Relations of Social Skills, Personal Competence, and Adolescent Alcohol Use:
A Developmental Exploratory Study

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Findings from school-based drug prevention interventions indicate that social skills and personal competence are an effective barrier against adolescent alcohol use. Efficacious and competent youth are hypothesized to possess skills to reduce offers for alcohol and invoke alternative strategies that offset peer pressure. To understand these developmental relations, a longitudinal model that specified effects of early alcohol use on later social skills and competence and their recursive influences was tested using data obtained from a cohort of nontreatment youth participating in a drug abuse prevention trial. Social skills, personal competence, and consumption were temporally stable from the 8th through 10th grade. Early competence predicted lowered alcohol use, whereas social skills were associated with greater subsequent alcohol use. Social influence risk moderated the competence-consumption relations, underscoring the close developmental interplay between social context and intrapersonal risk. Findings are discussed in terms of cognitive-behavioral strategies to effectively reduce alcohol use.

Adolescence is a period of heightened risk for initiation to alcohol and other drugs (Barnes & Welte, 1986; Kandel & Logan, 1984; Newcomb & Bentler, 1986). Epidemiological data show that during adolescence, alcohol is usually the first illicit substance used, the drug most prevalently used, and is associated progressively with other illicit drug use (Ellickson, Hays, & Bell, 1992; Kandel & Faust, 1975). Annual surveys conducted nationwide that monitor youthful drug use show that in recent years greater numbers of youth reported

having tried alcohol, having drank intensely (five or more drinks on one occasion), or having been drunk. For example, prevalence estimates obtained from national surveys of secondary school students indicate that slightly more than one-half of 8th graders have tried alcohol, and one in every four reported having a drink in the past 30 days, whereas 8.7% reported having been drunk in the past 30 days. Trends for 10th graders for the same behaviors are even more extreme (71%, 39%, and 31%, respectively), underscoring the increased prevalence of alcohol users during such a short time period (Johnston, O'Malley, & Bachman, 1995).

Because of the debilitating effects of alcohol both on the person and society and the great costs associated with treatment and prevention of alcohol abuse (Department of Health and Human Services, 1993), it seems imperative to develop a more complete understanding of the etiologic determinants that precipitate early-stage alcohol use. By all accounts, prevention of early-stage alcohol use can limit or forestall use of other illicit drugs and also reduce morbidity and mortality often associated with chronic alcohol use.

Among a wide variety of precursors and correlates, deficits in social skills and poor competence have been implicated as central causes of adolescent alcohol and drug use (Botvin & Botvin, 1992; Hawkins, Catalano, & Miller, 1992; Petraitis, Flay, & Miller, 1995). Guided by theoretical concerns and an accumulation of empirical data, school-based substance use prevention programs have responded with specific intervention strategies aimed at fostering drug-specific refusal skills (Pentz [1985] has referred to this component as *refusal efficacy* and Petraitis et al. [1995] have used the term *refusal self-efficacy*) that specifically address building resilience to peer influences for drug use. Multimodal or generic prevention programs augment social resistance skills by teaching students general social skills (e.g., assertiveness), along with problem-solving, decision making, and cognitive strategies (i.e., self-statements) that promote feelings of self-worth and self-esteem. Both the immediate and long-term goals of these programs are to reduce motivations to use drugs, prepare youth to navigate the developmental tasks associated with adolescence, and provide alternatives (i.e., coping mechanisms) that will thwart social influences to use drugs (Botvin, 1983; Dusenbury & Botvin, 1992; Pentz, 1985).

Theoretical Foundations to Social and Personal Competence Programs

A strong theoretical foundation undergirding competence enhancement prevention programs originates from the Bandura (1977a, 1997b) self-efficacy model of human behavior. According to Bandura, people rely on

symbolic representations of how they perform a task and link those cognitive performance evaluations to perceived beneficial outcomes. During sustained periods, and when beneficial outcomes repeatedly occur and result from personal effort and persistence, a motivational framework is established that links effort, behavior, and response outcome to the self. In this manner, a cognitive framework (efficacy expectation) is established that fosters a "conviction that one can successfully execute the behavior required to produce the outcomes" (Bandura, 1977a, p. 193). More specifically, Bandura believed that evaluation of personal mastery is a large factor in determining whether a person can cope with a particular (and potentially stressful) situation. According to this view, besides actual reinforcement operations, beliefs about efficacy also act as a potent form of reinforcement. Efficacy expectations that undermine perceived mastery diminish coping efforts or engagement in a task, whereas high levels of perceived competence effect positive contingencies that guide future action.

Many prevention strategies have relied on self-efficacy and social cognitive theory in an effort to mitigate a wide range of problem behaviors and developmental deficiencies. A principal component in most multimodal prevention studies has been the development of competencies (i.e., skills) and a sense of personal effectiveness that serve to ward off negative environmental influences (i.e., poverty) or promote well-being through enhanced skill acquisition and implementation. This approach logically is consistent with the assumptions of self-efficacy theory, which asserts that "perceived efficacy entails versatile execution of cognitive and manual skills" (Bandura, 1978, p. 241).

Among the many current examples of prevention strategies that have incorporated elements of self-efficacy theory, the Kumpfer social ecology model of adolescent drug use integrates components that address self-efficacy framed within the context of school and family influences (Kumpfer & Turner, 1990). Likewise, the social developmental model (Hawkins & Weis, 1985) and related efforts aimed at reducing delinquency and antisocial behavior (Kazdin, Esveldt-Dawson, French, & Unis, 1987), aggression (Lochman, 1992), high-risk sexual behavior (Basen-Engquist & Parcel, 1992), and peer rejection (Bierman & Furman, 1984; Ladd, 1981) all have relied on improving social or personal competence skills as an effective means of inducing behavioral change. Additional studies have confirmed the utility of positive self-efficacy and social competence as an important ingredient to later resilience (Battistich, Elias, & Branden-Muller, 1992; Garmezy, Masten, & Tellegen, 1984; Luthar, 1995), protection against psychopathology (Luthar & Zigler, 1991), and fostering academic success (Green, Forehand, Beck, & Vosk, 1980; Wentzel, 1991).

Importance of the Current Study

Despite the strength of theoretical insight and empirical findings related to self-efficacy theory, there is a paucity of empirical knowledge that addresses the etiologic significance and developmental relations among social skills, personal competence, and alcohol use. This may be an unfortunate oversight for several reasons. First, with few exceptions, evaluations of large-scale school and community-based prevention efforts primarily have examined pre- and postbehavioral differences as a means of evaluating program efficacy. Although this is an essential requirement in the evaluation of prevention field trials, much less attention has been paid to the role of hypothesized mediating mechanisms that are considered the *causal agents of change*.[1] To better understand the possible mechanisms through which these programs affect behavior, it is necessary to examine the etiologic relations between competence, skills, and alcohol use.

A second and equally compelling reason to examine these risk processes in the early adolescent period pertains to the heightened vulnerability associated with this age. Adolescence is a time of increasing psychosocial growth in which many youth struggle with identity issues (Erikson, 1968), experience changes in their peer group composition (Brown, 1990) and peer relations (Hartup, 1970), and experience disruption related to school transitions (Compas & Wagner, 1991; Larson & Ham, 1993), cognitive growth (Keating, 1990), and rapid physical and pubertal change (Lerner & Foch, 1987). The combined effects of these age- and stage-related changes can heighten stress, induce feelings of inadequacy, and provide a basis for emotional strain. Researchers have shown that emotional distress, in particular, predicts well both to alcohol and other illicit drug use (Labouvie, 1986a, 1986b), underscoring the heightened vulnerability associated with this age period. Moreover, competence and social skills are changing rapidly during this life period, and it is important to gain a more refined understanding of whether precocious alcohol use retards acquisition of these requisite cognitive and social skills.

In the current study, and using a two-wave cross-lagged panel design, a model was tested that examined the developmental relations between social skills, personal competence, and alcohol consumption. Measures of competence and social skills were obtained at two specified time points separated by two calendar years (assessments conducted in the 8th and 10th grades). One benefit of a longitudinal panel design is the ability to examine temporal precedence and make a time-limited determination of reciprocal influences. Because measures of consumption and skills are assessed repeatedly at equal intervals, it is possible to determine the durability and relative strengths of

their respective effects during a designated interval (Rogosa, 1979). In keeping with this methodology, one set of descriptive hypotheses included examining the consequences of 8th-grade alcohol use on 10th-grade competence and social skills. Lack of competence in several related areas of functioning also was hypothesized to be a major impetus to early-stage alcohol use. Consistent with a palliative coping model, paths from 8th-grade competence and social skills also were specified to subsequent alcohol consumption (Labouvie, 1986b). In addition, the use of a fixed-effect, repeated-measure design provided an opportunity to examine the stability of the psychosocial risk processes during an important developmental period. Specification of these stabilities is essential to estimate correctly the lagged effects (cf. Rogosa, 1979).

In addition to these considerations, the current study was designed to extend and refine previous research in several ways. First, in contrast to previous research that relied on a limited set of assertive skills (Pentz, 1985), an expanded set of social skills was tested, including social confidence (i.e., perceived social anxiety with respect to interpersonal situations), general social assertiveness, and social confrontation. These social skills represent a core set of social-cognitive processes that underlie social competence (Cavell, 1990) and can be assessed reliably with self-report methods (Cavell & Kelley, 1992).

Second, several measures of cognitive strategies were included to tap self-regulatory functions (i.e., self-statements) that facilitate greater self-control in anxiety-provoking situations, along with measures of decision-making skills (i.e., skills for evaluating potential solutions to problems), academic esteem, and perceived school abilities. Both the social skills and personal competence measures ostensibly reflect perceived self-efficacy and come closest to providing a psychometric basis to the theoretical components of the Bandura (1977a, 1997b) model.

Third, these developmental processes were examined in a larger sample than has been used in empirical studies to obtain greater precision in parameter estimation. Fourth, confirmatory factor analysis (CFA) was used to examine the factorial validity of the dimensions of social skills and personal competence. In contrast to more exploratory factor analytic methods, CFA procedures permit an explicit specification of how a set of observed measures are statistically "caused" by a hypothetical and unmeasured (latent) construct (Bentler, 1978). Additionally, based on classic psychometric methods that separately model true score variance and random measurement error variance, CFA procedures disaggregate construct level variance from measure-specific uniqueness. As a result, the final estimation of the associations among latent constructs is disattenuated for error. The theoretical model and

its postulated linkages subsequently are examined with respect to several goodness-of-fit indices (e.g., chi-square likelihood ratio) that determine statistically the plausibility of the a priori specifications (e.g., see Anderson & Gerbing, 1988, for a more detailed explanation of the benefits of CFA over exploratory factor analytic procedures for theory-testing applications).

Finally, both theory and research have indicated that youth who lack social skills and who experience low self-worth and poor self-esteem are more likely to succumb to peer influences to use alcohol and other drugs (Botvin, 1995; Kaplan, 1980; Stacy, Newcomb, & Bentler, 1992). In general, peers play an instrumental role in promulgating the initial stages of alcohol and other drug use (Ary, Tildesley, Hops, & Andres, 1993; Hansen et al., 1987).

According to Bandura (1977b), self-efficacy theory regards social influences as a primary source of learning, testing, and refining skills that can be obtained either vicariously or through direct modeling. Although evidence has accumulated supporting the strong etiological role of peers and related social factors (i.e., adult norms) in early-stage drinking, very little is known regarding the consistency of these effects or conditions that may ameliorate or offset social influences. Consistent with the theoretical work of Stacy et al. (1992), social pressures (i.e., peer influence) may be contingent on susceptibility (competence)—the latter of which can buffer the effects of peer pressure to use alcohol. Although models of this nature have been proposed conceptually, few studies have confirmed this notion empirically.

In addition to these conceptual issues, research on social influences and related conditions of vulnerability has shown that a multiple risk factor approach predicts well to initial and subsequent alcohol and other drug use (e.g., Scheier & Newcomb, 1991). According to Newcomb (1992), it is the cumulative and collective influence of multiple conditions of risk, rather than the predictive prominence of any one risk factor, that determines vulnerability. Following this recommended approach, a composite risk index was constructed based on five measures of alcohol-related social influences (the adolescent's report of peer use [normative expectations], the adolescent's perception of peer and adult attitudes toward alcohol use, and the adolescent's report of adult and friends' alcohol use). Moderated multiple regression was then used to test the ability of competence and social skills to buffer the effects of social influence risk on alcohol consumption. This analysis uses variance decomposition to isolate the unique regression components attributed to the predictor(s), moderator, and the interaction of these terms (Cohen & Cohen, 1983). Using hierarchical inclusion methods, the predictor (buffer) is entered first, followed by the moderator and the interaction (cross-product) term. A significant interaction term, controlling for the

main effects of the predictor and moderator, indicates a contingent or buffering relation.

METHOD

Sample Description

Data for the current study were obtained from a cohort of nontreatment students participating in a longitudinal, school-based drug abuse prevention trial. The full baseline sample for the parent study including both treatment and control students was composed of 9,800 students. Using a three-form design to maximize the assessment of psychosocial functioning, students completed one of three questionnaire forms that were distributed in each class randomly. A total of 2,696 students responded to the color-coded form containing the requisite measures (with a three-form design, 66% of the items overlap on two of three forms); 1,720 of those students were assigned to the intervention condition (and because they were exposed to the intervention they are not used in the current analyses), and 976 students, who did not receive the intervention, form the baseline sample for the current analyses. The baseline sample did not differ significantly from the treatment cohort with respect to key demographic characteristics (i.e., race, $\chi^2[6] = 4.133, p > .10$; family living situation, $\chi^2[5] = 8.101, p > .10$; and gender, $\chi^2[1] = 0.002, p > .10$). Extensive details related to the intervention content, sample description, and program findings are reported elsewhere (Botvin, Baker, Dusenbury, Tortu, & Botvin, 1990).

Students were drawn from a total of 56 middle schools located in a mixture of suburban, urban, and rural locations. The surrounding communities were predominantly middle class, and the resultant sample was 91% White. Data were obtained through paper-and-pencil questionnaires containing 180 items, which were group administered in classroom settings during a single class period. To increase the accuracy of the self-report data, standardized protocols were followed for administration of the questionnaires, confidentiality was emphasized (teachers were not present in the classroom), students were instructed to not write their names on the survey, and unique code numbers were used to identify and subsequently link questionnaires during the course of the study. To implement secure longitudinal tracking, master lists were created that included the student's name and additional identification information (date of birth and social security number where provided), and this information was used to track the students as they transitioned

through the local feeder systems from junior to senior high school. Passive consent procedures were used to inform parents of the scope of the study (a letter accompanied the consent form), and less than 1% of the total sample refused participation.

The two-wave panel sample ($N = 823$) used for the longitudinal analyses was based on youth present both in the 8th and 10th grades. The selection of the 8th-grade cohort as the initial baseline measure for the current analyses was made primarily for two reasons. First, distributions for alcohol use items in the 7th-grade were extremely nonnormal (i.e., the numbers of youth reporting sufficient variation in alcohol use in the 7th grade was small) and might strain the robustness of the maximum likelihood estimation techniques (Bentler, 1989). One underlying cause of the nonnormal distributional moments for the 7th-grade data is the infrequent nature of alcohol consumption at this young age. Only 60% of the 7th-grade sample reported some use of alcohol (most of these responses indicated highly infrequent use), whereas 73% of the 8th-grade sample reported having tried alcohol. In addition to the proportional increase in drinkers, there was a concomitant increase in mean level of alcohol use (i.e., means for frequency of alcohol consumption were 2.01 and 2.67, respectively, for the 7th and 8th grades) and greater variability observed in the 8th-grade measures of consumption. Skewness and kurtotic moments for the 8th-grade alcohol use measures were considerably more normal than the comparable 7th-grade measures, and there was a 50% reduction in the magnitude of these distributional moments between the 7th-and 8th-grade assessments.

Second, this age represents a period of developmental consolidation when issues pertaining to competence and social concerns become more prominent foci in the lives of these youth (Larson & Ham, 1993). Changing dynamics with respect to peer norms, peer group size, and the overall importance of competence and social skills for normal development indicate a period of heightened vulnerability that commences at about 14 to 15 years of age. Because this age also marks the period of early experimentation with alcohol (Kandel, 1980; Newcomb & Bentler, 1986), it is critical to better understand how essential developmental tasks can be influenced deleteriously by consumption.

Psychosocial Functioning and Alcohol Consumption

Baseline measures. Nine indicators were used to reflect three latent constructs in the eighth grade. A latent factor of Alcohol Involvement was reflected by three variables to tap frequency of alcohol use, "How often (if

ever) do you drink alcoholic beverages?" with responses ranging from 1 (*never tried them*) through 9 (*more than once a day*); intensity of alcohol use, "How much do you usually drink each time you drink?" with responses ranging from 1 (*I don't drink*) through 6 (*more than 6 drinks*); and drunkenness, "How often (if ever) do you get drunk?" with responses ranging from 1 (*I don't drink*) through 9 (*more than once a day*). Using latent variable methods, general construct-to-construct relations were hypothesized between Alcohol Involvement and the remaining psychosocial constructs, as well as alcohol-specific relations captured in the residuals of each measured variable. These residual terms represent unique variance that is not part of the more general construct variances (i.e., Alcohol Involvement) and capture the specific influences of either frequent or intense drinking episodes (including drunkenness).

Although both general population (Johnston et al., 1995) and regional surveys (Barnes & Welte, 1986; Kandel, 1980) have revealed that many early adolescent youth report some experience with alcohol, to capture more advanced stages of frequent or intense drinking requires examination of the specific effects of alcohol use on later psychosocial functioning (e.g., Scheier & Botvin, 1995). Structural equation modeling (SEM) provides a statistical means for examination of both general and specific effects through the analysis of nonstandard effects (Newcomb, 1990; Newcomb & Bentler, 1988). Specification searches were included to examine these unique across-time influences and are reflected in the final model parameterization.

Three multi-item indicators were used to reflect a latent construct of Social Skills (behavioral skills applied in interpersonal situations). Social confrontation was assessed by a four-item scale derived from the Richardson and Tasto (1976) Social Reaction (Anxiety) Inventory. The four items assess the probability of anxiety reactions in the domain of social relationships, specifically assessing fear of confrontation and anger expression (e.g., "How nervous would you feel" " . . . telling someone you know that you are angry with him [her]," and " . . . you tell someone who is embarrassing you to stop"). Responses for these items ranged from 1 (*not at all nervous*) through 5 (*very nervous*), and in the current study internal consistency reliabilities (coefficient alpha) were .75 and .81, respectively, for the 8th and 10th grades. Social (interpersonal) confidence (or lack thereof) was assessed by an eight-item scale taken from the Janis and Field (1959) Feelings of Inadequacy Scale. Fleming and Watts (1980) subsequently modified response formats for these items and provided factor analytic evidence for a subscale of "social confidence," including items assessing self-consciousness (e.g., "I often worry about what other people think of me"), social shyness (e.g., "I find it hard to start a conversation when I meet new people"), and interpersonal

concern (e.g., "I worry about whether other people like to be with me"). Responses for these items ranged from 1 (*strongly disagree*) through 5 (*strongly agree*). In the current study, internal consistency reliabilities for these items were .83 and .86, respectively, for the 8th and 10th grades.

Four items to assess frequency of interpersonal assertiveness were taken from the Gambrill and Richey Assertion Inventory (1975) and were rewritten to be appropriate for adolescent populations (Wills, Baker, & Botvin, 1989). The four items assess frequency of positive social assertion (e.g., "How often do you" " . . . start a conversation with someone you don't know" and " . . . ask someone out for a date") and general assertion behaviors tied to defense of rights (e.g., "How often do you" " . . . express an opinion even though others may disagree with you" and " . . . tell people when you think they have done something that is unfair"). Responses for these items ranged from 1 (*never*) through 5 (*almost always*). Internal consistency reliabilities for these items were slightly lower in magnitude than the remaining scales (.53 and .54, respectively, for the 8th and 10th grades). Previous empirical studies relied on more than four items to construct reliable scales assessing assertiveness, and the reduced number of items coupled with the item heterogeneity lowered the resulting internal consistency (Botvin, 1993; Wills et al., 1989). Despite the lack of item homogeneity, associations between the assertiveness scale (tapping frequency of skill implementation) and the remaining measures of social skills (tapping confidence in skill implementation and degree of interpersonal anxiety) served as a validity check for the multidimensional nature of social competence (the scales were moderately intercorrelated). Scoring for the respective indicators (less social confidence, more nervousness in social confrontations, and more frequent assertiveness [reverse loading]) resulted in higher scores for the Social Skills construct, reflecting less social competence and interpersonal efficacy.

Three multi-item indicators were used to reflect a latent construct of Personal Competence. The first of these indicators was an abridged six-item scale to assess perceived school abilities and academic esteem. Following earlier conceptualizations of self-concept proposed by Shavelson, Hubner, and Stanton (1976), Fleming and Watts (1980) suggested that self-esteem is a multidimensional construct consisting both of academic and nonacademic components. Based on their factor analysis of a modified version of the Janis and Field (1959) Feelings of Inadequacy Scale, those authors reported obtaining a four-item factor tapping "confidence about scholastic abilities," which included self-evaluations regarding school assignments ("I have trouble understanding things that are given for reading assignments") and concern regarding school work ("When I have to write a paper or do a reading assignment, I get kind of worried about it"). Several items were added that

tap perceived academic confidence including "I find it hard to take tests in school," "I sometimes feel that teachers are picking on me," and "I have gotten pretty good grades during the past year" (reverse coded). Responses for these items were rated on a 5-point scale ranging from 1 (*strongly disagree*) through 5 (*strongly agree*), and in the current study internal consistency reliabilities for this scale were .66 and .63, respectively, in the 8th and 10th grades.

Seven items to tap decision-making skills were taken from a modified 35-item version of the Response Profile of the Coping Assessment Battery (Bugen & Hawkins, 1981). Wills (1986) conducted exploratory factor analyses with a sample of middle school youth and reported obtaining a 7-item dimension of behavioral coping tapping active approaches to information gathering, decision making, and problem solving. Six of the 7 items tap direct action and problem-solving strategies (e.g., planning, evaluation, weighing options) individuals use when confronted with a problem (e.g., "When I have a problem, . . . I think about choices that exist before I take any action" and " . . . I think about the possible consequences of each alternative"). The 7th item is a more global strategy implemented to obtain a positive outcome when faced with problems (e.g., "When I have a problem, . . . I compromise to get something positive from the situation"). Responses for these items ranged from 1 (*never*) through 5 (*almost always*), and internal consistency reliabilities for this scale in the current study were .91 and .92, respectively, in the 8th and 10th grades.

A third indicator to tap cognitive self-regulation consisted of 7 items from the Rosenbaum (1980) Self-Control Schedule (SCS). The 36-item SCS assesses both self-control and self-management procedures that are prompted by cognitive and affective internally cued events. Such strategies are aimed toward reducing interference and anxiety caused by those events and rely on behaviorally oriented self-statements (e.g., "If I am feeling sad, I try to think about pleasant things" and "If an unpleasant thought is bothering me, I try to think about something pleasant"). Responses for these items ranged from 1 (*never true*) through 5 (*almost always true*), and in the current study internal consistency reliabilities for these items were .81 and .83, respectively, in the 8th and 10th grades.

A measure of social influence risk was based on a five-item composite scale including the adolescent's report of their friends' alcohol use ("How many of your friends drink alcohol?" with responses ranging from 1 [*none*] through 5 [*all or nearly all*]), perceived attitudes of parents and peers toward alcohol use ("How do your parents [peers] feel about whether or not you drink?" with responses ranging from 1 [*strongly against it*] through 5 [*strongly in favor of it*]), and normative expectations for peer and adult

alcohol use ("In your opinion, how many people your age [and how many adults] drink alcoholic beverages?" with responses for these items ranging from 1 [*none*] through 6 [*almost all*]). Prior to forming the composite social influence risk index, each risk factor was dichotomized using a median split.[2] At-risk youth in the upper-50th percentile were assigned a 1, and individuals scoring in the bottom half of the distribution (low risk) were assigned a 0. The five individual binary social influence risk scores then were summated into a single social influence risk index. Interitem correlations among the five social influence risk factors supported using a single index of risk (average $r = .36$ and $\alpha = .75$). For the subsequent moderated multiple regression analyses, a natural logarithm transformation was used for the dependent measure—a composite of frequency, intensity, and drunkenness (to reduce the spurious influence of outliers in a nonnormal distribution). Following conventions proposed by Aiken and West (1991), both the predictors and the moderator were computed as deviation scores (centered), which facilitated detection of moderator effects.

RESULTS

Treatment of Missing Values

Causes of missing data were consistent with real-world, school-based prevention studies (Graham & Donaldson, 1993; Graham, Hofer, & Piccinin, 1994). Average level of missingness across all variables used in the model (including grades) was 3.29% (ranging from 0% missing to 13% for perceived friend's attitudes toward drinking). Sixty-three percent of the panel sample had complete data, an additional 5% had no more than one missing value, and 3% had two missing values. Rather than lose a disproportionate number of cases to listwise deletion, a conditional mean imputation procedure gating on gender (to ensure maintaining observed gender differences) and self-reported grades was used to augment the behavioral measures (average missingness among the behavioral measures was 0.46%). Conditional imputation augments missing data with data obtained from complete cases characterized by similar behavioral (or psychosocial) profiles for the selected gating measures (e.g., grades and gender). The same procedure was used for the psychosocial measures; however, in this instance, conditional imputation included alcohol consumption level (low and high consumption using a median split) as a gating measure in addition to grades and gender. Overall, a substantial portion of missing data was attributed to fatigue (length

TABLE 1:   Summary Descriptive Statistics for Behavioral Items and Psychosocial Scales Used in Longitudinal Model

Latent Contruct and Measured Variable	$\overline{X}$	Number of Items	Range	SD	Skew	Kurtosis	Mean Gender Difference[a] r_{pbi}
Early adolescence (8th grade)[b]							
Alcohol Involvement							
Alcohol frequency	2.66	1	1-9	1.68	1.34	1.78	.09**
Alcohol intensity	1.98	1	1-6	1.34	1.57	1.79	.08*
Drunkenness	1.84	1	1-9	1.29	2.47	7.35	.04
Social Skills							
Social confidence	24.49	8	8-40	5.74	−0.37	0.68	−.11***
Assertiveness skills	12.19	4	4-20	2.79	0.22	0.47	.16***
Social confrontation	6.97	4	3-15	2.71	0.49	0.08	−.07*
Personal Competence							
Academic esteem	20.53	6	6-30	3.89	0.18	0.22	−.01
Decision-making skills	23.26	7	7-35	6.01	−0.05	0.35	−.09**
Self-management skills	26.19	8	8-40	6.07	−0.19	0.34	−.06*
Late-early adolescence (10th grade)[c]							
Alcohol Involvement							
Alcohol frequency	3.70	1	1-9	1.97	0.55	−0.39	.08*
Alcohol intensity	3.00	1	1-6	1.70	0.37	−1.11	.08*
Drunkenness	2.69	1	1-9	1.81	1.33	1.41	.07*
Social Skills							
Social confidence	23.68	8	8-40	5.95	−0.23	0.41	−.08*
Assertiveness skills	12.68	4	4-20	2.79	−0.03	0.62	.04
Social confrontation	6.90	4	3-15	2.81	1.01	0.01	−.04
Personal Competence							
Academic esteem	20.26	6	9-30	3.71	0.13	0.13	−.02
Decision-making skills	23.70	7	7-35	6.37	−0.03	−0.03	−.18***
Self-management skills	25.38	8	8-40	5.98	1.01	1.01	−.12***

a. A positive correlation indicates that males had the larger value.
b. $N = 976$.
c. $N = 823$ (panel sample).
*$p \le .05.$ **$p \le .01.$ ***$p \le .001.$

of survey) or skipped questions. Self-reported grades and alcohol use both were related significantly to survey completion ($ps < .01$).

Table 1 contains summary descriptive statistics for the 8th- and 10th-grade behavioral items and psychosocial scales used in the longitudinal analyses. Point-biserial correlations between gender and the psychosocial and behavioral measures are contained in the right-hand corner of Table 1. Among the larger of these observed differences, 8th-grade male students reported sig-

nificantly more assertiveness ($r^2 = 2.6\%$). In the 10th grade (merged cases), female students reported more decision-making skills ($r^2 = 3.2\%$) and more self-management skills ($r^2 = 1.4\%$). Despite these few modest and significant gender differences, it is worth noting that female students reported less social confidence, lower social confrontation, and higher academic esteem and self-management skills. For the most part, these gender differences were maintained across the 2-year interval. Averaging across all of the psychosocial scales in both 8th and 10th grades, gender accounted for 0.9% of the variance in psychosocial functioning. Among the behavioral measures, in both the 8th and 10th grades, male students reported greater alcohol use ($r = .09, p < .01$ and $r = .08, p < .05$, respectively), more intense drinking ($r = .08, p < .05$, for both grades), and more drunkenness in the 10th grade ($r = .07, p < .05$).

Panel Attrition Analyses

The panel attrition rate of 15.7% across the 2-year study is consistent with other real-world school-based prevention studies (Hansen, Tobler, & Graham, 1990; Snow, Tebes, & Arthur, 1992). The eighth-grade and panel samples had essentially the same proportions of males (51.4% and 51.5%, respectively), and there was no observed statistical difference in the proportion of students who reported their family situation as intact (both biological parents or one stepparent: 86% for both samples).

Based on comparison of their 8th-grade measures, students present at baseline but not present at the 10th-grade follow-up assessment were more likely to report using alcohol, $\chi^2(1, N = 823) = 12.25, p < .001$ (84% of the students lost to attrition compared to 71% of the panel students reported drinking) but did not differ significantly in frequency, intensity, or self-reported drunkenness. Furthermore, students present at baseline but not at follow-up reported significantly lower grades, $t(974) = 5.73, p < .001$ ($\overline{X} = 4.32$ as compared to $\overline{X} = 5.12$ on a 7-point scale), less social confidence $t(974) = 2.34$, $p < .05$ ($\overline{X} = 23.49$ as compared to $\overline{X} = 24.67$), and less social confrontation $t(974) = 2.56, p < .05$ ($\overline{X} = 6.46$ as compared to $\overline{X} = 7.07$). Overall, the attrition findings indicate a very slight difference in mean level of social and academic functioning between panel youth and those students who were unavailable for assessment at follow-up. The full set of 12 psychosocial and behavioral predictors with the addition of the 8th-grade measure of self-reported grades accounted for only 3.1% of the variation in retention status (dropouts coded 0 and panel youth coded 1). Self-reported grades was the only significant predictor of retention status ($\beta = .18, p < .001$). Regression diagnostics revealed a moderate degree of collinearity between grades, social concern,

and academic esteem, but the variance inflation factor was not sufficiently high enough to mask the unique predictive contributions of these measures. Finally, chi-square proportional tests indicated that race statistically was independent of attrition status.

Results of the Confirmatory Factor Analysis (CFA)

Prior to testing the main longitudinal research hypotheses, the psychometric adequacy of the hypothesized constructs was tested using CFA procedures. Both the measurement and subsequent SEM were conducted with the EQS statistical program (Bentler, 1989). The CFA provides an opportunity to examine the intercorrelations among the latent constructs and yields impor- tant information regarding their construct and criterion validity. Figure 1 contains the standardized parameter estimates (factor loadings) correspond- ing to the measurement model. All of the factor loadings were moderately large and highly significant, indicating the statistical reliability of these measures as indicators of the hypothesized latent constructs. Standard goodness-of-fit statistics underscored a marginal fit for the initial measure- ment model, $\chi^2(120, 823) = 764.56$, $p < .001$; root mean square residual (RMSR) = .06. Alternative model-fit-indices highlighted that substantial residual covariation could be accounted for by increased parameterization (i.e., adding correlated residuals). For example, among the incremental fit indices, the Bentler-Bonett Normed Fit Index (NFI: Bentler & Bonett, 1980), an estimate of how well the sample covariances fit the hypothetical model in contrast to a null or independence model, was .862, and the Non-Normed Fit Index (NNFI) was .875. The Comparative Fit Index (CFI: Bentler, 1990), a population chi-square statistic analagous to the NFI and that adjusts for sample size, was .892 (the Adjusted Goodness of Fit Index [AGFI], an absolute fit index, was .855). Benchmarks for the incremental fit statistics range from 0 to 1.0 and should be in the range of or exceed .90 to indicate an adequate fit of the implied covariance matrix to the sample covariances (Marsh, Balla, & McDonald, 1988). Another important indicator of model fit, the ratio of χ^2/df, was 6.37 and exceeded the 5.0 gold standard for this statistic (Marsh et al., 1988).

One method of adjusting or fine-tuning these models is to reparameterize using specification searches (Chou & Bentler, 1990; MacCallum, 1986). Lagrange modification indices are used to identify previously constrained parameters that significantly would improve the fit of the model (by relaxing the constraints and freely estimating these parameters). Although these parameter modifications are identified empirically, their inclusion and statis- tical soundness is based on substantive theory. Following examination of the
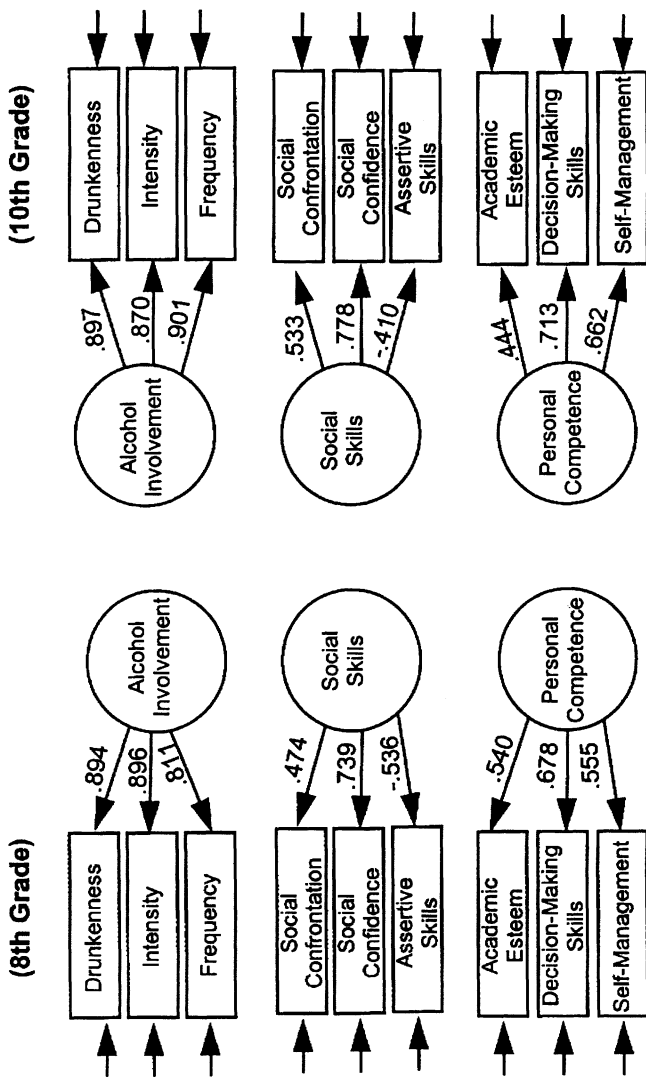
Figure 1: Confirmatory Factor Analysis Model

NOTE: Large circles represent latent constructs, rectangles are measured variables, and small single-headed arrows denote residual variances. Factor loadings are standardized, and significance levels were determined by critical ratio of unstandardized coefficient divided by its standard error. Factor intercorrelations corresponding to the measurement model are included in Table 2.

TABLE 2:   Factor Intercorrelations From the Confirmatory Measurement Model

Factor	1	2	3	4	5	6
Eighth grade						
1. Alcohol Involvement	1.0					
2. Social Skills	−.15**	1.0				
3. Personal Competence	−.42***	−.21***	1.0			
Tenth grade						
4. Alcohol Involvement	.56***	−.13**	−.31***	1.0		
5. Social Skills	−.09*	.64***	−.05	−.18***	1.0	
6. Personal Competence	−.27***	−.03	.72***	−.32***	−.13*	1.0

NOTE: Significance level is determined by a critical ratio of the unstandardized parameter estimate divided by its standard error.
*$p \le .05$. **$p \le .01$. ***$p \le .001$.

modification indices, a total of four residual covariances were included for repeated measures of social confrontation ($r = .26, p < .001$), assertiveness ($r = .26, p < .001$), academic esteem ($r = .40, p < .001$), and self-management skills ($r = .19, p < .001$);[3] and this reparameterization improved the model to an acceptable level of fit, $\chi^2(116, 823) = 551.60, p < .001$, RMSR = .06, NFI = .910, NNFI = .904, AGFI = .897, and CFI = .927. The difference between the model fit indices for the initial and final CFA, $\Delta\chi^2(4) = 212.97, p < .001$, and the reduced ratio of χ^2/df (4.75) underscored the significantly improved fit with the additional parameterization.[4]

Factor intercorrelations from the measurement model are contained in Table 2. Among the contemporaneous associations in the 8th grade, higher levels of Personal Competence were associated with lower Alcohol Involvement ($r = -.45$). Based on its scaling toward less social competence, Social Skills was associated with higher Alcohol Involvement ($r = -.15$). The association between Social Skills and Personal Competence ($r = -.31$) provides some evidence for the divergent validity of these two facets of self-efficacy. The relatively larger magnitude of association between Alcohol Involvement and Personal Competence persisted in the 10th grade ($r = .35$), as compared to Social Skills and Alcohol Involvement ($r = -.19$). Moreover, the small magnitude of association between 10th-grade Social Skills and Competence ($r = -24$) and their differing magnitude of relations with alcohol use provided additional evidence that social skills and personal competence capture uniquely different facets of self-efficacy that may contribute independently to alcohol involvement.

Across-time associations for Social Skills ($r = .75$) and Personal Competence ($r = .84$) provided evidence of the moderately stable nature of these
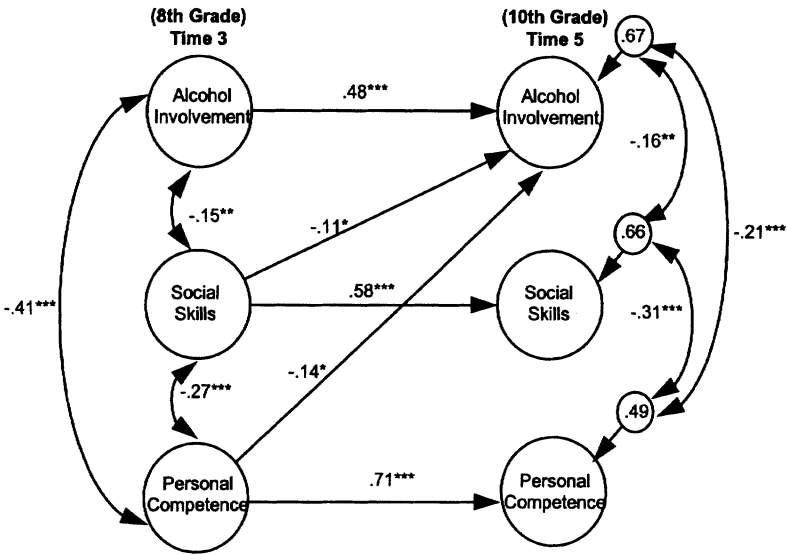
Figure 2:   Structural Model Depicting Longitudinal Relations of Competence, Social Skills, and Alcohol Consumption
NOTE: Large circles represent latent factors and small circles with numbers reflect residual variances. Path coefficients are standardized and significance levels were determined by critical ratio of unstandardized coefficient divided by its standard error (*$p \le .05$. **$p \le .01$. ***$p \le .001$).

developmental skills over time. In addition to the stability of psychosocial functioning, alcohol involvement was moderately stable over the 3-year period ($r = .56$), providing some indication that early-stage drinking may set the stage for continued drinking through the high school years.

Results of the Longitudinal Structural Equation Modeling (SEM)

Using the longitudinal component of these data, a SEM was tested that specified the hypothesized developmental relations between 8th-grade alcohol and the 10th-grade outcome contructs as well as regression paths between the 8th-grade skills measures and 10th-grade alcohol use. Contemporaneous relations in both the 8th and 10th grades were specified as covariances to avoid making specious causal attributions with cross-sectional data. The

parameterization of the SEM is identical to the CFA model (despite the changes in across-time covariances that are now specified as regression paths) and, as expected, the initial SEM had the same fit as the base CFA model. Following post hoc specification searches, a number of previously constrained regression paths between exogenous residual variances and either endogenous measured variables or latent constructs were identified and freely estimated (these will be discussed later). Following inclusion of several nonstandard paths, a final structural model was achieved, $\chi^2(116, 823) = 487.31$, $p < .001$, NFI = .920, NNFI = .918, AGFI = .904, CFI = .938, and ratio of $\chi^2/df = 4.20$, and is presented in Figure 2[5].

Contrary to the research hypotheses regarding consequences of alcohol on skills and competence, there were no significant paths from early alcohol involvement to subsequent psychosocial functioning. However, early social competence was associated with later increased consumption and early personal competence was associated with subsequent lower alcohol consumption. By the 10th grade, alcohol use continued to be associated with greater social competence and lower personal competence (associations among the disturbance terms reflect covariances between latent constructs net of the main hypothesized longitudinal effects). Within-time associations in the 8th grade underscored that early alcohol use was associated with higher social skills, whereas higher personal competence (e.g., self-management) was associated with lower alcohol use. Lower levels of social skills were associated with lower levels of personal competence. This pattern of relations remained developmentally stable, and in the 10th grade, high reported social skills were associated with higher competence, higher levels of personal competence continued to be associated with lower alcohol use, and higher social skills were associated with higher alcohol use.

Among the nonstandard effects that were included as part of the model-fitting procedures, early frequent drinking was associated both with later frequent drinking ($\beta = .09$, $p < .001$) and less social concern (more social confidence: $\beta = -.11$, $p < .01$). In addition to the hypothesized longitudinal relations, all three observed indicators of Social Skills were associated over time (8th-grade social confrontation—10th-grade social confrontation, $\beta = .23$, $p < .001$; 8th-grade social confidence—10th-grade social confidence, $\beta = .22$, $p < .001$; 8th-grade assertive skills—10th-grade assertive skills, $\beta = .16$, $p < .001$). Eighth-grade academic esteem also was associated with 10th-grade academic esteem ($\beta = .34$, $p < .001$), early self-management was associated with later self-management ($\beta = .19$, $p < .001$), and early social confidence (higher social anxiety) was associated with later decision-making skills ($\beta = .20$, $p < .001$). These effects should be noted with some caution, however, because with reliance on a single method of data collection (i.e., self-report), there is

some confounding of method and true construct variance, resulting in an upward bias for estimates of residual variance.

Social Influence Risk as a Moderator of Alcohol Use

The next series of analyses examined the ability of competence and social skills to buffer the effects of social influence risk. Although SEM is an appropriate analytic tool for testing moderator relations (Baron & Kenny, 1986), conducting these specific tests at the level of each observed indicator in an SEM framework would prove to be unwieldy and likely generate untenable results (and considerably reduce power). Using moderated multiple regression and testing independently the buffering properties of each indicator provides a more detailed and refined picture of which specific social and competence-based skills contribute to the vulnerability of these youth when confronted with alcohol-related peer and adult social influences.

The unit-weighted social influence risk score ranging from 0 through 5 was distributed normally. The modal number of risk factors was 3 (21%), and the mean level of risk was 2.60 (SD = 1.54). Male and female students did not differ significantly in the mean level of social influence risk. Table 3 contains the results of the cross-sectional moderator analyses. In each model, and to control for potential differences attributed to socialization influences, gender was entered first. The social skill and competence measures significantly predicted consumption in five of the six equations, with the exception of assertiveness. In comparison to the relatively small variance contribution made by the skills and competence measures, social influence risk had a significant and sizable contribution to the prediction of consumption (controlling for skills). The size of this contribution ranged from 33% in the model containing academic esteem to a high of 39.7% in the models containing social confidence and assertiveness. Significant interactions were obtained in the models containing academic esteem (β = –.07, p < .05: R^2 = .43) and decision-making skills (β = –.06, p < .05: R^2 = .42). Based on methods outlined in Aiken and West (1991), the simple main effects for three levels of the moderator in each of the equations containing a significant interaction term were plotted and are contained in Figure 3. As depicted, academic esteem and decision skills both buffer the effects of social influence risk, creating a more rapid decelerating slope (and thus lowering alcohol consumption) in the high social influence risk group (+1 SD above the mean).

These analyses then were replicated with the longitudinal portion of the data. Hierarchical inclusion methods were used effectively to disentangle the

TABLE 3:   Result of the Social Influence Risk Moderator Analyses: Eighth-Grade Alcohol Use

	R^{2a}	F^b	b^c	SE	b
Social Confidence	.007	5.74*	−.08	.002	−.005
Social Influence Risk	.320	393.5***	.56	.020	.406
Social Confidence ×					
Social Influence Risk	.005	5.94*	−.07	.004	−.009
Model R^2	.340				
Social Confrontation[d]	.008	6.45*	−.05[e]	.004	−.007
Social Influence Risk	.315	386.75***	.56	.021	.405
Social Confrontation ×					
Social Influence Risk	.001	1.16	−.03	.008	−.008
Model R^2	.333				
Assertiveness	.003	2.64*	.06	.004	.008
Social Influence Risk	.321	394.13***	.56[c]	.021	.407
Assertiveness × Social					
Influence Risk	.001	—[f]	—	—	—
Model R^2	.333				
Academic Esteem	.088	80.17***	−.18	.003	−.017
Social Influence Risk	.263	336.21***	.53	.021	.378
Academic Esteem × Social					
Influence Risk	.003	3.76[e]	−.05	.005	−.010
Model R^2	.363				
Decision-Making Skills	.053	45.92***	−.14	.002	−.008
Social Influence Risk	.286	359.06***	.54	.020	.391
Decision-Making Skills ×					
Social Influence Risk	.008	10.41**	−.09	.003	−.011
Model R^2	.356				
Self-Management	.047	41.20***	−.13	.002	−.007
Social Influence Risk	.289	360.88***	.55	.021	.392
Self-Management × Social					
Influence Risk	.002	2.52	−.04	.003	−.005
Model R^2	.347				

NOTE: $df = 4$, 818 for final step (interaction term).
a. Corresponding change in proportion of variance accounted for in previous step. Step 1 includes control for gender.
b. F test corresponding to incremental R^2 (*$p \le .05$. **$p \le .01$. ***$p \le .001$).
c. Standardized (partial) regression coefficient controlling for previous steps (including gender).
d. Social confidence and social confrontation are scaled such that higher scores reflect lower social skills.
e. $m < .10$ (m = marginal).
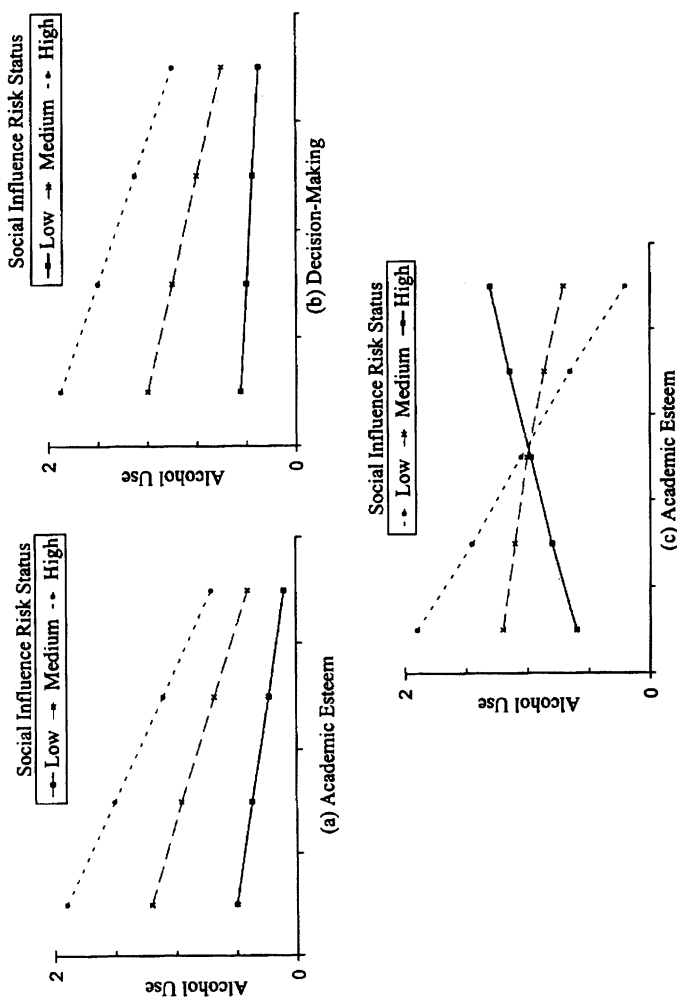f. Tolerances and F-to-enter criteria ($p \le .05$) not met for parameter.

Figure 3: Plots of significant interactions corresponding to cross-sectional (a,b) and longitudinal (c) moderated multiple regression analyses

effects of social influences and contemporaneous drinking on subsequent drinking. In each model, initial controls were included for baseline alcohol use (and gender). Next, the 8th-grade measure of psychosocial functioning (buffer) was included, which was followed by the measure of social influence risk and subsequently the respective interaction term. Only the model containing academic esteem contained a significant interaction term ($\beta = .08$, $p < .01$), and the full model accounted for 32% of the variance in 10th-grade alcohol use (additional significant regression effects included 8th-grade alcohol, $\beta = .49$, and academic esteem, $\beta = -.10$). In contrast to the parallel form interactions obtained with the cross-sectional models, the shape of the regression lines in the longitudinal model showed a crossover or disordinal interaction (Figure 3c). That is, the high and low social influence risk groups reversed their positions so that with less academic esteem, the highest social influence risk group moved from the lowest level of consumption to the highest level (academic esteem is reverse coded such that higher levels of the measure indicate lower esteem).

It is interesting to note that in each of the six cross-sectional models, social influence risk had a significant and sizable association with consumption, reflecting a strong contemporaneous relation between social context and consumption. However, in the longitudinal models, the 8th-grade measure of social influence risk did not significantly predict consumption, and the overall variance accounted for in each of these models was considerably smaller than in the respective cross-sectional models.

DISCUSSION

Precocious drinking in the early stages of adolescence might interfere with the development of prosocial behavior and also may come at the expense of acquiring important social and cognitive skills. The end result of these missed opportunities potentially can offset normal development and compromise adult functioning. Unfortunately, few studies have relied on empirical models to test the validity of those assumptions. In the current study, longitudinal panel data was used to examine whether early alcohol use adversely affected later skills functioning and also whether deficits in early skills influenced later alcohol use. With respect to understanding those precise developmental relations, several key findings from the study are worth noting.

First, estimates of drinking among these youth were consistent both with national (Johnston et al., 1995) and regional (Barnes & Welte, 1986; Oetting & Beauvais, 1990) secondary school samples. Almost three-quarters of this sample reported experience with alcohol, and 15% reported having been

drunk (which is somewhat lower than the national prevalence rate of 26% for 8th graders). By the 10th grade, reported prevalence had increased, and 87% of the students reported use of alcohol and 40% of the students reported having been drunk (there was a 67% gain in new users). The observed increase in drinking rates between the 8th and 10th grades was consistent with the age-related patterns of alcohol use based on self-report techniques with school-based samples. Consistent with national findings, males reported significantly higher levels of alcohol consumption.

Second, with respect to the specific developmental hypotheses, for those youth available at both assessments, early alcohol use did not significantly affect subsequent social or personal competence. This finding was particularly interesting because previous studies conducted with adolescents have shown that, over a longer time frame (8th to 12th grade), polysubstance use (alcohol, marijuana, and tobacco) adversely affected competence, specifically decreasing self-management strategies (Scheier & Botvin, 1995). The size of the reported longitudinal effects obtained in that study was quite small; however, based on the moderate stability of drug use over time and the contemporaneous associations between polysubstance use and psychosocial functioning at follow-up, those authors proposed a developmental lag model to account for the effects of early drug use on later functioning. According to the proposed model of those authors, drug use may not exert direct long-term effects on later functioning; however, protracted drug use produces deficits that remain below the threshold for detection in the intervening years. As the heightened levels of drug use continue and the deficits in competence remain unabated, there continues to be a negative influence on psychosocial functioning, which then reaches an optimal threshold for detection at some later point in time.

Although the current findings can be interpreted in the context of a proposed developmental lag hypothesis, several factors may be responsible for the differences between the earlier reported study and the current findings. First, the lengthier time frame spanning almost 5 years in the earlier reported study may have provided more opportunity for youth to experience greater amounts of alcohol and drug use. The increased quantity of drug use in conjunction with the increased span of time observed in the earlier study provided sufficient time for the accumulation of negative consequences. In addition, the inclusion of additional illicit substances (i.e., marijuana) at baseline in the earlier study made it difficult to obtain comparable findings to the current study (a longer time frame may be required to provide opportunities for developmental deficits to surface). Consistent with the reported findings of Scheier and Botvin (1995), however, the observation of moderate associations among the latent constructs at follow-up in the current

study reinforce that a developmental lag may have occurred, and that alcohol may indeed influence functioning but at some subthreshold level. Along these same lines, Pentz (1985) reported on data obtained from a middle school cohort that social skills, social competence, and alcohol consumption all were stable moderately, reinforcing the importance of these psychological processes for this age period.

In addition to modeling consequence hypotheses, the cross-lagged design permitted an examination of the possibility that deficits in early functioning are associated with increased consumption. With respect to these hypothesized paths, low levels of self-management and decision-making skills and negative academic esteem were associated during the 2-year period with higher levels of alcohol consumption. The size of this effect was relatively small (in relation to the stabilities and contemporaneous correlations among the latent constructs), albeit similar in magnitude to an earlier reported finding (Scheier & Botvin, 1995). It is worth noting with the observation of a significant lagged effect that poor competence contributes to persistent use of alcohol during this short time period.

In contrast to the negative effect obtained with competence, early precocious social skills predicted higher levels of consumption. Although the finding that poor competence is related to later drinking is consistent with the larger literature on competence and problem behaviors (Dodge, 1986), the current finding that social competence was associated with increased alcohol consumption is not surprising. Other researchers, working with middle school youth, have noted that precocious social skills are associated with deviant behavior (Wills et al., 1989). Superior social skills might facilitate group cohesion, which could promulgate opportunities for social interaction with older peers, peer modeling of drinking behaviors, and vicarious learning. In fact, increased emphasis on social relations may be the high point of the middle school transition, reinforcing the strength of peer influences and their importance in identity development at this critical juncture (Brown, 1990). Greater concern would be appropriate if heightened social skills (e.g., positive assertion) remain a central component of self-efficacy and consistently induced greater alcohol use; however, there is limited evidence to support this view. It is more likely that the transition to middle school provides a framework for the introduction of new, older, and larger peer networks, encouraging assertive and socially confident youth to occupy the center of attention in which peer modeling of alcohol use is likely to have its greatest influence.

Youth with high levels of perceived personal competence also reported high assertiveness, lower social anxiety, and higher social confidence. Despite the uniquely different pattern of relations between these two constructs

and alcohol use, it is the confluence of social skills and competencies that collectively buffer against precocious alcohol use. As these youth traverse early adolescence, reliance on efficient decision-making skills and self-management strategies for reducing anxiety-provoking thoughts might reduce social anxiety and foster a sense of efficacy that in turn may help to ward off social influences that promote alcohol use. Decision skills form an important substrate to many health-promoting behaviors, and the current findings indicate that skills-enhancement programs that aim to promote academic competence (e.g., improving skills to reduce test-taking anxiety, facilitate completion of homework assignments, and reduce anxiety related to school performance) and develop cognitive reasoning (i.e., decision-making skills) and self-regulatory strategies (i.e., reduction of anxiety provoking thoughts) may enhance social efficacy and represent an effective barrier against alcohol use.

The relations of competence and alcohol use were moderated also by social influence risk. Additional factors may impinge on alcohol use, and the relatively small size of the regression effects from 8th-grade skills to 10th-grade consumption argues for including additional and important social learning risk factors that capture the effects of social learning processes (this is also consistent with the Bandura [1977a, 1977b] model of self-efficacy). In the models predicting 8th-grade alcohol use, social influence risk significantly moderated relations between academic esteem, decision-making skills, and alcohol use. Plots of both significant interactions revealed that the high-risk group had a more rapidly decelerating slope compared to the low-risk group, providing some evidence of the close interplay between social influences and perceived competence. Perhaps because of the strength and developmental importance of vicarious learning processes for this age group, social influences made a significant unique contribution in each of the equations containing 8th-grade alcohol use.

In contrast to the 8th-grade findings, early social influence risk did not account for any significant unique variance in subsequent alcohol use. Only one model predicting 10th-grade alcohol use contained a significant interaction (academic esteem), underscoring the diminishing influence of early social influences on skills and alcohol use as these youth transition from early to later adolescence. Early peer networks rapidly undergo change in the middle school years (e.g., Savin-Williams & Berndt, 1990), and this may lessen the importance of early peer models for later drinking behavior. Additional factors that may mitigate social influences on later drinking include an increased awareness of the deleterious effects of alcohol, a more realistic sense of adult drinking practices (i.e., perceived norms), and a sharper focus on skill acquisition that prepare these youth to negotiate the

transition to young adulthood. Separately or combined, these factors can mitigate the influence of social models (peer and parent) contributing to the observed temporal erosion between social influences and alcohol use. Despite the relatively few significant interactions obtained in these analyses, it is important to interpret the moderator effects because they may portend new approaches to understanding the complex relations between intrapersonal and interpersonal processes in the generation of early-stage alcohol use. The large number of statistical comparisons used to conduct the moderator analyses, however, indicates that some caution should be taken in their interpretation. Without adjustments to correct for conducting multiple statistical tests and examining multiple hypotheses (i.e., testing all of the interactions with independent analyses), the risk of making a Type I error is considerably inflated.

Limitations

There are several limitations to the current study worth noting. First, the generalizability of these findings is qualified by the limited racial heterogeneity of the sample. This is particularly important because race (and possibly gender) may factor heavily in the relations among skills, competence, and alcohol use. Developmental studies have identified important cultural and ethnic differences between patterns of alcohol use (Maddahian, Newcomb, & Bentler, 1985), differences in relations between risk and alcohol use (Maddahian, Newcomb, & Bentler, 1988), and developmental differences in competence formation among racial minorities (Spencer, 1985). Further studies need to examine precisely how cultural factors influence initiation to alcohol use, and to inform prevention more effectively, specifically how ethnic and cultural factors influence the development of differences in psychosocial functioning that may precede the onset of drinking.

In addition to these concerns, a host of risk factors that have been demonstrated empirically to predict adolescent alcohol use were not specified in the causal model, thus introducing bias into the estimation of the regression parameters. Examples of important domains of influence that empirically have been shown to predict consumption include outcome expectancies (i.e., perceived benefits of drinking), intrapersonal factors (i.e., depression), family functioning (i.e. cohesiveness), parental drinking history, and additional environmental factors that were not captured in the measure of social influence risk. Although the importance of these risk factors is acknowledged widely both in school-based (Epstein, Dusenbury, Botvin, & Diaz, 1996; Scheier, Botvin, Diaz, & Iffil-Williams, 1997) and general population studies (e.g., Barnes & Farrell, 1992; Dembo, Allen, Farrow, Schmeidler, & Burgos,

1985; Duncan, Duncan, & Hops, 1994; Johnson & Pandina, 1991), the purpose of the current analyses was to elucidate the structural relations between a more simplified set of risk constructs and, as a result, obtain a more thorough understanding of essential risk mechanisms. It is imperative to add a basic understanding of these relations to the larger (multivariate) equation and produce a more complete picture of the varied network of influences that foster alcohol (and other drug) use.

In addition to the omission of several key risk factors, reliance on a cross-lagged panel design may have oversimplified the nature of the developmental processes (Rogosa, 1979, 1980). Although the use of two waves of data permitted the exploration of longitudinal developmental processes, the causal operative risk mechanisms that instigate alcohol use and the conditions of risk that also may result from alcohol use probably take longer to unfold. Researchers, for example, may want to examine how deficiencies in personal competence set the stage for poor social skill development, which cumulatively may heighten vulnerability (engendering risk and/or alcohol use). These issues, coupled with the fact that in a two-wave design the estimated developmental functions are influenced by regression to the mean, necessitate use of more waves of data to truly estimate interindividual and intraindividual change.

It is worth noting also that these data are entirely self-report, and although these techniques represent a valid means of ascertaining drug use trends (Gfroerer, 1985; Stacy, Widaman, Hays, & DiMatteo, 1985), collection of alternative sources of information—particularly for the measures of social skills and competence—might enhance the validity of these findings. The low reliability for the measure of assertiveness (both the observed measure and latent dimension) may have influenced the fit statistics for the longitudinal model and biased the true picture of how those social skills relate to alcohol consumption. Despite the use of statistical techniques that attenuate the effects of measurement error, the low reliability for the assertiveness measure most likely influenced the final structural estimates. Response formats for the assertiveness items were based on reported frequency of a behavioral skill, whereas the comparable response formats for the remaining social skills tapped degree of nervousness for the social confrontation items, and a Likert-type scale (*agree/disagree*) was used for the social confidence items. As a result of these differing measurement properties, there is likely to be larger error variances in the measurement model that are a direct result of the low measure validity (Rindskopf & Rose, 1988). One remedy would include lengthening the measure of assertiveness, which could improve the reliability estimate as well as enhancing the measurement validity with a more standardized response format.

Another means of improving the internal validity of the model would expand on the self-report assessment procedures that are used to measure interpersonal competency. Possible sources of collateral information would include parents' and teachers' reports of social competence as well as sociometric data obtained from peers regarding competence. Multimethod assessment is one of the strengths of the Pentz (1985) study, which, in addition to standard survey-based assessment, collected observational (audiotaped) data for the measures of social assertiveness. Studies that have used multimethod assessment of behavioral skills to validate social competence have reported small to moderate associations between differing methods of assessment (Cavell & Kelley, 1992; Levenson & Gottman, 1978). Nevertheless, the use of multiple measures and multiple assessment strategies represents an important means of establishing construct validity.

Implications for Prevention

Select findings from the current study bode well for current drug abuse prevention strategies, which teach social and cognitive skills to help prepare youth for adulthood and provide needed skills to offset the demands of peer pressure for engaging in antisocial behavior (Botvin, 1995). The strength of the relations between the psychosocial constructs and alcohol use as early as the 8th grade reinforces the need for implementing primary prevention for even younger ages. It is well understood that elements both of social skills and personal competence are key ingredients of self-concept (Harter, 1985) and are required for successful transition to adulthood. The absence of these skills, either through developmental lag (Baumrind & Moselle, 1985) or pseudomaturity (Newcomb, 1987), may contribute to dysfunctional behaviors that could lead to chronic problems in living. The Newcomb (1987) hypothesis that many youth rapidly accelerate through adolescence as a result of their drinking comports nicely with the current proposed developmental lag model. That is, the onset of early-stage drinking may compromise the acquisition of skills, which was evident in the higher levels of reported drinking by poorly competent youth. Equally compelling is the recognition that some youth may initiate a delinquent lifestyle, through disenfranchisement or chronic alcohol use, that disrupts school attendance and limits opportunities for learning. The lack of participation in school and related institutions (extracurricular activities) and the inability to acquire requisite skills essential for normal functioning may forecast difficulties in a wide arena that compromise life's pursuits (Newcomb & Bentler, 1988).

Both the contemporaneous and longitudinal relations between competence and alcohol consumption supports implementation of cognitive-behavioral drug

abuse prevention strategies as an effective deterrent against experimental alcohol use. School-based programs that have recognized the theoretical and conceptual importance of competency-based strategies have recorded success (Botvin, Baker, Dusenbury, Botvin, & Diaz, 1995; Pentz et al., 1989), and their continued implementation and wide dissemination might ensure the continued success of school-based primary prevention.

A second piece of information obtained from the current study may assist also in the refinement of current school-based strategies. Many current intervention programs rely heavily on social influence models of drug prevention. It may be prudent, however, to recast existing intervention models to include alcohol-reduction strategies that consider the close generative relations between social and personal competence, self-efficacy, and deviant peer bonding. Kaplan and colleagues (Kaplan, 1980; Kaplan, Martin, & Robbins, 1984), for example, have suggested that low self-worth and high self-derogation are principal causes of drug use, and that the absence of conventional bonds to normative institutions (i.e., school) and the need for improved self-worth result in alternative and deviant subgroup bonding. The deviant subgroup provides a socioemotional vehicle for achieving recognition and peer social status, and despite their adoption and promotion of delinquent behavioral standards, they are regarded as a respite from self-denigrating social comparisons. The end result of this process is to accelerate consumption with a concomitant lowering of skill performance (a social control approach would posit that once these youth become deviant, their truancy will rise, lowering their desire to bond with social institutions such as school [Hirschi, 1969]).

The risk-engendering portion elucidated in the current study indicates that peer models for alcohol use often are developed in association with, or following, deficits in competence (i.e., decision skills and academic esteem). At the very least, social influences interact with competencies and, as evidenced by the nonlinear form in the respective plot of theses two measures, indicate a complex developmental relation. The cross-sectional findings provided evidence that the effect of social influence risk on alcohol consumption was buffered by decision skills and academic esteem. There were noted differences in the longitudinal model, in which the disordinal relations underscored that high social influence risk paved the way to more alcohol use irrespective of academic success. What these findings indicate, however, is that to successfully promote resistance to peer pressure for alcohol (and other drugs), prevention programs need to bolster self-confidence by imparting effective cognitive strategies that provide a positive foundation for self-esteem.

NOTES

1. It should be noted carefully that more recently, several independent research teams have conducted program evaluations that have considered the role of hypothesized mediating mechanisms in reducing alcohol or other illicit drug use. Specifically, Donaldson, Graham, and Hansen (1994) and Hansen et al. (1988) have examined mediational mechanisms (i.e., the role of refusal skills on drug use) using data obtained from a large, randomized school-based drug abuse prevention trial. Based on subset analyses of the same prevention trial, MacKinnon et al. (1991) reported program effects on hypothesized mediators including modification of positive drug expectancies, behavioral intentions, perceived peer attitudes, and communication skills. Similar analyses to examine the role of hypothesized mediating mechanisms in promoting or retarding cigarette, alcohol, and other illicit drug use were conducted by Botvin and colleagues (Botvin et al., 1992; Botvin, Schinke, Epstein, Diaz, & Botvin, 1995). Although results have been consistent within, but not necessarily across, these different prevention trials, in most cases program effects have been shown to influence hypothesized mediators in a manner consistent with theory (Botvin et al., 1992).

2. Traditionally, a risk-factor methodology has used an upper-quartile split of the distribution to determine risk status. This approach is meant to capture extreme behaviors that portend negative outcomes. Unfortunately, distributions for the peer and adult influence measures did not permit using this extreme cut point to determine risk status. A median split essentially differentiated youth who reported having none or one friend using alcohol from respondents who reported more than one friend (or adult) as using alcohol.

3. At the suggestion of one of the reviewers, the psychometric soundness of the measurement model and the relative influence of subject loss across the 2-year period was tested using several variants of the factor structure. First, a model consisting of the 10th-grade endogenous measures was tested separately for the follow-up sample. This model was compared (albeit not statistically) to the factor structure (standardized parameter loadings) tested with the baseline sample ($N = 976$) and the panel sample ($N = 823$). Two distinct sets of statistics support the tenability of the basic measurement model and also underscore that development (i.e., maturation) or subject loss did not readily influence the factor structure. Goodness-of-fit indices for the endogenous (10th-grade) model were adequate (with no additional parameterization, i.e., residual covariances), $\chi^2(24, 871) = 250.11, p < .001$, RMSR = .08, NFI = .911, NNFI = .878, AGFI = .886, and CFI = .919, as was the fit for the 8th-grade sample for the identical baseline measures, $\chi^2(24, 976) = 254.98$, $p < .001$, RMSR = .06, NFI = 910, NNFI = .876 AGFI = .888, and CFI = .917. The use of the panel sample (merged cases from 8th through 10th grade) did not detract from these fit indexes, $\chi^2(24, 823) = 162.32, p < .001$, RMSR = .05, NFI = .932, NNFI = .912, AGFI = .914, and CFI = .941, underscoring that sample attrition did little to influence the factor structure and factor covariances. Second, the correlation between the parameter estimates (both factor loadings and factor intercorrelations) obtained from the exogenous (8th-grade) and endogenous models was .95, indicating that little disfigurement to the basic factor structure occurred between assessments (underscoring the presence of some developmental equilibrium underlying these processes). Likewise, the correlation between parameter estimates obtained from the endogenous model (10th-grade sample) and a model tested with the panel sample ($N = 823$) was .99.

4. Although not dictated by theory or supported empirically by the LaGrange modification indices, a model was tested that specified correlated error terms for all of the psychosocial measures and then a model was tested that specified correlated error terms for the behavioral

measures. The model with correlated errors for all of the psychosocial measures improved somewhat the fit, $\chi^2(114) = 527.65$, NFI = .914, NNFI = .907, CFI = .931, AGFI = .898, RMSR = .06, as did the model that specified correlated residuals for all of the behavioral measures, $\chi^2(111) = 508.06$, NFI = .917, NNFI = .908, CFI = .934, AGFI = .898, RMSR = .06. The slight improvement in fit consistent with the added residual terms corresponding to the first, $\chi^2/df = 4.63$, and second model, $\chi^2/df = 4.57$, did not provide sufficient impetus to warrant inclusion of these terms at this point in the model-testing procedure.

5. An SEM also was tested that included gender to examine potential moderation of alcohol-competency relations. Model fit indices underscored that gender did not significantly improve the baseline model (CFI = .892), and none of the longitudinal paths from gender to the behavioral or psychosocial outcomes were significant. Gender, however, was associated significantly with all of the 8th-grade constructs including alcohol, $r = .10$, $p < .01$; social skills, $r = -.19$, $p < .001$; and competence, $r = -.12$, $p < .01$.

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