

SOCIAL SKILLS, COMPETENCE, AND DRUG  
REFUSAL EFFICACY AS PREDICTORS OF  
ADOLESCENT ALCOHOL USE\*<sup>†</sup>

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ABSTRACT

Numerous alcohol and drug abuse prevention trials have included social resistance training as a strategy for reducing early-stage adolescent alcohol use. Evaluations of these trials has shown them to be moderately effective, although the precise impact of the resistance training in comparison to other programmatic features has not been clearly identified. The current study examined the extent to which assertiveness and related social skills, personal competence (perceived cognitive mastery), and refusal efficacy predict alcohol involvement. Males were at greater risk for poor refusal skills and reported higher alcohol involvement. Cross-sectionally, youth characterized by poor social skill development reported lower refusal efficacy, lower grades, poor competence, and more alcohol use. Poor refusal efficacy was associated with more risk-taking, lower grades, less competence, and more alcohol use. Longitudinally, both poor refusal skills and risk-taking were associated with higher alcohol use. High personal competence was associated with lower alcohol use in both the eighth and tenth grades, but had no long-term effects on alcohol use. Findings highlight the close interplay between perceived competence and refusal skill efficacy, both of which should be included as essential components of school-based prevention strategies.

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Many school-based drug abuse prevention programs teach drug refusal skills as an effective means of countering peer and related pressures to use alcohol and other drugs [1-4]. The conceptual basis for social resistance skills programs rests heavily on the claim that youth require the confidence to refuse offers to drink alcohol and that teaching drug refusal and related social skills will bolster adolescents' ability to refuse explicit offers and peer pressure to drink. Specific features of resistance skills programs include teaching youth effective techniques to recognize explicit offers for alcohol, practicing refusal skills techniques (i.e., role playing), and developing cognitive scripts that can be invoked in situations where resistance skills would be effective. According to Botvin, "the main objective of resistance skills training is to provide adolescents with a repertoire of verbal and nonverbal skills that they can call on when confronted by peer pressure to use drugs in a variety of situations" [3, p. 32].

Although programs that utilize a social resistance skills approach have been shown to be effective for deterring the use of tobacco [5-7], alcohol and marijuana [8], it remains unclear as to which facet of the social skills training is most efficacious. In some cases, programs rely on general social skills training and confidence building [4], whereas other programs focus specifically on drug refusal skills as the most effective means of reducing consumption [9-11]. To better understand the potential efficacy of these prevention trials as well as move forward in the explanation of alcohol etiology, it is important to understand how much variation in consumption can be attributed to deficits in social skills (e.g., assertiveness) versus how much is determined by drug-specific resistance skills.

#### FINDINGS FROM SCHOOL-BASED DRUG ABUSE PREVENTION TRIALS

Over the past few years, several prevention studies have attempted to discern the relative effectiveness of different intervention components. Hansen and his colleagues, for example, conducted a program evaluation to determine the relative efficacy of a social resistance curriculum and an affective education model, the latter which emphasized inadequate coping skills and poor internal resources (i.e., low self-esteem) as determinants of early-stage drug use [10]. However, in the social curriculum a total of two out of twelve teaching modules included information directly related to social skills resistance training (a third module taught students to actively role play peer resistance techniques in front of adults). The remaining curriculum components included specific instruction on normative expectations (i.e., perceived drug use by peers and adults), motivations for and consequences of drug use, friendship formation (maintaining positive relations), and an assortment of strategies indirectly related to resistance skills (e.g., recognizing and resisting media and environmental influences). The eclectic nature of the social skills intervention makes it difficult to discern the relative effectiveness of this approach.

In a separate study, Hansen and Graham identified one prevention program in a comparative evaluation as Resistance Training, albeit four lessons (of a total of 9) focused on the consequences of using substances [9]. Information about the consequences of substance use could potentially boost the effects of the resistance training by increasing motivation to refuse drugs. In particular, the acquisition of information regarding negative consequences may provide a sound rationale for refusing peer advances to engage in behavior that is considered unhealthful. Because of the close developmental interplay between many of the instructional skills, it is difficult, in these and related studies, to disentangle the precise role that resistance skills training plays in contrast to other key program components that may directly influence behavioral consumption.<sup>1</sup>

#### RELATIONS OF SOCIAL AND PERSONAL COMPETENCE TO ALCOHOL USE

In contrast to social learning models of early-stage drug use, multi-modal or “generic” prevention programs emphasize the acquisition of social and personal competence as an effective means of deterring early-stage drug use [1-3]. The primary aim of these programs is to target an array of etiologic factors that are both directly and indirectly related to drug use in an effort to reduce risk and enhance protection. A core feature of competence enhancement programs is the view that vulnerability is comprised of a wide range of intrapersonal (e.g., coping skills) and interpersonal characteristics (e.g., social skills) that influence susceptibility to peer pressure. Accordingly, improvement in one area of functioning is likely to foster increased resilience in developmentally related areas of functioning [3]. For example, one of the hypothesized benefits of social skills/social competence training is to boost self-esteem and self-confidence, which has a positive impact on other related domains of functioning (i.e., increasing drug-specific refusal efficacy). Additional features of generic intervention strategies include practicing general assertiveness skills, as well as helping youth to acquire effective strategies to initiate social encounters with peers. Armed with greater confidence in their social skills, youth are likely to refuse offers to use alcohol and other drugs.

<sup>1</sup> Interestingly, Hansen and Graham [11] and Donaldson et al. [12] showed that programs emphasizing resistance skills training may have positively influenced skill development, but did not significantly reduce drug use. Although these researchers attribute the absence of this substantial and important relationship to invalid program theory, we theorize that other intrinsic “developmental” and motivational factors may influence the linkage between resistance skills and consumption. It is also important to note, as we have demonstrated with the use of the current data, that both etiology and prevention studies rely on similar methodologies that permit examination of the specific long-term developmental relations between skills and behavior.

## THEORETICAL UNDERPINNINGS TO COMPETENCE ENHANCEMENT PROGRAMS

Bandura's model of personal efficacy and behavior change provides a general theoretical background for understanding the relationship between competence (i.e., cognitive skill appraisal), refusal efficacy, and behavior [13, 14]. According to Bandura, self-efficacy is the "conviction that one can successfully execute the behavior required to produce the outcomes" [14, p. 193]. In contrast to the more global constructs of self-esteem and self-concept, self-efficacy is part of a specific symbolic organization consisting of representations (i.e., cognitive schemata) that capture previous performance episodes and link these performance evaluations to perceived beneficial outcomes. When the outcomes repeatedly occur and result from personal effort and persistence, a cognitively mediated motivational framework is established linking effort, behavior, and response outcome to the self (i.e., cognitive expectation or efficacy expectation). Bandura further suggested that "reinforcement operations affect behavior largely by creating expectations that behaving in a certain way will produce anticipated benefits or avert future difficulties" [14, p. 193]. Positive performance outcomes that are based on mastery experiences are more likely to promote high efficacy expectancies that should generalize across many behavioral tasks (i.e., stimulus generalization), whereas negative outcomes are more likely to generate avoidance coping (i.e., dysfunctional behavior).

Self-efficacy is directly tied to skills and the perception of competence to actualize these skills. In its broadest interpretation, competence is generally regarded as the ability "to generate and coordinate flexible, adaptive responses to demands and to generate and capitalize on opportunities in the environment" [15, p. 80]. Social competence includes the ability and motivation to navigate challenging interpersonal situations and is often considered a prerequisite for adequate social relations. According to Pentz, the targeted skills in social competence prevention strategies includes ". . . both the cognitions associated with confidence and perceived mastery of social skills . . ." [4, p. 118]. Although social competence is considered by many to be multi-faceted and includes a broad range of interpersonal skills [16], an essential focus of these programs includes general assertiveness (disagreeing, making requests, confrontational skills), peer-specific assertiveness (e.g., dealing with a wide range of pressures from peers), and assertiveness for resisting peer pressure to use drugs.

In general, whether adolescents are with their immediate family or with peers, successful adjustment hinges on the focal youths' ability to direct questions to people, talk in front of a group, present information to a gathering of people, and express their opinions and dissatisfactions in potentially conflictual situations. Moreover, a growing body of developmental research has shown that in the early stages of adolescence, superior school performance, peer relations, and optimal mental health adjustment essentially hinge on successful acquisition and

implementation of those skills [17-21]. Shy and rejected youth tend to avoid confrontational situations, fail to assert themselves properly, and get bullied, which may lead to a sense of perceived loss of control, depression, and other negative sequelae [22, 23]. Assertive youth, on the other hand, draw upon their interpersonal mastery to navigate difficult and stressful social situations and avoid some of the difficulties faced by their non-assertive counterparts. The perception of social competence helps youth to manage conflict, reduce anxiety, and provide confidence that is applied toward future situations.

A second distinguishing feature of generic, competence-based prevention approaches is a focus on personal skills and self-management strategies that can also effectively mitigate motivations to use drugs [3, 24]. Personal competence regards the ability to make effective decisions (including goal setting), implement self-management strategies to control anxiety (i.e., self-statements), maintain a sense of control in situations that require planning and mastery, and perceive self-confidence when problem-solving. In light of a growing body of research that shows strong predictive relations between competence and later mental health adjustment [25], we hypothesize that competent youth are more masterful (i.e., better able to execute a task), less motivated to engage in risky behavior, are less susceptible to negative social influences from peers and the media, and are more likely to either flatly refuse active drug offers or utilize assertive skills to defuse a confrontational situation.

## OVERVIEW OF THE CURRENT STUDY

In the current study, we examine the long-term influences on alcohol consumption of both social resistance skills and social skills, the latter of which included measures of assertiveness, (lack of) social confidence, social confrontation, and social comfort.<sup>2</sup> In addition, controlling for prior alcohol use, as well as risk associated both with poor social skills and poor refusal efficacy, we also tested the predictive capability of personal competence skills (i.e., academic esteem, self-reinforcement, problem-solving confidence, and personal control [cognitive mastery]), which have also been linked to the onset of early-stage alcohol use [3, 24, 27]. To better understand the developmental and structural linkages between these skills and behavior and to avoid any bias associated with known program effects, we utilized a nontreatment cohort of youth participating in a school-based, drug abuse prevention trial. The use of a control cohort

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The theoretical basis for the inclusion of these measures of psychosocial functioning in the prevention curriculum includes both Bandura's self-efficacy [13, 14] and Jessor and Jessor's problem behavior theory [26]. More complete descriptions of the rationale for inclusion of these and related measures as well as information pertaining to a series of program evaluations of the Life Skills Training intervention and its ability to reduce both alcohol and general drug consumption can be found in Botvin et al. [27-29].

enabled us to examine the basic structural relations between skills (both social and drug refusal) and alcohol use unfettered by the intervention.

Annual assessments in the school-based drug abuse prevention trial were conducted between seventh (pretest) and twelfth grade and the current sample is drawn from the first and third annual follow-up conducted in the eighth and tenth grades.<sup>3</sup> One important motivation for using data obtained from this age group is the heightened vulnerability associated with this age period. The transitional period between the eighth and tenth grade is a period of major reorganization of the self-system, with concomitant changes in perceived cognitive [31], social [32], and physical competence [33]. This is also a period that coincides with changes in peer group composition and peer relations [34, 35], highlighting the importance of social competence to successful adjustment. Along these lines, self-efficacy theory holds that an important vehicle for transmission and acquisition of response outcomes is vicarious or direct modeling. Either by observation or through active participation, youth acquire insight into the basic rewards and contingencies that accompany various pro- and antisocial activities. During the early stages of adolescence, a primary source of observational learning is peer friendship networks, which gain in stature and respective importance for decision-making and social comparison.

In addition to these conceptual issues, we relied on a risk factor methodology to assess deficits in social competence. Newcomb has suggested that cumulative risk indices that include multiple risk factors are more efficient predictors of consumption, particularly given the diverse array of etiological determinants of alcohol and drug use [36]. In the current study, additive risk indices of poor social competence and poor refusal skills were constructed by summing across binary indicators of risk status (these methods are more fully described below). The risk indices are then used to predict concurrent and subsequent personal competence and alcohol use.

We also included a measure of risk-taking in an effort to model the influence of ineffective social reward systems and personality differences that may alternatively cause both alcohol use and poor competence. Evidence is accruing of moderate to strong relations of sensation-seeking (impulsivity, risk-taking, and unconventionality) as a correlate or causal determinant of alcohol consumption among younger aged populations [37-39]. In particular, youth characterized as

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The eighth grade assessment was included as our baseline for primarily two reasons. First, base rates for alcohol consumption in the seventh grade are extremely low (only 58% reported some use of alcohol) and the corresponding distributional properties (skewness and kurtosis) for the behavioral measures may strain the robustness of the estimation procedures. By the eighth grade, there was a higher mean level of consumption (2.62 vs. 2.05 for the frequency measures), more behavioral variability existed, and evidence of nonnormality was considerably reduced (skewness and kurtosis were reduced threefold). In addition, the use of the eighth grade cohort also permitted meaningful comparisons with epidemiological data obtained from a nationally representative sample of youth [30].

risk-taking may take greater social risks and, as a result, increase their exposure to antisocial behavior. The self-derogation model proposed by Kaplan and his colleagues [40] suggests that poor social controls and lack of ties to conventional institutions foster deviant subgroup bonding. Associations with a more deviant peer group introduces new behavioral standards (i.e., high risk-taking and drug use) that reflect the interests of disenfranchised youth. The effect of the deviant peer group is to subvert opportunities to acquire skills that are obtained either vicariously (observational learning) or directly via modeling in classroom situations. The effect of diminished learning opportunities is to reduce personal and social competence.

In addition to modeling these important covariates, a dummy-coded measure of gender (males = 1 and females = 0) was included at baseline to control for socialization influences. Rates of consumption differ even at this early age with males reporting higher rates of alcohol consumption as well as more intense drinking. It is important to specify socialization processes in a developmental model to account for possible gender-based differences. Finally, we included a measure of self-reported grades in the model to account for differential survey completion rates (grades are a proxy for reading comprehension). Consistent with the transition into middle school, grades and related academic concerns become more prominent foci, underscoring the importance of controlling for academic concerns [41], which may influence perceived competence.

## METHOD

### Sample Description

Data for the current study were obtained as part of a five-year investigation conducted between 1985 and 1991, which was designed to study the etiology and prevention of tobacco, alcohol, and other illicit drug abuse. Details of this study, implementation protocols, and findings related to the preventive intervention have been reported extensively elsewhere [27, 29, 42] and only a few key features are noted here. The parent study included fifty-six public schools and was conducted at three suburban sites including central and eastern upstate New York and Long Island. These areas present a mixture of rural, suburban, and urban locations, are predominantly (91%) White, and middle-class. Beginning with the seventh grade (Time 1) and annually thereafter students responded to one of three randomly administered, closed-ended, group-administered, self-report paper and pencil questionnaires. Students were assured of the confidentiality of their responses in writing (both on the parental consent form and the questionnaire itself), verbally at the time of administration, and through a Certificate of Confidentiality from the Department of Health and Human Services. Passive consent procedures were used and less than 1 percent of the total sample included in the investigation refused participation. Tracking of students at the different assessment points was accomplished using unique identification codes lithocoded onto

questionnaires. Items included in the survey assessed a variety of psychosocial attitudinal, behavioral, and interpersonal domains related to alcohol, tobacco, and marijuana use.

Measures for the present study were obtained in the first annual posttest administered in the eighth grade (Time 3), and a subsequent follow-up data collection conducted in the tenth grade (Time 5). Two cohorts of data were available for this study, one collected annually in the fall and one collected shortly thereafter in the spring. Given the identical nature of the questionnaires, we combined these samples for the analyses.

### ALCOHOL, COMPETENCE, AND SOCIAL SKILL MEASURES

The modeling procedures were conducted using the EQS structural equations modeling program [43]. Observed indicators were constrained to load on one latent construct and for the measurement portion of the analyses, factor variances were fixed at unity. Multiple-indicator, latent constructs of alcohol and competence were hypothesized at both the eighth and tenth grades, whereas the remaining measures were constructed as observed variables. Indicators of alcohol involvement included frequency of alcohol use (i.e., “how often, if ever, do you drink alcoholic beverages?”), quantity (e.g., “how much, if at all, do you usually drink each time you drink?”), and drunkenness (“how often, if ever, do you get drunk?”). Responses for the alcohol frequency item ranged from “never tried them” (1) to “more than once a day” (9); for the drinking quantity item ranged from “I don’t drink” (1) to “more than 6 drinks” (6); and for the drunkenness item ranged from “I don’t drink” (1) to “more than once a day” (9).

### PERSONAL COMPETENCE

A latent construct of Personal Competence was reflected by four observed indicators tapping personal control in learning environments (i.e., cognitive mastery), self-reinforcement, academic esteem, and problem-solving confidence. Five items to tap personal control were taken from the thirty-item Paulhus Spheres of Control (SOC) battery [44]. Based on prior exploratory factor analyses, Paulhus obtained a ten-item subscale tapping personal efficacy and provided support for the empirical validity of this scale using confirmatory procedures. In the current study, an abridged set of five items (highest factor loadings) had reliabilities of .77 and .81, respectively, for the eighth and tenth grades. Sample items included “The things I achieve are due to my hard work and ability” and “I can learn almost anything if I set my mind to it.” Responses ranged from “strongly agree” (1) through “strongly disagree” (5).

Six items to tap academic esteem were taken from the Janis and Field Feelings of Inadequacy Scale (FIS) [45]. Fleming and Watts [46] reported that a rotated



factor solution for the full set of FIS items included dimensions tapping both academic (i.e., school abilities:  $\alpha = .77$ ) and non-academic components of self-esteem (i.e., self-regard). Based on the analyses of those authors, we created a six-item scale to assess (lack of) confidence about scholastic abilities, including self-evaluations regarding understanding school assignments (“I have trouble understanding things that are given for reading assignments”) and academic concern (“When I have to write a paper or do a reading assignment, I get kind of worried about it” and “I find it difficult to express my ideas in writing”). Three additional items tapped 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” [reversed in scoring]. Responses for these items were rated on a 5-point scale ranging from “strongly disagree” (1) through “strongly agree” (5), resulting in higher scores indicative of lower academic esteem. Coefficient alphas were .65 and .66, respectively, in the eighth and tenth grades.

Six items to tap problem-solving confidence were taken from the Heppner and Petersen thirty-five-item Problem Solving Inventory [PSI: 47]. The PSI was originally factor analyzed by Heppner and Petersen using exploratory methods (principal components with varimax rotation) and an eleven-item scale ( $\alpha = .85$ ) obtained tapping confidence in handling applied problems. Seven of the items with the highest loadings are used in the current study. Sample items included “I have the ability to solve most problems even though at first it looks as if there’s no solution,” and “With enough time, I think I can solve most problems that come up.” Responses for these seven items ranged from “strongly disagree” (1) through “strongly agree” (5). Coefficient alphas were .79 and .83, respectively, for the eighth and tenth grades.

Nine items from the Heiby [48] thirty-item Frequency of Self-Reinforcement Attitudes Questionnaires were used to assess a general response set of self-reward strategies. According to Heiby, self-reinforcement is “the process of establishing and controlling overt and covert positive consequences of one’s own behavior” [48, p. 1304]. Individuals with low frequency of self-reinforcement (FSR) will be characteristically low in self-confidence and self-esteem as part of their response set due primarily to the unpredictable nature of external sources of reinforcement. Heiby presents extensive criterion, face validity (interrater reliability), and reliability data (both split-half and test-retest) supporting the utility of a measure of self-reinforcement. From the original pool of thirty items, nine items were chosen with face validity for adolescent populations and used in the current study. Sample items included “When I succeed at small things, I become encouraged to go on,” and “The way I achieve my goals is by rewarding myself every step along the way.” Responses for those items ranged from “strongly disagree” (1) through “strongly agree” (5). Coefficient alphas were .84 and .86, respectively, for the eighth and tenth grades.

## ASSESSMENT OF SOCIAL COMPETENCE

Sixteen items assessing frequency of interpersonal assertiveness were taken from the forty-item Gambrell and Richey Assertion Inventory [49]. Wills, Botvin, and Baker demonstrated the factorial validity and scale integrity of a reduced set of items and provided evidence of moderate relations to alcohol and drug use in an adolescent sample [50]. Sample items assessed the frequency (probability) of social assertiveness (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 related to the 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 ranged from “never” (1) through “almost always” (5). In the current sample, internal consistency (coefficient alpha) was, respectively, .79 for the eighth and tenth grades.

Nine items assessing degree of nervousness in social situations (i.e., social comfort) were taken from the Richardson and Tasto [51] 166-item Social Reaction Inventory (SRI). Items in the SRI assess the verbal-cognitive component of anxiety in the domain of social relationships. Richardson and Tasto used principal axes factoring methods to derive seven domains including a set of items tapping social assertiveness (interactions) and visibility (expressing opinions and defense of rights). A common stem (“How nervous would you feel . . .”) preceded each item and sample items included “. . . giving a speech before a group of strangers,” and “. . . feeling like you are the center of attention in a group.” Coefficient alphas were .88 and .89, respectively, for the eighth and tenth grade samples. Responses ranged from “not at all nervous” (1) through “very nervous” (5).

Four additional items assessing social confrontation and anger expression were also taken from the Social Reaction Inventory. These items are typically considered part of the general domain of social assertiveness but because of their specificity to anger feelings, may reflect a conceptually distinct facet of social assertiveness. Using the same stem as the nine-item social assertiveness scale, sample items included, “How nervous would you feel . . . telling someone you know that you are angry with him [her],” and “. . . if you tell someone who is embarrassing you to stop.” A response format identical to the social assertiveness items was used with the social confrontation items. Based on the current data, coefficient alphas were .81 and .85, respectively, for the eighth and tenth grades.

Social (interpersonal) concern was assessed by an eight-item scale taken from the Janis and Field FIS. Based on a subset of the original FIS scale items, Fleming and Watts provided factor analytic evidence (direct oblimin rotation of principal components analysis) of a dimension 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 “strongly disagree” (1) through “strongly agree” (5) [46]. In the current study, coefficient alphas were .81 and .82, respectively, for the eighth and tenth grades.

A thirteen-item scale was used to assess degree of confidence in social situations. A common stem (“How confident you are that you could do well in the following situations . . .”) preceded each question (i.e., “. . . asking questions to avoid a misunderstanding,” “. . . ending a conversation with friends without offending them,” and “. . . making requests or asking favors”). Responses ranged from “not at all confident” (1) through “very confident” (5). Adequate psychometric properties and statistical relations with drug consumption measures have been demonstrated empirically and are reported elsewhere [42]. For the current study, internal consistency was .87 and .89, respectively, for the eighth and tenth grades.

The five scales assessing social competence were used to form an additive risk index. Each individual measure was dichotomized using an upper (or lower) quartile cut-point to determine risk status. Youth reporting infrequent assertiveness, high social concern, low social comfort, poor confrontational skills, and lacking confidence in their social skills were assigned a “1,” whereas the remaining students in the distribution were given a “0.” The resultant binary scales were then summed into a single additive index of social competence risk, with scores ranging from 0 to 5. Higher scores on this index are indicative of greater risk for poor social competence.

Refusal skills were assessed using a three-item scale. The three items (i.e., “refusing a cigarette offered by a friend” [“not at all confident” (1) to “very confident” (5)]; “say no when someone tries to get you to drink,” and “say no when someone tries to get you to smoke” [“never” (1) to “almost always” (5)]) were averaged and the resultant composite dichotomized according to a risk-factor methodology. Students in the lower quartile of the composite were assigned a “1” to designate poor refusal skills (low confidence and infrequent skill implementation) and the remaining students not regarded as high-risk were assigned a “0.” Coefficient alpha for the three-item refusal skills scale was .74 both for the eighth and tenth grades.

Several analyses were conducted to establish if there was behavior specificity for the alcohol and cigarette refusal items. First chi-square proportion tests were used to examine if there was a statistical overlap in the students reporting any alcohol experience who also reported some use of cigarettes (both behavioral measures were dichotomized to create measures of “use/nonuse”). Among youth reporting some use of alcohol, 41.4 percent reported experience with cigarettes and 64.8 percent reported they currently smoke (from at least a few times/year through a pack or more each day). This suggests that adolescents who use alcohol do so in combination with other drugs. The observed overlap in substances comports with epidemiological evidence from adolescent populations

that underscores patterns of multisubstance use particularly involving cigarettes and alcohol [52]. In the current study, the generality of the drug-specific refusal skill items also was observed in the pattern of bivariate associations between the cigarette refusal items and alcohol consumption (average  $r = -.37$ ), the alcohol refusal item and alcohol use ( $r = -.64$ ), the smoking refusal items and smoking behavior ( $r = -.41$ ), and the alcohol refusal item and smoking behavior ( $r = -.37$ ). These relations reveal a pattern of shared variance between cigarette-specific skills and alcohol use and likewise between alcohol-specific skills and cigarette use. Based on this evidence, all three refusal items were included as an indicator of refusal skills efficacy (given the risk methodology used, high scores on the refusal skills measure indicate greater risk for poor refusal skills).

Finally, seven items taken from the Eysenck Personality Inventory were used to assess risk-taking [53]. This brief measure of risk-taking assesses a proclivity toward dangerous behaviors, excitement, and impulsivity. Sample items included “I get bored more easily than most people” and “I would do almost anything for a dare.” Responses ranged from “strongly disagree” (1) through “strongly agree” (5) and in the current study coefficient alpha was .75 for both the eighth and tenth grades.

## RESULTS

A total of 974 students were available for the longitudinal path analyses (8th grade: 51.4% male, mean age = 13,  $SD = .51$ ). Not all of the students were able to finish the questionnaire in the allotted time period and we augmented missing data using the Expectation-Maximization (EM) algorithm. Based on statistical theorems proposed by Little and Rubin [54] and Rubin [55], multiple imputation methods can be used to augment missing data utilizing a maximum-likelihood estimation procedure that iteratively “fills in” missing data with predicted scores based on complete data [56, 57]. In contrast to both listwise deletion, an extremely restrictive procedure that would eliminate a large portion of usable data, and mean substitution which artificially inflates the kurtose (and produces biased estimates), EM procedures utilize full regression methods to produce unbiased estimates of model parameters [56]. Analyses showed that 61 percent of the cases had complete data, of the remaining cases 5 percent had at most one missing variable, and 6 percent had two missing; average number of missing values was five out of nineteen variables included in the analyses. Inspection of the sixty-six missing data patterns revealed these data were missing completely at random and satisfied the conditions for multiple imputation [55, 56]. Additional analyses indicated that missingness was significantly related to grades (a proxy for reading comprehension), therefore a measure of self-reported grades [ranging from “D’s or lower” (1) through “mostly A’s” (7)] was included both in the EM

procedure and in the final model parameterization. A total of five augmented data sets were produced and corresponding statistics are point estimates averaging across the five imputed datasets.

### GENDER DIFFERENCES IN ALCOHOL USE, SOCIAL SKILLS, AND COMPETENCE

Although a number of gender differences were nonsignificant, it is still worth noting that in the eighth grade male students reported more frequent alcohol use, greater consumption of alcohol, and more instances of being drunk. Male students also reported less social skills competence, more risk-taking, lower refusal skills competence, and less academic esteem. Female students, on the other hand, reported more self-mastery, more problem-solving confidence, and higher grades. The average absolute correlation between gender and the full set of eighth grade behavioral measures was  $r = .06$ , between gender and the eighth grade psychosocial measures was  $r = .04$ , between gender and tenth grade consumption was  $r = .06$ , and between gender and tenth grade psychosocial functioning was  $r = .05$ . Despite the limited predictive power of gender with respect to the model variables, gender was included in the final path model to account for socialization differences that may developmentally influence both consumption and competence.

Summary descriptive statistics (means and standard deviations) and bivariate relations (point estimates) for all of the measures used in the path model are contained in Table 1. Although not presented, none of the measures were characteristically skewed (exceeding 2.00) and the largest deviation from normality was observed in the drunkenness variable (kurtosis = 5.21 in the 8th grade). As expected, the additive measures of risk for poor social competence and poor refusal skills were inversely related to all five measures of personal competence (e.g., mastery) and positively associated with all three measures of alcohol. This same pattern of relations applied to risk-taking, which was positively associated with poor social competence and poor refusal skills and also positively associated with alcohol use. Consistent with our hypotheses, the four measures of competence were all negatively associated with alcohol use and the three measures of consumption were positively and highly interrelated.

The pattern of associations between competence and alcohol use remained consistent across time, however, there was also evidence of some temporal erosion as the magnitude of these associations diminished. The three measures of alcohol use remained moderately associated in the tenth grade, reinforcing that alcohol involvement was based on frequent and intense use (high volume per occasion) that also included frequent drunkenness.

Table 1. Summary of Descriptive Statistics and Correlations Among All Observed Measures Used in the Model

	1	2	3	4	5	6	7	8
8th Grade <sup>a</sup>								
1. Gender	1.0							
2. Poor social skills	.02	1.0						
3. Risk-taking	.06	-.07	1.0					
4. Poor refusal skills	.08	.16	.17	1.0				
5. Academic esteem <sup>b</sup>	.03	.16	.15	.23	1.0			
6. Self-reinforcement	.01	-.24	-.04	-.22	-.17	1.0		
7. Cognitive mastery	-.06	-.28	-.04	-.29	-.31	.54	1.0	
8. Problem-solving	-.04	-.23	-.06	-.17	-.19	.37	.42	1.0
9. Grades	-.05	-.20	-.11	-.24	-.41	.24	.32	.20
10. Frequency	.06	.05	.29	.41	.16	-.20	-.25	-.18
11. Intensity	.08	.06	.25	.42	.16	-.19	-.23	-.15
12. Drunkenness	.05	.12	.23	.44	.19	-.17	-.23	-.14
10th Grade								
13. Academic esteem	.02	.13	.11	.14	.44	-.10	-.18	-.16
14. Self-reinforcement	-.02	-.14	-.10	-.13	-.20	.40	.23	.15
15. Cognitive mastery	-.09	-.15	-.13	-.18	-.20	.24	.32	.22
16. Problem solving	-.07	-.16	-.04	-.16	-.20	.23	.25	.30
17. Frequency	.10	.03	.23	.31	.12	-.11	-.17	-.05
18. Intensity	.11	.03	.22	.35	.14	-.15	-.22	-.07
19. Drunkenness	.06	.03	.23	.36	.09	.09	-.18	-.04
Mean	.50	1.25	3.23	0.26	5.01	3.37	3.35	3.36
Standard Deviation	.49	1.10	.72	.43	1.59	.65	.61	.66

<sup>a</sup>Statistics based on  $N = 974$ . Statistics are point estimates averaged over five imputed data sets.

<sup>b</sup>Scaled toward lower academic esteem.

**Note:** Significance level of  $p \leq .05$  is obtained for correlations of .19 or greater (two-tailed) and  $p \leq .01$  for  $r \geq .25$ .

### PREVALENCE OF ALCOHOL USE AND TRANSITIONAL ALCOHOL USE

In the eighth grade, 36 percent of the students reported some use of alcohol, whereas in the tenth grade 64.3 percent of the sample reported experience with alcohol. There was a significant increase in the proportion of users [ $\chi^2(1) = 110.0, p < .001$ ]. As an indication of the intensity of drinking, among the eighth grade nonabstaining youth, two-thirds of these youth reported having at least two or more drinks per occasion and one in five students reported having recently been drunk (ranging from 2 to 3 times per month to every day). In the tenth grade, the relative proportions for intense drinking and drunkenness increased to 83 percent and 30 percent, respectively.

9	10	11	12	13	14	15	16	17	18	19
1.0										
-.26	1.0									
-.27	.77	1.0								
-.31	.82	.82	1.0							
-.26	.09	.09	.10	1.0						
.21	-.21	-.18	-.19	-.23	1.0					
.23	-.28	-.21	-.22	-.35	.48	1.0				
.21	-.21	-.16	-.20	-.35	.36	.46	1.0			
-.15	.53	.44	.42	.12	-.14	-.23	-.17	1.0		
-.23	.52	.52	.48	.13	-.16	-.24	-.20	.70	1.0	
-.18	.56	.51	.52	.12	-.16	-.26	-.18	.72	.74	1.0
3.34	2.66	2.12	1.91	3.42	3.36	3.36	3.39	3.69	3.21	2.86
.53	1.75	1.62	1.43	.67	.65	.66	.56	1.93	1.74	1.78

### RESULTS OF THE CONFIRMATORY MEASUREMENT MODEL

The next step in the model building process included conducting the confirmatory factor analysis (CFA) to empirically determine the fit of the hypothesized model structure to the sample covariances. Figure 1 contains the standardized solution for the CFA. Three important pieces of evaluative information are provided from the CFA procedure. First, the standardized parameter loadings attest to the statistical reliability of the hypothesized latent dimensions (i.e., competence and alcohol involvement). In addition, estimates of the associations among the exogenous (observed) measures and between the exogenous measures and latent constructs yield information on construct and criterion validity. A third

important piece of information provided by the CFA regards how well the sample covariances reproduce the implied (hypothesized) model. Several incremental goodness-of-fit statistics are used to gauge the fit including the Bentler-Bonett Normed Fit Index (NFI [58]), the Nonnormed Fit Index (NNFI), and the Comparative Fit Index [59], which in contrast to the two previous fit statistics is a population chi-square statistic that adjusts for sample size. All of the incremental fit indices range from 0 through 1 with values of .90 or more indicating a good fit. Incremental fit indices show the improvement in fit of the hypothesized model compared to a null or independence model that specifies no hypothesized correlations among the measures. In addition to these specific fit indices, the standardized root mean square of the residual differences is the average absolute differences between the observed covariances and the reproduced (parameterized) matrix. As an indicator of fit, the RMSR should be quite small (RMSR  $\leq$  .05), indicating that the model has been correctly specified and that there is little residual discrepancy between the implied and sample covariance matrices.

Fit indices for all five augmented datasets underscored that the models provided a reasonably adequate fit to the data [ $\chi^2(121, 974) = 631.60$ , NFI = .914, NNFI = .900, CFI = .929,  $p < .001$ , RMSR = .04,  $\chi^2/df = 5.22$ ].<sup>4</sup> Standardized parameter loadings for the observed indicators were large and significant, underscoring the statistical reliability of these measures. Based on their respective loadings, eighth grade Competence was most strongly indicated by cognitive mastery and least so by (low) academic esteem. Factor loadings for Alcohol Involvement were fairly equivalent in magnitude, reinforcing the equal contribution of these measures toward defining high-risk drinking. The pattern of factor loadings remained consistent for the tenth grade constructs. Correlations among the exogenous measures are contained in Table 2 and are discussed more extensively in the context of the structural equation model.

4

The goodness-of-fit indices reported are based on the first set of maximum-likelihood estimates of the variance-covariance matrix produced by the EM algorithm applied to the raw data. Subsequent imputed datasets are obtained by bootstrapping (974 cases are drawn randomly with replacement) from the parent raw data. Goodness-of-fit statistics for the four remaining imputed datasets were as follows: [ $\chi^2(121) = 943.37$ , NFI = .881, NNFI = .850, CFI = .894,  $p < .001$ , RMSR = .04], [ $\chi^2(121) = 754.99$ , NFI = .899, NNFI = .877, CFI = .913,  $p < .001$ , RMSR = .05], [ $\chi^2(121) = 844.54$ , NFI = .887, NNFI = .860, CFI = .901,  $p < .001$ , RMSR = .05], and [ $\chi^2(121) = 815.02$ , NFI = .896, NNFI = .872, CFI = .909,  $p < .001$ , RMSR = .05]. In addition, although all of the model fit indices underscore some improvement could be made to the fit of the base model (i.e., reducing the discrepancy between the sample and implied covariance structures), empirically conducted simulation studies have shown reparameterization with residual covariances to be highly unstable and sample specific. In particular, MacCallum and colleagues [60] have shown that respecification (e.g., sequential model modification) based on post hoc modification indices are unstable with sample sizes less than 1,500. Given the exploratory nature of this study, we felt inclined to leave the base model intact especially because all of the incremental model fit indices approached (or in some cases exceeded) the gold standard of .90.



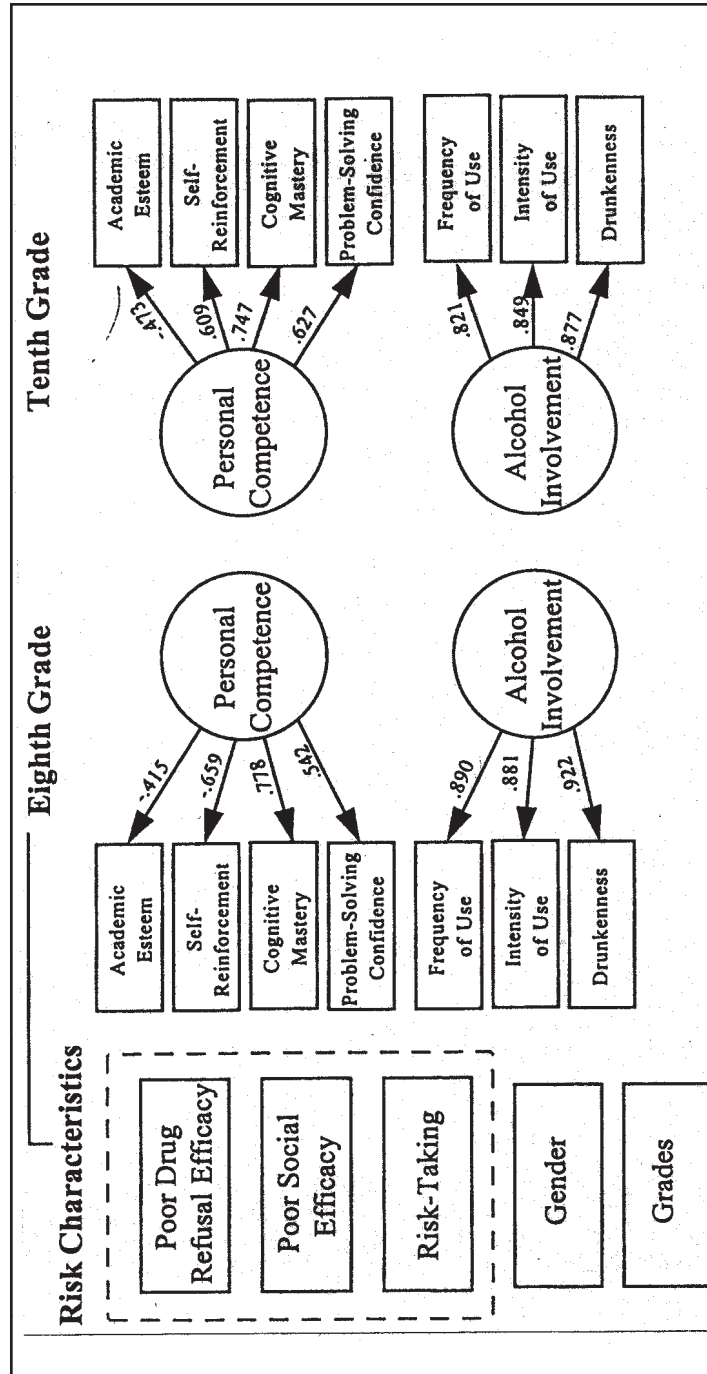


Figure 1. Confirmatory measurement model depicting associations between risk, competence, and alcohol involvement. Large circles represent latent constructs, rectangles are measured variables. Factor loadings are standardized and significance levels were determined by critical ratios on unstandardized coefficients. Factor intercorrelations corresponding to the measurement model are included in Table 2.

Table 2. Cross-Sectional (8th Grade) Associations Among Exogenous Measures Corresponding to Final Structural Equations Model

	V1	V2	V3	V4	V5	F1 <sup>a</sup>	F2 <sup>a</sup>
1. Gender	1.0	-.03	.07*	.08*	-.05	-.04	.08*
2. Poor social skills		1.0	-.05	.16**	-.21**	-.42**	.08*
3. Risk taking			1.0	.20**	*	*	.32**
4. Poor refusal skills				*	-.13**	-.07*	*
5. Grades				1.0	-.25**	-.41**	.50**
6. Personal competence <sup>a</sup>					*	*	*
7. Alcohol use <sup>a</sup>					1.0	.52**	-.32**
						*	*
						1.0	-.33**
							*
							1.0

<sup>a</sup>Latent construct, all other measures are observed.

\* $p \leq .05$

\*\* $p \leq .01$

\*\*\* $p \leq .001$

## RESULTS OF THE LONGITUDINAL PATH ANALYSIS

Next, the measurement model was reconstructed and a two-wave, three-year longitudinal structural model was tested. Across-time covariances from the measurement model were reparameterized to reflect “causal” regression paths between the eighth grade predictors and tenth grade outcome constructs. Disturbance terms (residual variances that reflect variation net of prediction from the causal paths) were specified for the latent constructs in the tenth grade. Figure 2 contains the results of the longitudinal structural equation model (nonsignificant paths removed). All of the exogenous measures were allowed to freely covary, especially because specification of causal relations among contemporaneous measures are at best tenuous (these correlations are contained in Table 2). The fit of this model was identical to the fit of the CFA (no post hoc parameterization was included to capture sample-specific, residual covariances).

As depicted, there were only three significant longitudinal paths: risk-taking predicted alcohol use ( $\beta = .10, p < .05$ ), and poor drug refusal efficacy predicted both personal competence ( $\beta = .10, p < .05$ ) and alcohol involvement ( $\beta = .11, p < .05$ ). These parameter estimates are partial standardized regression coefficients and indicate the change in the outcome for a corresponding unit change in the predictor, controlling for all other measures in the model. High competence was associated with lower alcohol use at both assessments, although this relationship was smaller in magnitude in the tenth grade. Associations among the eighth grade exogenous measures (Table 2) reveal that they all were significantly associated with each other and likewise with eighth grade alcohol use.

Consistent with our research hypotheses, alcohol use was inversely associated with grades ( $r = -.32, p < .001$ ) and competence ( $r = -.33, p < .001$ ). As

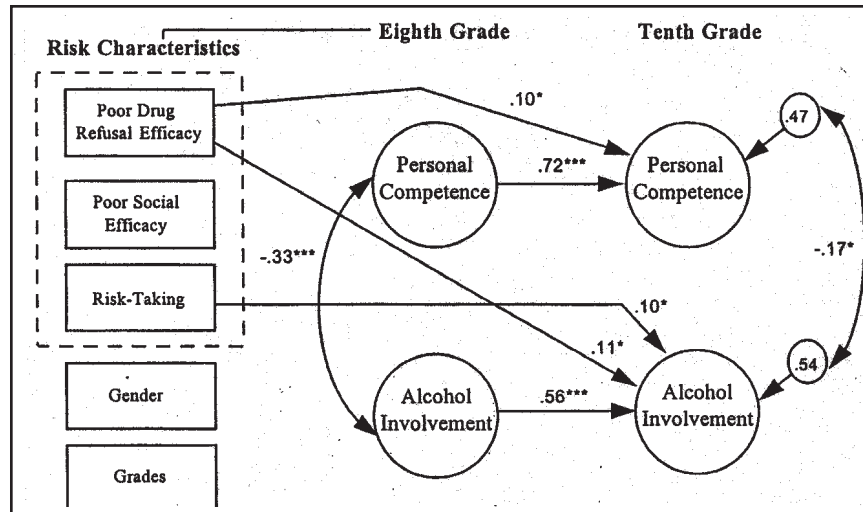


Figure 2. Longitudinal relations between social risk, competence, and alcohol use. Large circles represent latent factors and small circles with numbers reflect residual variances. Structural regression coefficients are standardized and significance levels were determined by critical ratios on unstandardized coefficients [ $*p < .05$ ;  $**p < .01$ ;  $***p < .001$ ].

expected, grades were positively associated with personal competence ( $r = .52, p < .001$ ). Interestingly, the correlations between competence and social skills and likewise between competence and refusal efficacy were equivalent in magnitude ( $r = -.42$  and  $-.41$ , respectively); however, the same pattern of association was not observed between the two respective skills measures and alcohol use ( $r = .08$  and  $.50$ , for social skills and refusal efficacy, respectively). These patterns, however, were consistent with the fact that higher scores on the risk indices indicated less social competence, poor refusal skills efficacy, and both of these risk conditions were related to increased alcohol use.

## DISCUSSION

The primary objective of this study was to examine the relative contributions of social and personal competence and refusal skills to the prediction of adolescent alcohol use. Toward this end, we tested a two-wave, path model that included measures of social competence, drug refusal skills, personal competence, and alcohol use measured in the eighth grade and examined the long-term effects of these measures on personal competence and alcohol use in the tenth

grade. The hypothesized model also included controls for risk-taking and gender, both of which may spuriously confound those relations during the early part of the adolescent development.

One of the main findings to come from this study is that only two of the early adolescent measures (high risk-taking and poor refusal skills) predicted later alcohol involvement, and both effects were relatively small. Interestingly, in their evaluation of an alcohol prevention trial, Donaldson et al. [12] reported that refusal skills did not predict alcohol use over a four-year period, although in their reported study social skills training improved refusal skills. Even though the Donaldson et al. study was a prevention study and involved a younger age group than the current study, the different findings underscore the need to identify specific and possibly age-related, causal risk processes.

One possible avenue of inquiry would include establishing whether the alcohol risk associated with the variables examined in this study is a developmentally stable process, or whether vulnerability fluctuates as conditions of risk accumulate and change over time. Younger age youth may not be exposed sufficiently to peer pressure for alcohol and drug use, but, over time, these social pressures may increase and reach a critical mass. The findings from the current study suggest that the skills associated with alcohol (and cigarette) refusal efficacy may not be static, but rather with increasing age these resistance skills gain in significance. Social skills increase in importance during adolescence as youth engage in greater social comparison and invest more in their own interpersonal competencies. Consistent with these developmental changes, refusal skills and the underlying motivations that encourage assertive behavior may become more influential processes in the development of resilience.

Somewhat unexpectedly, poor refusal efficacy was positively associated with later personal competence. In the eighth grade assessment, the zero-order relations between elements of personal competence and refusal skill were positive, indicating that higher competence was associated with higher refusal efficacy. On the basis of the zero-order relations, we speculate that, despite their initial risk status, there is some change over the three-year intervening period, and youth with poor refusal skills improve their social and personal competence (therefore individuals shift in their relative rank position). A closer inspection of the residual correlation matrix provides some support for this claim. With the exception of problem-solving confidence, all of the associations between refusal skills and the observed measures of personal competence were negative (for both the 8th and 10th grades). The tenth grade relations contained in the residual matrix reflect associations net of the effect of all predictors (with stability effects partialled). In the final structural model, the sign associated with these bivariate relations was reversed, perhaps pointing to a subsample of youth who are rapidly undergoing transitions in their skill development during the intervening period. Although SEM procedures contain many strengths for handling multivariate data with repeated measures, it is difficult to capture the full set of developmental

relations with a single nomothetic model. Further analyses that dissect the sample into components reflecting stable versus changing patterns of behavior and skills should clarify these developmental mechanisms.

Our data also confirm a long-term, direct relation between risk-taking and alcohol involvement. Stacy et al. [37] has suggested that identification of high-risk youth on the basis of personality characteristics like impulsivity is an important component of designing successful interventions. Risk-taking or impulsivity may be associated with ineffective social rewards systems and poor regulation or modulation of inhibitory systems. Continued and unabated disinhibition may portend later consumption and related problems (i.e., driving under the influence, which combines risky behavior and excessive alcohol intake). The early adolescent association between risk-taking and competence provides evidence of an early developmental linkage between inhibition/reward systems and mastery evaluation. Unfortunately, the absence of a consequence measure of risk-taking to control for contemporaneous relations at follow-up prevents establishing the true causal nature of those relations.

Part of what is captured in our measure of risk-taking is an element of unconventionality and thrill seeking (e.g., fast driving, boredom, daring activities). Social control and self-derogation theories [40] suggest that unconventionality is associated with weak ties to normative institutions. Youth who lack strong ties to school and other educational environments miss out on critical opportunities to acquire competencies that are needed for successful adjustment. Social reward mechanisms for these youth that can effectively compensate for their skills deficits may include risk-taking and substance use. Future studies may want to examine the stability and predictive significance of these relations over extended periods of time in an effort to determine if personality characteristics that tie into emotional regulation and reward systems (i.e., sensation-seeking) are linked with cognitive evaluation and self-regulatory systems (i.e., competence).

Both alcohol involvement and competence were moderately stable over the three-year period, reinforcing the importance of these behaviors and skills for this age period. Rates of alcohol use in the current sample are consistent with national estimates [30] obtained from secondary school students. Slightly more than one-third of the eighth graders and roughly two-thirds of the tenth graders report some experience with alcohol (corresponding to 45.3% and 63.5% for annual use among 8th and 10th graders in the MTF study). Given the large numbers of youth reporting some alcohol use in this period and the rapid increase in usage between eighth and tenth grade period, it seems prudent to invest in strategies that reduce early onset and that can abate continued use of alcohol use during this critical age period.

Despite the absence of any long-term relations between personal competence and alcohol use, high levels of competence was cross-sectionally associated with less alcohol use, albeit the magnitude of this association diminished over time. In a separate study, Scheier and Botvin [61] examined the long-term consequences

of polydrug use on cognitive and personal competence. These authors reported small, albeit significant, effects of alcohol on self-reinforcement and decision skills. Because those effects were small and the contemporaneous relations at follow-up between drug use and competence were moderate to large, these authors suggested that the effects of early-stage drug use on later competence were developmentally delayed. According to this model, early deficits in competence may not extend forward in time to sufficiently increase alcohol use, however, prolonged alcohol use through the adolescent years continues to retard skill development. It is the effect of sustained drinking and nonparticipation in socially rewarding and competitive school environments that fosters deficits in competence.

A second and no less important research goal in the current study including examining the interrelationship of social skills and competence in the early stages of adolescence. The pattern of positive associations among the competence measures and negative relations between the social risk measures and competence (including grades) were consistent with our hypotheses. The magnitude of association between the two sets of social skills (risk for poor social skills and low refusal efficacy) and competence were equivalent ( $r = -.42$  and  $-.41$ , respectively, for social skills and refusal skills), and the moderate overlap between these constructs provides further evidence of cross-domain relations [18]. Youth with poor social skills and poor refusal efficacy also reported poor personal control (cognitive mastery), low frequency of self-reinforcement, low academic esteem, and low problem-solving confidence. Greater risk for poor refusal skills and lower personal competence also were significantly associated with alcohol use. The positive and relatively large association between grades and competence reinforces the linkage between perceptions of self-efficacy and actual performance (albeit the latter is self-reported). Both grades and competence were equivalently and moderately related to alcohol use, underscoring that alcohol-using youth reported lower grades and lower perceived mastery of important and requisite developmental skills.

Interestingly, the statistical linkage between poor refusal skills and alcohol in the eighth grade was considerably larger than the relation between risk for poor social skills and alcohol use. The individual measures comprising the index of social skills risk reflect lack of confidence in general assertiveness (i.e., defense of rights), low social confrontation, and high social concern, the latter measure ostensibly tapping social anxiety. The basis for the inclusion of social competence enhancement as part of current prevention strategies rests on the assumption that acquiring confidence in the execution of interpersonal skills will offset negative peer pressure and help youth to resist drug offers. In addition, social confidence, positive social relations, and age-appropriate assertiveness are all considered necessary (but not sufficient) for the successful transition to adulthood.

A closer inspection of the respective zero-order associations between the constituent elements of the social skills risk index and alcohol use shows these

relations to be small and nonsignificant. Usually, pooling the variation of a homogeneous set of items into a single index of risk will increase their predictive strength, however, in the current analyses this was not the case. It is plausible that social skills may not present a formidable barrier against alcohol use at this early stage, but developmentally these skills may acquire greater protective strength (particularly given their comparatively larger observed relationship with personal competence). Rather than diminishing their importance for prevention, it may be prudent to reinforce these skills at an early age in an effort to reduce early-stage alcohol use and prevent further transitions from use to abuse.

### IMPLICATIONS FOR PREVENTION

There are also several important lessons for prevention based on the current findings. First, the findings from the current study provide evidence that refusal efficacy has long-term deterrent capabilities and that youth who lack refusal skills are more likely to engage in alcohol use during early adolescence and this condition persists into later adolescence. Alcohol use, or for that matter any drug use, during adolescence portends negative behavioral and psychosocial outcomes that can diminish the possibility of normal adult functioning. In the face of mounting evidence obtained from evaluations of several prevention trials that resistance skills training does not obtain the same optimal goals, for example, as does normative education (i.e., altering youths' perceptions of peer and adult drug use), the current findings argue that we should continue arming these youth with appropriate social resistance skills.

In addition, the cross-sectional strength of the relations between competence, social skills, and refusal efficacy augers well for multi-modal, prevention curriculum, the latter which may be effective in reducing or delaying drug use. This is especially important given the diverse set of etiological risk factors that promote alcohol and drug use [62]. Furthermore, these findings also provide evidence that competence training can result in reduced alcohol consumption. That is, youth reporting high levels of personal competence can effectively apply these skills to offset various internal and external pressures to use alcohol and other drugs. Based on the current analyses, these pressures include a wide range of feelings of insecurity revolving around social presence (anxiety), active peer pressure to smoke or drink, and for males more than females, impulsivity.

### LIMITATIONS

There are several limitations to the current study worth noting. First, the sample we analyzed represents a broad mixture of experimental alcohol use patterns, including youth reporting no alcohol use mixed with students reporting frequent, excessive, and disruptive alcohol use. The processes highlighted by the longitudinal path model, however, reflect group, rather than individual level,



behavioral tendencies, and future analyses may want to exact greater precision with respect to estimation of individual differences for psychosocial functioning (i.e., competencies) as well as alcohol use (nonuse vs. use). A more specific understanding of how risk evolves over time will only help to inform prevention researchers and practitioners with respect to the broad success that can be achieved with high-risk populations.

Second, in the interest of parsimony the exogenous measures in the model represent a few of the many risk factors associated with adolescent alcohol use. Clearly inclusion of a host of social influence, motivational (i.e., expectancies), family, and personality measures are required to more accurately and fully specify the developmental influences that promulgate consumption. Among the many possible indicators of model fit, the overall  $R^2$  value for both the cross-sectional and longitudinal model underscore that alternative models with a wider array of precursors might enhance prediction. We restricted the inclusion of control measures to satisfy the statistical requirements for ML estimation procedures. Nonetheless, alternative models should be addressed, particularly ones that identify potential mediational relations between skills and competence, which may be the appropriate hypothesized medium by which deficits in social skills promote deficits in competence and subsequent consumption.

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