



ALCOHOL AND MARIJUANA USE AMONG RURAL YOUTH: INTERACTION OF SOCIAL AND INTRAPERSONAL INFLUENCES

GILBERT J. BOTVIN,* ROBERT G. MALGADY,† KENNETH W. GRIFFIN,*
LAWRENCE M. SCHEIER,* and JENNIFER A. EPSTEIN*

*Cornell University Medical College; and †New York University

Abstract — Epidemiological research indicates that the prevalence rate of drug use among adolescents has risen steadily during this decade, and although alcohol use has stabilized it is still highly prevalent. Psychosocial etiological models have typically examined main effects of risk and protective factors. This study examined moderating effects of intrapersonal skills on social (peer and parental) risks associated with alcohol and marijuana use among eighth-grade rural adolescents, an understudied population. Results indicated that the relationships of peer and parental attitudes, and peer usage to alcohol and marijuana use, are moderated by adolescents' decision-making and self-reinforcement skills. Social risk factors were strongly associated with increased alcohol and marijuana use among adolescents with poor intrapersonal skills. However, good decision-making and self-reinforcement skills diminished the influence of social risk factors on substance use. Results are discussed in terms of implications for psychosocial models of alcohol and drug use, and for designing effective school-based universal prevention interventions. © 1998 Elsevier Science Ltd

After a downward trend in drug use among American youth in the 1980s, the present decade is witnessing a spiraling resurgence of drug use. Data from the Monitoring the Future Study indicate that, nationally, illicit drug use has risen every year since 1991, with the largest increases among eighth graders (Johnston, O'Malley, & Bachman, 1995). Among this group of youth, illicit drug use over the prior 12 months has nearly doubled since 1991 (from 11% to 21%), and marijuana use has nearly tripled (from 6% to 16%). During the past 5 years alcohol use among eighth graders has remained stable, but nonetheless is alarming with 55% lifetime and 46% annual prevalence rates reported (Johnston et al., 1995).

The onset and early progression of alcohol and drug use often occur during adolescence. For many youth, involvement with psychoactive substances is episodic and limited to brief periods of experimentation. However, for some adolescents, trials with alcohol, marijuana, or other drugs eventuate a pathway into compulsive patterns of usage promoting both psychological and physical dependence. The use of psychoactive substances during late childhood and adolescence can lead to academic, social, and emotional problems, and high risk behavior, thus impairing adaptive psychosocial development. Sustained substance use into adulthood can lead to severe physical health, psychological, financial, legal, and interpersonal problems (Newcomb & Bentler, 1988). Moreover, in recent years growing concern has arisen about the comorbid association of alcohol and drug use with both HIV-transmission (Botvin & Dusenbury, 1992; Grossman, 1996), largely through drug injection and increased sexual promiscuity, and with violence (Botvin & Scheier, 1996).

This research was supported by funds from the National Heart, Lung, and Blood Institute (Grant No. HL33865) and the New York State Division of Substance Abuse Services (Grant No. NYS-C001531).

Requests for reprints should be sent to Gilbert J. Botvin, Cornell University Medical College, 411 East 69th St., New York, NY 10021.

Etiological research suggests that both alcohol and drug use are influenced by a complex array of cognitive, attitudinal, social, personality, pharmacological, and developmental factors (Millman & Botvin, 1992). In an effort to understand better the causes of substance use and how to develop effective prevention intervention, these etiological factors have been organized into theoretical models of risk and protective factors (e.g., Hawkins, Catalano, & Miller, 1992). An important role has been assigned to intrapersonal factors, such as decision-making skills, self-reinforcement, and self-control, in determining vulnerability to social influences to engage in alcohol and drug use (e.g., Botvin, 1995; Jessor & Jessor, 1977).

Perhaps because of the complexity of risk and protective factors that have been amalgamated into etiological models of substance use, there has been an emphasis on testing main effects models. However, main effects are usually uninterpretable in the presence of interaction or moderator effects (Winer, 1971). Because little is known about moderator effects in etiological models of alcohol and drug use, one purpose of this study was to determine whether intrapersonal protective factors (decision-making skills, self-reinforcement, self-control) moderate the relationships of social risk factors (peer and parental attitudes, friends' substance use) to alcohol and drug use.

Another gap in the substance use literature is that most research has focused on either urban or suburban populations, while relatively little attention has been paid to rural populations (e.g., Conger & Elder, 1994; Spoth & Redmond, 1996). There is a compelling need for research on rural youth (e.g., Substance Abuse and Mental Health Services Administration, 1996), a population in which alcohol and drug use are on the rise (e.g., Iowa Department of Education, 1994). Further, it is unclear to what extent current etiological models of substance use are generalizable to rural populations. Therefore, the second purpose of this study was to identify risk and protective factors of alcohol and drug use, and their interactions, among rural adolescents.

METHODS

Participants

The sample consisted of 1,171 adolescents recruited from 56 schools in middle-class districts in three rural geographic regions of New York State, as defined by U.S. Census Bureau Zip codes. Students were recruited through passive-consent procedures, and the research protocol was approved by the Institutional Review Board at Cornell University Medical College. The sample was 52% male, 91% non-Hispanic White, and 83% lived in nuclear households. About one-third of the students' parents were college educated. The mean age of the adolescents was 12.59 years ($SD = .93$). By and large, the students were achieving well in school, with 91% reportedly earning mostly B's and A's.

Instrumentation

Students were administered a questionnaire regarding their demographic background, personal alcohol and marijuana use, peer and parental attitudes, peer usage, social and intrapersonal skills. The substance-use questions were: How often (if ever) do you get drunk? How often (if ever) do you drink? How much (if at all) do you usually drink each time you drink? How often (if ever) do you usually smoke marijuana? The frequency questions were measured on a 9-point scale ranging from "don't drink" to "more than once a day;" the quantity question was measured on a 6-point scale, ranging from "don't drink" to "more than 6 drinks." Parallel sets of questions were

also included pertaining to their friends' frequency and quantity of usage of alcohol, and frequency of marijuana use. These questions have been used in previous studies of adolescent alcohol and drug use (e.g., Botvin, Baker, Dusenbury, Tortu, & Botvin, 1990).

Questionnaires also included an array of scales measuring psychosocial risk and protective factors depicted in Botvin's (1995) etiological model of substance use. Risk factors within the domains of peer and parental influence, and protective factors within the domain of intrapersonal skills, are described in Table 1. Two questions from Botvin et al. (1995) assessed the number of students' friends who use alcohol and marijuana (i.e., "How many of your friends drink alcohol?" "How many of your friends smoke marijuana?"). These questions were rated on 5-point scale from "none" to "almost all." Friends and parental attitudes toward alcohol use (10 items) and marijuana use (11 items) were assessed by parallel scales adapted from the *Teenager's Self Test: Cigarette Smoking* (U.S. Public Health Service, 1974). Responses were measured on a 5-point scale, ranging from "strongly agree" to "strongly disagree." Total scores were scaled such that a high score represented a favorable or permissive attitude toward alcohol or drug use. Internal consistency for the attitude scales ranged from $\alpha = .73-.78$. One of the scales measuring intrapersonal factors consisted of the 7-item decision-making scale developed by Wills (1986), rated from "never" to "almost always." Total scores were scaled such that a high score reflected the use of sound decision-making skills (e.g., "When I have a problem I get information that is needed to deal with the problem"). Alpha reliability of the Wills decision-making scale was .82.

Another intrapersonal scale was the 8-item self-reinforcement scale developed by Rosenbaum (1980), rated on a 5-point scale from "never true" to "almost always true." Total scores were scaled such that a high score reflected the use of an adaptive self-reinforcement strategy (e.g., "When I am worried about something, I try to keep myself busy with things that I like"). Alpha reliability of the Rosenbaum self-reinforcement scale was .85. The final scale measuring intrapersonal factors was the 10-item Kendall & Wilcox (1979) self-control scale, rated on a 5-point scale from "strongly disagree" to "strongly agree." Total scores were scaled such that a high score reflected a high degree of self-control (e.g., "When I have to wait in line, I do it patiently"). Alpha reliability of the Kendall-Wilcox self-control scale was .77.

Table 1. Social and intrapersonal predictors of alcohol and marijuana use

Domain	Scale/Question
Peer	(1) Favorableness of friends' attitude toward drinking (adapted from Teenagers' Cigarette Smoking; U.S. Public Health Service, 1974)
	(2) Favorableness of friends' attitude toward marijuana (adapted from Teenagers' Cigarette Smoking; U.S. Public Health Service, 1974)
	(3) Number of friends' who drink (Botvin et al., 1990)
	(4) Number of friends' who use of marijuana (Botvin et al., 1990)
Parental	(1) Permissiveness of parents' attitude toward drinking (adapted from Teenagers' Cigarette Smoking; U.S. Public Health Service, 1974)
	(2) Permissiveness of parents' attitude toward marijuana (adapted from Teenagers' Cigarette Smoking; U.S. Public Health Service, 1974)
Intrapersonal	(1) Decision making (Wills, 1986)
	(2) Self-reinforcement (Rosenbaum, 1980)
	(3) Self-control (Kendall & Wilcox, 1979)

Procedures

Participants were administered questionnaires in their classrooms by trained research assistants. To enhance the validity of self-reported substance-use data, breath samples were collected following the recommendations of Evans, Hansen, and Mittlemark (1977).

Because of the length of the questionnaire, which had to be administered in a single 50-minute class period, not all scales/questions could be compiled into a single instrument. Therefore, using matrix sampling (Torgerson, 1958) three forms of overlapping questionnaires were randomly administered across schools.

R E S U L T S

Prevalence of alcohol and marijuana use

Self-reported rate of monthly drinking was higher (24.7%) than monthly marijuana use (3.7%). There were moderate levels of comorbid behavior in frequency ($r = .44$, $p < .001$) and quantity ($r = .38$, $p < .001$) of alcohol and marijuana consumption. However, there was a significant difference (Fisher's r to z transformation¹ = 3.28, $p < .01$) in comorbid behaviors with regard to quantity of consumption among boys ($r = .51$, $p < .001$) compared to girls ($r = .18$, $p < .02$).

Regression analyses: Main effects models

The four alcohol and marijuana use behaviors were regressed on the set of risk and protective factors across domains. As a result of matrix sampling and listwise deletion of missing data, the multiple regression analyses were based on $Ns = 197$ – 200 subjects. Because there were four outcome measures, a Bonferroni protection against inflation of Type I error was used to test the significance of overall R^2 values and increments in R^2 due to interaction effects.

Frequency of drunkenness. Frequency of drunkenness was significantly related to the model's array of risk and protective factors shown in Table 1 ($R^2 = .48$, $p < .01$). Number of friends who drink ($\beta = .32$, $p < .001$) and who smoke marijuana ($\beta = .27$, $p < .001$), and parental attitude toward drinking ($\beta = .13$, $p < .02$) significantly predicted increased frequency of drunkenness. Self-control significantly countered these influences ($\beta = -.14$, $p < .03$); good self-control was associated with a decrease in frequency of drunkenness.

Quantity of drinking. A similar pattern was evident in the multiple-regression analysis of quantity of alcohol consumption ($R^2 = .43$, $p < .01$). Significant factors associated with increased risk were number of friends who drink ($\beta = .28$, $p < .001$) and who smoke marijuana ($\beta = .26$, $p < .002$), and friends attitudes toward drinking ($\beta = .19$, $p < .02$). Once again, self-control was a significant protective factor ($\beta = -.16$, $p < .02$), negatively associated with quantity of drinking.

Frequency of drinking. Substantially greater variance in frequency of drinking was explained by the model ($R^2 = .61$, $p < .01$). Significant risk factors were number of

¹Fisher's r to z transformation (Winer, 1971) was applied to the correlation of alcohol and marijuana consumption in order to test the significance of the difference between the correlations for boys and girls. The z -transformation was derived by Fisher to normalize the sampling distribution of r , which is hyperbolic for nonzero values of the parameter.

friends who drink ($\beta = .35, p < .001$) and who smoke marijuana ($\beta = .22, p < .001$), followed by parental attitude toward drinking ($\beta = .16, p < .002$). Self-control ($\beta = -.12, p < .03$) was associated with decreased frequency of drinking.

Frequency of smoking marijuana. Frequency of marijuana use was also highly predictable ($R^2 = .64, p < .01$). Significant risk factors included number of friends who drink ($\beta = .14, p < .04$) and who smoke marijuana ($\beta = .47, p < .001$), parental attitude toward marijuana ($\beta = .33, p < .001$) and friends attitude toward marijuana ($\beta = .12, p < .05$). There were no significant main effects of protective factors.

Regression analysis: Interaction effects models

Median splits were conducted on the intrapersonal protective factors, which were then dummy-coded (0 = below median; 1 = above median), and product variables were formed with peer and parental influence risk factors. Product variables were tested for significance in a series of hierarchical multiple-regression models, following main effects; when they were significant, simple multiple-regression analyses were conducted within low and high groups. This enabled a comparison of separate semi-partial standardized regression coefficients (betas) between groups. Significant interactions involving decision-making skills are shown in Table 2, and significant interactions involving self-reinforcement skills are shown in Table 3.

Interactions with decision-making skills. With respect to frequency of getting drunk, decision-making skill had a significant interaction effect ($p < .01$) with number of friends who use marijuana. Among adolescents with good decision-making skills, there was a significant negative relationship ($\beta = -.32, p < .05$) between peer usage and frequency of drunkenness. However, among adolescents with poor decision-making skills, there was a significant positive relationship ($\beta = .33, p < .01$) such that friends' usage was associated with increased frequency of being drunk. Thus, decision-making skills appear to reverse strong peer influences on alcohol abuse. Within groups, there was somewhat higher amounts of variance explained ($R^2s = .54-.56, ps < .01$) compared to the main effects regressions for the full sample.

Similar results appeared in the analysis of quantity of drinking. A significant ($p < .01$) interaction was shown between decision-making skill and number of friends using marijuana. Among adolescents with good decision-making skills, friends' usage had a negative relationship to quantity ($\beta = -.33, p < .05$), whereas those with poor deci-

Table 2. Interactions of peer use and self-control \times decision-making skill on alcohol use

Alcohol Use	Decision-making \times peer use		Decision-making \times self-control	
	β	p	β	p
Frequency Drunk				
Below Median	.33	.01		
Above Median	-.32	.05		
Drinking Quantity				
Below Median	.37	.01	-.10	<i>ns</i>
Above Median	-.33	.05	-.40	.01

Note. Beta coefficients for adolescents above and below the decision-making skill median ($Ns = 197-200$).

sion-making skills evidenced a positive relationship ($\beta = .37, p < .01$) with peer influence associated with increased quantity of drinking. Moreover, decision-making skills also interacted with self-control ($p < .01$). Adolescents with good decision-making skills had a negative relationship ($\beta = -.40, p < .01$) between self-control and usage. In contrast, no significant relationship existed between self-control skills and quantity of drinking ($\beta = -.10, p < .05$) for adolescents with poor decision-making skills. Thus, self-control is a significant protective factor impacting on drinking behavior, but only if coupled with good decision-making skills. Alcohol consumption was somewhat more predictable in the poor decision-making skills group ($R^2 = .66, p < .01$) compared to the more skilled group ($R^2 = .55, p < .01$). There were no interaction effects in the analyses of frequency of drinking or marijuana use.

Interactions with self-reinforcement skills. With respect to frequency of drunkenness, although there was no interaction effect between peer drinking and self-reinforcement skill, the comorbid effect of peer marijuana use interacted significantly ($p < .01$) with self-reinforcement skill. Among adolescents less skilled in self-reinforcement, peer use of marijuana was the strongest predictor of drunkenness ($\beta = .40, p < .001$). However, adolescents more highly skilled in self-reinforcement benefited such that peer influence ($\beta = -.10, p < .05$) was not a significant risk factor. The percentage of variance explained was similar across the two groups (R^2 s = .54–.58, $ps < .01$).

Quantity of drinking was more strongly affected by the moderation of comorbid peer marijuana use by self-reinforcement skill. Among adolescents with less self-reinforcement skill, friends' usage of marijuana was the strongest predictor of quantity of drinking ($\beta = .45, p < .001$). In contrast, there was a significant negative relationship between peer usage and drinking among adolescents with good self-reinforcement skills ($\beta = -.27, p < .05$). Thus, self-reinforcement was not merely a protective factor, but actually reversed the risk associated with peer influence. Within groups, quantity of drinking was somewhat more predictable for those with low self-reinforce-

Table 3. Interactions of social influences \times self-reinforcement skill on alcohol and marijuana use

Substance Use	Self-reinforcement \times peer use ^a		Self-reinforcement \times peer attitudes	
	β	<i>p</i>	β	<i>p</i>
Frequency Drunk				
Below Median	.40	.001		
Above Median	-.10	<i>ns</i>		
Drinking Quantity				
Below Median	.45	.001		
Above Median	-.27	.05		
Drinking Frequency				
Below Median	.23/.46 ^a	.01/.001 ^a		
Above Median	-.05/.21 ^a	<i>ns</i> /.01 ^a		
Frequency of Marijuana				
Below Median	.45	.001	.20	.05
Above Median	-.27	.05	-.16	<i>ns</i>

Note. Beta coefficients for adolescents above and below the self-reinforcement skill median (N s = 197–200).

^aPeer marijuana use/peer drinking.

ment skills ($R^2 = .57, p < .01$) compared to adolescents with high self-reinforcement skills ($R^2 = .46, p < .01$).

The interaction between peer influences (both drinking and smoking marijuana) and self-reinforcement skill impacted on frequency of drinking. Among adolescents with poor self-reinforcement skills, number of friends drinking ($\beta = .46, p < .001$) and number of friends using marijuana ($\beta = .23, p < .01$) were the most salient risk factors. In contrast, among adolescents with good self-reinforcement, the effect of peer drinking was diminished ($\beta = .21, p < .01$) and the effect of peer marijuana use was eradicated ($\beta = -.05, p < .05$). Frequency of drinking was about equally predictable in both groups (R^2 s = .63-.69, $ps < .01$).

In terms of frequency of marijuana use, self-reinforcement skill was a significant moderator ($p < .05$) of the impact of peer attitudes toward smoking marijuana on usage. There was a significant relationship between attitudes and usage ($\beta = .20, p < .05$) among the group low in self-reinforcement skill, such that permissive attitudes were associated with increased frequency of marijuana usage. Conversely, no relationship was shown between peer attitudes and marijuana usage ($\beta = -.16, p < .05$) in the group high in these skills. A greater percentage of variance was explained in the high-skills group ($R^2 = .61, p < .01$) than in the low-skills group ($R^2 = .52, p < .01$).

DISCUSSION

The self-reported rate of monthly drinking among rural youth surveyed in the present study (24.7%) is nearly double the rate (13.3%) reported in the National Household Survey (U.S. Department of Health and Human Services, 1995). Although research on substance use in rural populations is limited, this finding is consistent with another recent epidemiological study reporting a rate of monthly drinking among rural sixth to twelfth graders as high as 38%, nearly three times the national estimate (Iowa Department of Education, 1994). Conversely, the increased prevalence of drinking in rural populations is countered by a lower rate of marijuana use, estimated at about one-half to one-third in the present study (3.7%) compared to national surveys (Johnston et al., 1995). In the National Household Survey (U.S. Department of Health and Human Services, 1995), results also indicated lower rates of marijuana usage in "non-metropolitan" areas. Thus, findings from these limited sources suggest that alcohol consumption, rather than marijuana smoking, should be the primary target of prevention interventions in rural schools.

Botvin's (1995) psychosocial model of domains of risk and protective factors appears to explain substantial portions of variance in both the quantity and frequency of alcohol and marijuana use. The strongest direct effects are due to peer influences (number of friends engaging in substance-use behaviors), peer and parental attitudes toward substance use, and to a lesser degree adolescents' self-control.

These findings support research testing the efficacy of prevention intervention strategies based on this psychosocial model (e.g., Botvin, 1982; Botvin & Dusenbury, 1987; Botvin & Tortu, 1988). Accordingly, substance use is the outcome of the interplay between social and intrapersonal factors, and much like other social behaviors, it is learned through a process of modeling, imitation, and reinforcement. The interaction effects found in the present study suggest that the strengths of social models in the adolescents' environment, largely peers and parents, are moderated by intrapersonal factors such as one's decision-making skills and capacity for self-reinforcement. These findings suggest that peer and parental influences contribute directly and strongly to

vulnerability to substance use; however, significant intrapersonal dynamics can often attenuate the effects of social risk factors.

Both the importance of sound decision-making skills and the improvement of such skills have been emphasized since the early statistical work of Meehl (1954/1996). Related literature has linked decision-making skills to self-efficacy and personal growth (Whiston, 1996); strategic organizational behavior (Kline, 1996); and to sexual behavior and improvement of AIDS-prevention strategies (Finkelstein & Brannick, 1997). Consistent with the interactions between decision-making skills and peer and parental influences in the present study, Wilks (1986) similarly has shown that adolescent decision making is influenced by peer and parental frames of reference. However, the relative importance of peer versus parental influences varies by the situational context in which decision making takes place. While parents exert greater influence on educational and vocational decisions, peer are more influential in social decision making, such as dating or drinking (Wilks, 1986).

Results of the present study have important implications for developing more effective approaches to the prevention of tobacco, alcohol, and illicit drug use. Although these results indicate that intrapersonal factors appear to be relatively weak direct predictors of substance use, their strong moderating influences of social risk factors support the need for prevention approaches that include a focus on intrapersonal factors such as decision making and self-reinforcement. Thus, the influence of intrapersonal protective factors on reducing, and even reversing, the effects of social risks for substance use suggests that the most effective prevention approaches are likely to be ones that target both interpersonal and intrapersonal actors related to adolescent substance use. Additional research is needed to determine the generalizability of these findings to other populations.

REFERENCES

- Botvin, G. J. (1982). Broadening the focus of smoking prevention strategies. In T. Coates, A. Peterson, & C. Perry (Eds.), *Promoting adolescent health: A dialogue on research and practice* (pp. 137-147). New York: Academic Press.
- Botvin, G. J. (1995). Principles of prevention. In R. H. Coombs & D. Ziedonis (Eds.), *Handbook on drug abuse prevention* (pp. 19-44). Needham, MA: Allyn & Bacon.
- Botvin, G. J., Baker, E., Dusenbury, L., Tortu, S., & Botvin, E. (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.
- Botvin, G. J., & Dusenbury, L. (1987). Life skills training: A psychoeducational approach to substance abuse prevention. In C. A. Maher & J. E. Zins (Eds.), *Psychoeducational interventions in schools: Methods and procedures for enhancing student competence* (pp. 46-65). New York: Pergamon Press.
- Botvin, G. J., & Dusenbury, L. (1992). Substance abuse prevention: Implications for reducing HIV infection. *Psychology of Addictive Behaviors*, *6*, 70-80.
- Botvin, G. J., & Scheier, L. (1996). Preventing adolescent drug abuse and violence. In D. Wilson, J. Rodriguez, & W. Taylor (Eds.), *Adolescent health promotion in minority populations*. Washington, DC: American Psychological Association.
- Botvin, G. J., & Tortu, S. (1988). Preventing adolescent substance abuse through life skills training. In R. H. Price, E. L. Cowen, R. P. Lorion, & J. R. McKay (Eds.), *Fourteen ounces of prevention: A casebook for practitioners* (pp. 98-110). Washington, DC: American Psychological Association.
- Conger, R. D., & Elder, G. H. (1994). *Families in troubled times: Adapting to change in rural America*. New York: Aldine de Gruyter.
- Evans, R. I., Hansen, W. B., & Mittlemark, M. B. (1977). Increasing the validity of self-reports of smoking behavior in children. *Journal of Applied Psychology*, *62*, 521-523.
- Finkelstein, M. A. & Brannick, M. T. (1997). Making decisions about sexual intercourse: Capturing college students' policies. *Basic and Applied Social Psychology*, *19*, 101-120.
- Grossman, A. H. (1996). The challenges of HIV/AIDS education and training for social workers and other mental health professionals. *National Social Work Aids Network Reading and Writings*, *1*, 17-28.
- Hawkins, J. D., Catalano, R. F., & Miller, J. Y. (1992). Risk and protective factors for alcohol and other

- drug problems in adolescence and early adulthood: Implications for substance abuse prevention. *Psychological Bulletin*, **112**, 64–105.
- Iowa Department of Education. (1994). *The 1994 Iowa Youth Survey: Normative and trend data*. Des Moines, IA: Author.
- Jessor, R., & Jessor, S. L. (1977). *Problem behavior and psychosocial development: A longitudinal study of youth*. New York: Academic Press.
- Johnston, L. D., O'Malley, P. M., & Bachman, J. G. (1995). *National survey results on drug use from the Monitoring the Future Study, 1975–1993: Vol. I. Secondary school students*. Rockville, MD: U.S. Department of Health and Human Services.
- Kendall, P. C., & Wilcox, L. E. (1979). Self-control in children: Development of a rating scale. *Journal of Consulting and Clinical Psychology*, **47**, 1020–1029.
- Kline, T. J. B. (1996). Refinement and evaluation of the Decision-Making Questionnaire. *Psychological Reports*, **78**, 151–162.
- Meehl, P. E. (1996). *Clinical versus statistical prediction: A theoretical analysis and review of the literature*. Northvale, NJ: Jason Aronson. (Original work published 1954)
- Millman, R. B., & Botvin, G. J. (1992). Substance use, abuse, and dependence. In M. Levine, N. B. Carey, A. C. Crocker, & R. T. Gross (Eds.), *Developmental-behavioral pediatrics* (2nd ed., pp. 451–467). New York: W. B. Saunders.
- Newcomb, M. D., & Bentler, P. M. (1988). *Consequences of adolescent drug use: Impact on lives of young adults*. New York: Sage.
- Rosenbaum, M. (1980). Schedule for assessing self-control behaviors. *Behavior Therapy*, **11**, 109–121.
- Spoth, R., & Redmond, C. (1996). Illustrating a framework for rural prevention research: Project Family studies of rural family participation and outcomes. In R. Peters & R. McMahon (Eds.), *Childhood disorders, substance abuse, and delinquency: Prevention and early intervention approaches*. Newbury Park, CA: Sage.
- Substance Abuse and Mental Health Services Administration. (1996). *Request for proposals: Predictor variables by developmental stage*. Rickville, MD: Author.
- Torgerson, W. S. (1958). *Theory and methods of scaling*. New York: Wiley.
- U.S. Department of Health and Human Services. (1995). *National household survey on drug abuse: Population estimates 1994* (DHHS Publication No. (SMA) 95-3063). Rockville, MD: Office of Applied Studies, Substance Abuse, and Mental Health Services Administration.
- U.S. Public Health Service. (1974). *Teenagers' self-test: Cigarette smoking* (DHEW Publication No. CDC 74-8723). Bethesda, MD: U.S. Department of Health, Education, and Welfare, National Clearing House for Smoking and Health.
- Whiston, S. C. (1996). The relationship among family interaction patterns and career indecision and career decision-making self-efficacy. *Journal of Career Development*, **23**, 137–149.
- Wilks, J. (1986). The relative importance of parents and friends in adolescent decision making. *Journal of Youth and Adolescence*, **15**, 323–334.
- Wills, T. A. (1986). Stress, coping, tobacco and alcohol use in early adolescence. In S. Shiffman & T. A. Wills (Eds.), *Coping and substance use* (pp. 67–94). New York: Academic Press.
- Winer, B. J. (1971). *Statistical principles in experimental design*. New York: McGraw-Hill.