deborah M. Galvin, Ph.D. (CSAP)  
William E. Schlenger, Ph.D. (RTI)

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Contact:  
Jeremy W. Bray  
RTI  
3040 Cornwallis Road  
Research Triangle Park, NC 27709-1294  
(919) 541-7003  
(919) 541-6683 (fax)  
[bray@rti.org](mailto:bray@rti.org)

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## **BACKGROUND**

The baby boom generation will begin to retire in less than a decade (U.S. Department of Labor, 1997), creating a major shift in the sociodemographic characteristics of the American workforce in which the younger workers become a larger percentage of the overall workforce. The number of 16- to 24-year-olds in the labor force is projected to increase by 3.4 million by 2010, making the youth labor force larger than it was in 1980, 1990, or 2000 (Fullerton and Toossi, 2001). On the near horizon, the workforce will become progressively younger.

As the labor force becomes younger, employers will be faced with new problems because youth concerns and issues will increasingly impact the workplace. Perhaps first among these problems is adolescent and young adult substance use and abuse. According to the 2001 National Household Survey on Drug Abuse (NHSDA, now known as the National Household Survey on Drug Use and Health [NSDUH]), individuals ages 16-25 are the most likely to use illicit drugs (SAMHSA, 2002). Young adults ages 18-25 also demonstrate the highest prevalence of both binge and heavy drinking, 38.7% and 13.6%, respectively (SAMHSA, 2002).

The purpose of this paper is to stimulate potential applicants to the Center for Substance Abuse Prevention's (CSAP's) "Workplace Prevention and Early Intervention Transitioning Youth into the Workplace" (YIW) grant program to think about factors that may (1) influence the design of a proposed intervention and (2) need to be measured in the empirical evaluation of that intervention. We begin with a brief summary of some potentially important contextual factors. We then summarize empirical information about risk factors for substance abuse among youth and young adults, consequences of substance abuse, and interventions that have been studied empirically.

## **CONTEXTUAL FACTORS**

The efficacy of psychosocial and behavioral interventions is often influenced by the context in which they are provided, and the workplace may include a different continuum of contextual factors than other venues (e.g., schools, community-based agencies, health service providers). In any workplace evaluation, there are a number of variables that may influence the behavior(s) being studied. Workplace characteristics, climates, and cultures vary across small to large corporations, businesses, private and public foundations, organizations, and employers. Within these variations are differences in basic work principles; primary language, dialect(s), and/or slang spoken; and workplace social structures, hierarchies and group

dynamics, including levels of alienation or powerlessness (e.g., when a worker feels they cannot contribute to the end product or cannot control their tools, resources, job setting, flow of information, or amount of change in direction or goals). There are also variations in employee characteristics, such as age, race, culture, religiosity, perceived social status and class, status of health/wellness, level of education, occupational attainment, personal income, marital status, attitudes, etc. Other variables that might be important include environmental settings; region; local community structure; and economic conditions of the community, region, and nation.

In a study of prevention and early intervention programs in the workplace, all of the risk and resiliency factors may interact with multicultural and multigenerational workplace contextual variables. Many youth may view the transition to the world of work as a “rite of passage,” a time when the youth changes from a “child” into an “adult,” becomes financially independent, and is “able to stand on their own two feet.” Yet, depending on the age of the youth and their particular circumstances at home and school, this rite of passage may conflict with other status labels, such as “old enough to drive, drink, vote, or be drafted.” Other potential influences on the “rite of passage” include having graduated from school (or not), living at home, and being treated as a “child” by parents. Likewise, the workplace itself can influence the youth’s perception of self which can be quite important in the prevention of substance abuse.

Epidemiologic research conducted in workplaces has identified some important contextual influences on employee drinking. For example, Ames and her colleagues (1999, 2000) have documented relationships between workplace climate, norms, and policies (and policy enforcement levels) and work-related drinking. Similarly, Bacharach, Bamberger, and Sonnenstuhl (2002) have shown that perceived permissive drinking norms and perceived workplace stress are associated with higher rates of problem drinking in a diverse sample of blue-collar workers who belonged to eight large unions.

Other work-related factors that may be important include the following:

- Is the work full- or part-time (e.g., less than 40 hours, summer work, seasonal work)?
- Is it second- or third-shift work?
- Is it an extension of a school assignment?
- What kind of work is it (e.g., occupation type)?
- Is it one of multiple jobs that the youth/young adult holds?

- Is the youth/young adult also in school, or has the youth/young adult graduated or dropped out?
- Is the job part of a mandate for probation or parole (i.e., under supervision)?

## **RISK FACTORS AND CORRELATES**

The time period spanning from adolescence to young adulthood encompasses a number of developmental transitions and landmarks, including puberty, and moving from high school to college or to the workforce. Adolescents experience a variety of important changes, including physiological maturation, increased responsibilities and autonomy, and exposure to new social, school, and work environments and roles throughout this period. Chen and Kandel (1995) have reported results from a longitudinal study covering the period from adolescence to the mid-thirties that indicate that the initiation of drug use also typically occurs during late adolescence through early adulthood. Specifically, the major risk periods for initiation of alcohol and marijuana use peak at age 18, and the major risk period for initiation of cocaine use peaks between the ages of 21 and 24. Furthermore, after age 29, almost no one in the study initiated alcohol or illicit drug use. Other studies have also shown a clear association between youth substance use and the transition from school to the labor force (Kandel, 1984; Kaplan and Liu, 1994; Kandel et al., 1986).

Developmental transitions during this period of vulnerability represent opportunities to intervene to modify courses of behavior that are already changing. These are optimal times to redirect potentially harmful trajectories and develop successful strategies for healthy choices (Schulenberg et al., 2001). However, there is a significant gap in the delivery of prevention and early intervention services to persons in this vulnerable age group. Many of the intervention or prevention programs for adolescents are presented in middle or high school. These school-based programs miss those who have already dropped out of school and only provide services to students until high school graduation, which typically occurs at age 18. Workplace intervention and prevention programs are focused on prevention among the mainstream of the workforce, who historically have been of an older age cohort (Cook and Schlenger, 2002).

### **Risk Factors**

Research has indicated that the prime risk factor for initiating alcohol, marijuana, or cocaine use is simply being an adolescent or young adult (Chen and Kandel, 1995). However, because the vast majority of adolescents who use alcohol or other drugs *do not* escalate to abuse or dependence (Newcomb, 1995; Powers, 1998), we will focus on the risk factors and

correlates of problem use, abuse, or dependence. Colder and Chassin (1999) suggest that interventions focused on preventing problem use should be specifically targeted to adolescents at risk. Young people at high risk for developing substance use problems are not as likely as their peers to be influenced by broad-based prevention efforts. It is essential to use interventions that target their special needs (i.e., mediate the effects of their risk factors) in the effort to reduce their high rates of alcohol and drug use problems (Harrison, 2001). Knowledge of the specific risk factors and correlates of substance use problems is critical to successful prevention and early intervention efforts with adolescents and young adults.

It is important to note that although substance *use* behaviors have been shown to be associated with social and peer factors, the escalation to harmful use or abuse appears to be more strongly related to biological and psychological risk factors (Glantz and Pickens, 1992). Family and parental influences are a prime risk factor for substance use problems. McGue (1994) asserts that “the familial aggregation of alcoholism is one of the most robust and well-replicated findings in the alcohol research field” (p. 1). Adoption and twin studies have demonstrated that genetic factors play some part in the family aggregation. Research on drug disorders, including dependence, shows similar findings (Merikangas et al., 1998; Bierut et al., 1998; Hopfer et al., 2003).

Although genetic factors account for some of the risk, family environment also plays a part. Parental psychopathology (e.g., maternal depression and anxiety) has been associated with risk of substance use disorders in offspring, although it is unclear whether this association is genetic, a consequence of family environment, or a combination of the two (Merikangas, Rounsaville, and Prusoff, 1992). Disruptions in parenting, specifically in maternal parenting, have been associated with problem alcohol use in offspring; and parental use of alcohol has also been found to be associated with problem drinking in male offspring but not in females (Colder and Chassin, 1999). Male gender has also been identified as a risk factor for alcohol use problems (Johnstone, 1994). By age 18, males with substance abuse outnumber females with the disorder. When adult populations are compared, the male-female ratios approximate 5:1 for alcohol use disorders (Harrison, 2001).

Several psychological or personality traits have also been identified as risk factors for early-onset alcohol use problems. Cloninger (1987) and colleagues (1988) describe a personality type that has a predisposition for alcohol use problems. This personality type includes high novelty seeking, low harm avoidance, and high reward dependence traits. Smith and Anderson (2001) describe a similar personality type that includes disinhibition, impulsivity,

or behavioral undercontrol. Disinhibited adolescents are likely to be heavier drinkers and to experience more problems with their drinking.

Other psychological disorders have also been investigated as risk factors for substance use problems. The three disorders that receive the most attention in the literature are attention deficit hyperactivity disorder (ADHD), conduct disorder, and mood disorders (e.g., major depressive disorder and bipolar disorder). All three have been found to be highly comorbid with substance use disorders (Swadi, 1999; Clark et al., 1997; Merikangas, 1994). The associations among these disorders are typically bidirectional, in that psychological disorders predispose adolescents to substance use disorders (e.g., “self-medicating” or using substances to avoid or relieve distress or emotional pain) and vice versa (e.g., cocaine use may induce or exacerbate clinical depression) (Copans, Kinney, and Estroff, 2001).

### **Correlates**

Several correlates of substance use disorders have also been identified in adolescents and young adults. These correlates include environmental influences and stressors that may occur in a person’s life. In some cases, these circumstances or events may precede the substance use disorder and may potentially contribute to its causation, whereas in other cases the opposite may be true.

A variety of correlates related to early-onset delinquency, including antisocial behavior, have been found to be associated with substance use disorders (Taylor et al., 2002). Early initiation of substance use and heavy substance use have been identified as correlates of substance use disorders (Weinberg et al., 1998). Illicit drug use among youth has been linked to delinquent behaviors, most notably theft (Kandel et al., 1986). Education studies have repeatedly shown that chronic or heavy substance use and problem use are associated with school failure, as well as high school dropout and absenteeism (Roebuck, French, and Dennis, 2003; Yamada, Kendix, and Yamada, 1996; Hawkins, Catalano, and Miller, 1992).

Using national household survey data, Wu, Schlenger, and Galvin (2003) documented a significant association between being a member of the workforce and substance use and problem use in adolescents. Similarly, adolescents who attend high school and also work more than 15 hours per week at a job have been found to have an increased risk for substance abuse (Valois et al., 1999). Research done by Martin and colleagues (1996) indicates a model of job-related influences that are associated with problem drinking. These influences include job stressors, job rewards, participation in work-based drinking networks, and systems of social support. Adolescents and young adults, especially those who are entering the work

environment, will be particularly vulnerable to these influences as they attempt to succeed and find their place in a new environment.

## **CONSEQUENCES OF ADOLESCENT/YOUNG ADULT SUBSTANCE ABUSE**

Substance use problems have been associated with a number of negative workplace outcomes. Substance abuse has frequently been associated with reduced productivity on the job. Various studies have shown that illicit drug use among workers correlates to fewer hours worked (Bray et al., 2000); job withdrawal (Lehman and Simpson, 1992); and increased absenteeism, job mobility, and unemployment rates (Bray et al., 2000; Kandel and Yamaguchi, 1987; Normand, Salyards, and Mahoney, 1990). Heavy alcohol use has been associated with negative work-related attitudes (Lehman and Simpson, 1992) and a number of work performance problems, including absenteeism and poor work quality (Mangione et al., 1999). Substance abuse also correlates to an increased risk of accidents and injury in the workplace (Pollack et al., 1998). These negative outcomes are escalated when substance abuse is complemented by co-occurring psychological disorders, multiple substance use, or other medical disorders (Bray et al., 2000).

Employers clearly have an incentive to mediate the negative workplace outcomes associated with substance abuse. In partnership with employers, substance abuse prevention and early intervention programs equip workers to alter the trajectory of problem behavior, specifically substance abuse, in their lives. As younger workers become a larger percentage of the overall workforce, it will become increasingly important for substance abuse prevention and early intervention programs to be aimed at this vulnerable population if workplace outcomes are to be affected.

## **WORKPLACE AND YOUTH SUBSTANCE ABUSE PREVENTION AND EARLY INTERVENTION PROGRAMS**

At the macro level, substance abuse prevention and early intervention efforts to date have been of two kinds: universal (primary) programs, often school-based, aimed at children and adolescents; and universal and indicated programs, often based in the workplace, aimed at adults. In what follows, we summarize briefly the state of the art in these two areas.

### **Workplace Prevention and Early Intervention Programs**

A small but growing literature documents workplace-based substance abuse prevention efforts. Because these efforts are targeted at adults, they focus on universal prevention of drug

use but selective and indicated prevention of alcohol abuse. Additionally, to avoid stigma they are often “packaged” with other kinds of interventions such as health and wellness programs or stress reduction interventions.

The roots of workplace substance abuse prevention efforts are found in the occupational alcoholism program movement, which sired today’s multiple-problem employee assistance programs (EAPs), and in the drug-free workplace movement, stimulated by the Drug Free Workplace Act of 1988, which has resulted in widespread pre-employment and other drug testing (Cook and Schlenger, 2002).

Current workplace prevention efforts range from drug testing to health promotion. Bennett, Reynolds, and Lehman (2003) note that variability across worksites is a problem, suggesting that such variability underscores the need for a broad set of interventions for prevention and early intervention such that comprehensive programs can be implemented that address fully the needs of each specific workplace.

Recent workplace programs with documented empirical evidence of their efficacy include a stress- and coping-based intervention, working from a risk and protective factor model. In two studies, there was evidence that the intervention had a positive effect in mediating and moderating certain risk and protective factors related to problem alcohol use. These effects were demonstrated across diverse work settings and with a diverse group of employees (Snow, Swan, and Wilton, 2003).

A second intervention with empirical evidence of success encompassed a “harm reduction” approach. In an effort to stem injuries presumably linked to problem alcohol use among workers of a forest products company, this intervention provided educational and training materials about psychosocial hazards to the employees. The educational information was combined with lay perspectives on the causes of alcohol-related accidents and was adopted into the consciousness of the workforce. Employees were enlightened enough to understand that they had been enabling these behaviors. Strategies to prevent these behaviors were produced and implemented successfully (Shain and Suurvali, 2003).

Additionally, CSAP’s Workplace Managed Care collaborative moved the field forward by providing empirical information about a diverse array of substance abuse prevention and early intervention efforts implemented in the context of managed health care. The collaborative comprised nine grantees, a coordinating center, and a CSAP staff collaborator. The grantees were all teams that included workplace researchers, workplaces, and their managed care

companies. The grantees implemented 3-year studies of interventions of their own creation in the workplaces with which they partnered. There was substantial diversity among the interventions and the characteristics of the workers studied, who ranged from transportation workers to insurance claims processors. At the macro level, four different “types” of prevention and early intervention efforts were studied. Four grantees embedded substance abuse prevention within a broader health promotion, wellness, or stress management program. Two grantees employed peer interventions, in which workers were trained to identify and refer co-workers whose drinking or drug use was risky. Two grantees employed web-based information and motivational interventions, and one grantee distributed information and increased the frequency of drug testing.

### **Adolescent Prevention and Early Intervention Programs**

Substance abuse prevention programming for youth has experienced substantial positive development. Departing largely from a total reliance on informational messages about alcohol and drugs and their negative health consequences, and without rigorous evaluation for behavioral effects, youth substance abuse prevention programming increasingly has become based on additional risk and protective factors, content and techniques derived from behavioral and social science theories and research, and methodologically powerful research designs for their evaluation.

That progression is readily illustrated by the history of the development, application, and evaluation of school curricula for substance abuse prevention, which continues to be the most widespread mode of prevention programming for youth in the United States. Initially relying primarily on teacher provision of information about alcohol and drugs and their negative consequences, an approach found to be ineffective for influencing behavior (Tobler, 1986), substance abuse prevention curricula now exist that focus on an array of risk and protective factors in addition to health risks (e.g., life skills, more comprehensive consideration of negative consequences of use, perception of use by others, peer and adult influences). These curricula stem from behavioral and social science theory and research and have been shown by randomized controlled trials to impact youth substance use (Botvin et al., 1995; Ellickson, Bell, and McGuigan, 1993; Flay et al., 1989; Murray et al., 1988).

However, it also is clear that problems associated with youth substance use and abuse cannot be completely solved by implementing effective school curricula. State-of-the art curricula have moderate rather than strong behavioral effects (Tobler and Stratton, 1997). Only one of the science-based curricula has been shown to have effects that lasted beyond middle

school (Botvin, et al., 1995). A recent scientific evaluation of a curriculum that began with elementary school students did not show behavioral effects (Peterson et al., 2000). Finally, although evidenced-based curricula that have behavioral effects are gaining in popularity in the United States, they are not being properly implemented in an overwhelming majority of school systems (Ennett et al., 1994; Ennett et al., 2003). These considerations suggest the need for additional ways to prevent adolescent and young adult substance use and abuse.

As evidenced by SAMHSA's National Registry of Effective Programs (Schinke et al., 2002), programs that involve other modes of delivery and strategy have been developed and found effective for preventing youth substance use and abuse. Similar to the experience of state-of-the-art school-based curricula, however, the behavioral effects of these interventions are of moderate magnitude, with much of the variance in substance use remaining unexplained by them. A conclusion to be drawn from this brief historical consideration is that additional approaches to intervening with youth to prevent substance use and abuse are in order.

### **The Gap in Prevention and Early Intervention Programming**

Youth transition to the workplace has received relatively little attention as an opportunity for effective substance abuse prevention programming and evaluation within the workplace setting. As the number and proportion of youth in the workplace increase, substance abuse prevention for youth in and transitioning to the workplace will become increasingly important. Employed youth are at high risk of substance use relative to youth who are not in the workforce (Resnick et al., 1997; Wu, Schlenger, and Galvin, 2003). Similar to schools, workplaces have advantages for prevention and early intervention because they are identifiable and organized settings where youth congregate for defined periods of time. Joining the workforce represents a key transition period for youth, and the transition could provoke stresses that encourage substance abuse. Peer networks that influence youth substance use change with workforce entry, contributing to increased substance use and abuse among working youth (Bauman and Ennett, 1996). Given these considerations, it is striking that youth transition to the workplace has not received more attention by prevention programming and evaluation research. The development and implementation of such programs, and their evaluation, are most likely to contribute to reductions in substance use and abuse if informed by the content and techniques of other youth substance abuse prevention programs shown to be effective, such as relevant programs in SAMHSA's National Registry of Effective Programs.

## REFERENCES

- Ames, G.M., and J.W. Grube. May 1999. "Alcohol Availability and Workplace Drinking: Mixed Method Analyses." *Journal of Studies on Alcohol* 60(3):383-393.
- Ames, G.M., J.W. Grube, and R.S. Moore. March 2000. "Social Control and Workplace Drinking Norms: A Comparison of Two Organizational Cultures." *Journal of Studies on Alcohol* 61(2):203-219.
- Bacharach, S.B., P.A. Bamberger, and W.J. Sonnenstuhl. 2002. "Driven to Drink: Managerial Control, Work-related Risk Factors, and Employee Problem Drinking." *Academy of Management Journal* 45(4):637-658.
- Bauman, K.E., and S.T. Ennett. 1996. "On the Importance of Peer Influence for Adolescent Drug Use: Commonly Neglected Considerations." *Addiction* 91(2):185-198.
- Bennett, J.B., G.S. Reynolds, and W.E.K. Lehman. 2003. "Understanding Employee Alcohol and Other Drug Use: Toward a Multilevel Approach." In *Workplace Substance Abuse Prevention: Beyond Drug Testing to Wellness*, J.B. Bennett and W.E.K. Lehman, eds., pp. 29-56. Washington, DC: American Psychological Association.
- Bierut, L.J., S.H. Dinwiddie, H. Begleiter, R.R. Crowe, V. Hesselbrock, J.I. Nurnberger, B. Porjesz, M.A. Schuckit, and T. Reich. 1998. "Familial Transmission of Substance Dependence: Alcohol, Marijuana, Cocaine, and Habitual Smoking." *Archives of General Psychiatry* 55(11):982-994.
- Botvin G.J., E. Baker, L. Dusenbury, E. Botvin, and T. Diaz. 1995. "Long-Term Follow-Up of a Randomized Drug Abuse Prevention Trial in a White Middle-Class Population." *Journal of the American Medical Association* 273:1106-1112.
- Bray, J.W., G.A. Zarkin, M.L. Dennis, and M.T. French. 2000. "Symptoms of Dependence, Multiple Substance Use, and Labor Market Outcomes." *American Journal of Drug and Alcohol Abuse* 26(1):77-95.
- Chen, K., and D.B. Kandel. 1995. "The Natural History of Drug Use from Adolescence to the Mid-Thirties in a General Population Sample." *American Journal of Public Health* 85(1):41-47.
- Clark, D.B., N.A. Pollock, J.T. Bromberger, O.G. Bukstein, A.C. Mezzich, and J.E. Donovan. 1997. "Gender and Psychopathology in Adolescents with Alcohol Use Disorders." *Journal of the American Academy of Child & Adolescent Psychiatry* 36(9):1195-1203.
- Cloninger, C. 1987. "Neurogenetic Adaptive Mechanisms in Alcoholism." *Science* 236: 410-416.
- Cloninger, C., S. Sigvardsson, and M. Bohman. 1988. "Childhood Personality Predicts Alcohol Use in Young Adults." *Alcoholism* 12:494-505.
- Colder, C.R., and L. Chassin. 1999. "The Psychosocial Characteristics of Alcohol Users Versus Problem Users: Data from a Study of Adolescents at Risk." *Development and Psychopathology* 11(2):321-348.

- Cook, R., and W. Schlenger. 2002. "Prevention of Substance Abuse in the Workplace: Review of Research on the Delivery of Services." *The Journal of Primary Prevention* 23(1):115-141.
- Copans, S.A., J. Kinney, and T.W. Estroff. 2001. "Adolescent Development and Substance Abuse." In *Manual of Substance Abuse Treatment*, T.W. Estroff, ed., pp. 265-272. Washington, DC: American Psychiatric Publishing.
- Ellickson, P.L., R.M. Bell, and K. McGuigan. 1993. "Preventing Adolescent Drug Use: Long-Term Results of a Junior High Program." *American Journal of Public Health* 83(6):856-861.
- Ennett S.T., C.L. Ringwalt, J. Thorne, et al. 2003. "A Comparison of Current Practice in School-Based Substance Use Prevention Programs with Meta-Analysis Findings." *Prevention Science* 4(1):1-14.
- Ennett S.T., N.S. Tobler, C.L. Ringwalt, and R.L. Flewelling. 1994. "How Effective is Drug Abuse Resistance Education?: A Meta-Analysis of Project DARE Outcome Evaluations." *American Journal of Public Health* 84(9):1394-1401.
- Flay, B.R., D. Koepke, S.J. Thomson, S. Santi, A. Best, and K.S. Brown. 1989. "Six-Year Follow-up of the First Waterloo School Smoking Prevention Trial." *American Journal of Public Health* 79(10):1371-1376.
- Fullerton, H.N., and M. Toossi. 2001. "Labor Force Projections to 2010: Steady Growth and Changing Composition." *Monthly Labor Review* 124(11):21-38.
- Glantz, M.D., and R.W. Pickens. 1992. "Vulnerability to Drug Abuse: Introduction and Overview." In *Vulnerability to Drug Abuse*, M.D. Glantz and R.W. Pickens, eds., pp. 1-14. Washington, DC: American Psychological Association.
- Harrison, P.A. 2001. "Predisposing Factors." In *Manual of Substance Abuse Treatment*, T.W. Estroff, ed., pp. 13-33. Washington, DC: American Psychiatric Publishing.
- Hawkins, J.D., R.F. Catalano, and J.Y. Miller. 1992. "Risk and Protective Factors for Alcohol and Other Drug Problems in Adolescence and Early Adulthood: Implications for Substance Abuse Prevention." *Psychological Bulletin* 112:64-105.
- Hopfer, C.J., M.C. Stallings, J.K. Hewitt, and T.J. Crowley. 2003. "Familial Transmission of Marijuana Use, Abuse, and Dependence." *Journal of the American Academy of Child & Adolescent Psychiatry* 42(7):834-841.
- Johnstone, B.M. 1994. "Sociodemographic, Environmental, and Cultural Influences on Adolescent Drinking Behavior." In *The Development of Alcohol Problems: Exploring the Biopsychosocial Matrix of Risk*, NIAAA Monograph No. 26, R. Zucker, G. Boyd, and J. Howard, eds., pp. 169-204. Rockville, MD: U.S. Department of Health and Human Services.
- Kandel, D.B. 1984. "Marijuana Users in Young Adulthood." *Archives of General Psychiatry* 41(2):200-209.

- Kandel, D.B., M. Davies, D. Karus, and K. Yamaguchi. 1986. "The Consequences in Young Adulthood of Adolescent Drug Involvement: An Overview." *Archives of General Psychiatry* 43(8):746-754.
- Kandel, D.B., and K. Yamaguchi. 1987. "Job Mobility and Drug Use: An Event History Analysis." *American Journal of Sociology* 92:836-878.
- Kaplan, H.B., and X. Liu. 1994. "A Longitudinal Analysis of Mediating Variables in the Drug Use–Dropping Out Relationship." *Criminology* 32(3):415-439.
- Lehman, W.E.K., and D.D. Simpson. 1992. "Employee Substance Use and On-the-Job Behaviors." *Journal of Applied Psychology* 77:309-321.
- Mangione, T.W., J. Howland, B. Amick, J. Cote, M. Lee, N. Bell, and S. Levine. 1999. "Employee Drinking Practices and Work Performance." *Journal of Studies on Alcohol* 60:261-270.
- Martin, J.K., P.M. Roman, and T.C. Blum. 1996. "Job Stress, Drinking Networks, and Social Support at Work: A Comprehensive Model of Employees' Problem Drinking Behaviors." *Sociological Quarterly* 37:579-599.
- McGue, M. 1994. "Genes, Environment, and the Etiology of Alcoholism." In *The Development of Alcohol Problems: Exploring the Biopsychosocial Matrix of Risk, NIAAA Monograph No. 26*, R. Zucker, G. Boyd, and J. Howard, eds., pp. 1-39. Rockville, MD: U.S. Department of Health and Human Services.
- Merikangas, K.R. 1994. "Vulnerability for Alcoholism." In *The Development of Alcohol Problems: Exploring the Biopsychosocial Matrix of Risk, NIAAA Monograph No. 26*, R. Zucker, G. Boyd, and J. Howard, eds., pp. 331-339. Rockville, MD: U.S. Department of Health and Human Services.
- Merikangas, K.R., B.J. Rounsaville, and B.A. Prusoff. 1992. "Familial Factors in Vulnerability to Substance Abuse." In M.D. Glantz and R.W. Pickens (eds.), *Vulnerability to Drug Abuse*. Washington, DC: American Psychological Association, 75-97.
- Merikangas, K.R., M. Stolar, D.E. Stevens, J. Goulet, M.A. Preisig, B. Fenton, H. Zhang, S.S. O'Malley, and B.J. Rounsaville. 1998. "Familial Transmission of Substance Use Disorders." *Archives of General Psychiatry* 55(11):973-979.
- Monti, P.M., S.M. Colby, and T.A. O'Leary. 2001. "Introduction." In *Adolescents, Alcohol, and Substance Abuse; Reaching Teens through Brief Interventions*, P.M. Monti, S.M. Colby, and T.A. O'Leary, eds., pp. 1-18. New York: Guilford Press.
- Murray D.M., M. Davis-Hearn, A.I. Goldman, P. Pirie, and R.V. Luepker. 1988. "Four- and Five-Year Follow-Up Results from Four Seventh-Grade Smoking Prevention Strategies." *Journal of Behavioral Medicine* 11(4):395-405.
- Newcomb, M.D. 1995. "Identifying High-Risk Youth: Prevalence and Patterns of Adolescent Drug Abuse." In *Adolescent Drug Abuse: Clinical Assessment and Therapeutic Interventions (NIDA Research Monograph 156)*, E. Rahdert and D. Czechowitz, eds., pp. 7-38. Rockville, MD: U.S. Department of Health and Human Services.

- Normand, J., S.D. Salyards, and J.J. Mahoney. 1990. "An Evaluation of Preemployment Drug Testing." *Journal of Applied Psychology* 75(6):629-639.
- Peterson, A.V., K.A. Kealey, S.L. Mann, P.M. Marek, and I.G. Sarason. 2000. "Hutchinson Smoking Prevention Project: Long-term Randomized Trial in School-based Tobacco Use Prevention—Results on Smoking." *Journal of the National Cancer Institute* 92:1979-1991.
- Pollack, E.S., G.M. Franklin, D. Fulton-Kehoe, and R. Chowdhury. 1998. "Risk of Job-related Injury among Construction Laborers with a Diagnosis of Substance Abuse." *Journal of Occupational and Environmental Medicine* 40:573-577.
- Powers, R.A. 1998. "Substance Abuse." In *Clinical Child Psychiatry*, W.M. Klyklo, J. Kay, and D. Rube, eds., pp. 230-262. Philadelphia: W.B. Saunders Company.
- Resnick, M.D., P.S. Bearman, R.W. Blum, K.E. Bauman, et al. 1997. "Protecting Adolescents from Harm: Findings from the National Longitudinal Study on Adolescent Health." *Journal of the American Medical Association* 278(10):823-832.
- Roebuck, M.C., M.T. French, and M.L. Dennis. 2003. "Adolescent Marijuana Use and School Attendance." Unpublished working paper.
- Schinke, S., P. Brounstein, and P. Gardner. 2002. *Science-Based Prevention Programs and Principles*. Rockville, MD: Center for Substance Abuse Prevention, Substance Abuse and Mental Health Administration, U.S. Department of Health and Human Services.
- Schulenberg, J., J.L. Maggs, K.J. Steinman, and R.A. Zucker. 2001. "Development Matters: Taking the Long View on Substance Abuse Etiology and Intervention during Adolescence." In *Adolescents, Alcohol, and Substance Abuse; Reaching Teens through Brief Interventions*, P.M. Monti, S.M. Colby, and T.A. O'Leary, eds., pp. 19-57. New York: Guilford Press.
- Shain, M., and H. Suurvali. 2003. "Lay and Scientific Perspectives on Harm Prevention: Enabling Theory and Program Innovation." In *Workplace Substance Abuse Prevention: Beyond Drug Testing to Wellness*, J.B. Bennett and W.E.K. Lehman, eds., pp. 203-226. Washington, DC: American Psychological Association.
- Smith, G.T., and K.G. Anderson. 2001. "Personality and Learning Factors Combine to Create Risk for Adolescent Problem Drinking: A Model and Suggestions for Intervention." In *Adolescents, Alcohol, and Substance Abuse; Reaching Teens through Brief Interventions*, P.M. Monti, S.M. Colby, and T.A. O'Leary, eds., pp. 109-141. New York: Guilford Press.
- Snow D.L., S.C. Swan, and L. Wilton. 2003. "A Workplace Coping-Skills Intervention to Prevent Alcohol Abuse." In *Workplace Substance Abuse Prevention: Beyond Drug Testing to Wellness*, J.B. Bennett and W.E.K. Lehman, eds., pp. 57-96. Washington, DC: American Psychological Association.
- Substance Abuse and Mental Health Services Administration (SAMHSA). 2002. *Results from the 2001 National Household Survey on Drug Abuse: Volume I. Summary of National Findings*. Office of Applied Studies, NHSDA Series H-17, DHHS Publication No. SMA 02-3758. Rockville, MD: SAMHSA.

- Swadi, H. 1999. "Individual Risk Factors for Adolescent Substance Abuse." *Drug and Alcohol Dependence* 55:209-224.
- Taylor, J., S. Malone, W.G. Iacono, and M. McGue. 2002. "Development of Substance Dependence in Two Delinquency Subgroups and Nondelinquents from a Male Twin Sample." *Journal of the American Academy of Child & Adolescent Psychiatry* 41(4):386-393.
- Tobler, N.S. 1986. "Meta-Analysis of 143 Adolescent Drug Prevention Programs: Quantitative Outcome Results of Program Participants Compared to a Control or Comparison Group." *Journal of Drug Issues* 16(4):537-567.
- Tobler, N.S., and H.H. Stratton. 1997. "Effectiveness of School-Based Drug Prevention Programs: A Meta-Analysis of the Research." *Journal of Primary Prevention* 18:71-128.
- U.S. Department of Labor. 1997. *The Aging Baby Boom: Implications for Employment and Training Programs*. U.S Department of Labor, Employment and Training Administration. *Policy and Research Publications Online Reports*. <<http://wdr.doleta.gov/opr/fulltext/document.asp?docn=5895>>.
- Valois, R.F., A.C. Dunham, K.L. Jackson, and J. Waller. 1999. "Association between Employment and Substance Abuse Behaviors among Public High School Adolescents." *Journal of Adolescent Health* 25:256-263.
- Weinberg, N.Z., E. Rahndert, J.D. Colliver, and M.D. Glantz. 1998. "Adolescent Substance Abuse: A Review of the Past 10 Years." *Journal of the American Academy of Child & Adolescent Psychiatry* 37(3):252-261.
- Wu, L.T., W.E. Schlenger, and D.M. Galvin. 2003. "The Relationship between Employment and Substance Use among Students Aged 12 to 17." *Journal of Adolescent Health* 32:5-15.
- Yamada, T., M. Kendix, and T. Yamada. 1996. "The Impact of Alcohol Consumption and Marijuana Use on High School Graduation." *Health Economics* 5:77-92.