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Protective Role of Personal Competence Skills in Adolescent Substance Use: Psychological Well-Being as a Mediating Factor

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Adolescents who use a variety of cognitive and behavioral self-management strategies have been shown to report reduced rates of early-stage substance use, but little is known about how these personal competence skills may be protective. In a series of structural equation models, this study examined the association between competence skills and substance use over a 3-year period among 849 suburban junior high school students, and whether psychological distress, well-being, or both mediated this relation. Findings indicated that well-being fully mediated the relation between early competence and later substance use, but distress did not. Youth with good competence skills reported greater subsequent well-being, which in turn predicted less later substance use. Findings suggest that competence skills protect youth by enhancing well-being and that prevention programs should aim to enhance competence in order to promote resilience.

National survey data have shown that prevalence rates of illicit drug use among adolescents peaked in the late 1970s, fell through much of the 1980s, and began to increase again during the early 1990s (Johnston, O'Malley, & Bachman, 1999). Over this period of time, research and theory on the etiology and prevention of adolescent substance use have increased substantially. Etiology research has identified several important risk factors for adolescent substance use as well as several protective factors that are associated with enhanced resilience in the face of risk (Hawkins, Catalano, & Miller, 1992). Social psychological theories of adolescent development, such as problem behavior theory (Jessor & Jessor, 1977) suggest that substance use is learned through a process of modeling, imitation, and reinforcement and that adolescents with poor social and personal competence skills are more vulnerable to negative social influences that promote substance use and other problem behaviors. Furthermore, problem behavior theory proposes that adolescents with poor competence skills engage in substance use in order to achieve goals that they are unable to meet using other, more adaptive self-management strategies or social skills.

Competence and Adolescent Substance Use

Competence has been described as "learned attitudes and aptitudes, manifested as capacities for confronting, actively struggling with, and mastering life problems through the use of cognitive and social skills" (G. Caplan, 1980, p. 672). Promoting competence skills among youth is increasingly recognized as an important way of helping young people successfully meet developmental challenges and avoid a variety of negative outcomes (Masten & Coatsworth, 1998; Masterpasqua, 1989). For example, research has shown that high academic competence as reflected by performance in school is related to less substance use and delinquency (Paulson, Coombs, & Richardson, 1990) and greater resilience among youth in high-risk settings (Stoiber & Good, 1998). Furthermore, social competence as defined either by broad-based interpersonal skills (e.g., assertiveness) or drug-specific social resistance skills has been found to be associated with less adolescent drug and alcohol use (Botvin, Baker, Dusenbury, Tortu, & Botvin, 1990; M. Caplan et al., 1992; Pentz, 1985). Conversely, youth with low levels of competence have been found to be at high risk for negative outcomes. A recent study found that early use of alcohol and tobacco was more likely among youth who scored poorly on a variety of competence measures, including both self-reported and teacher-rated assessments of competence (Jackson, Henriksen, Dickinson, & Levine, 1997).

Although previous research has shown the adaptive nature of academic and social competencies, fewer studies have focused on the potential protective role of personal competence skills (i.e., cognitive and behavioral self-management strategies) in the development of substance use among youth. Studies have shown that deficits in self-regulation, self-control, and problem-solving skills are related to adolescent substance use (Gilchrist, Schinke, Bobo, & Snow, 1986; Godshall & Elliot, 1997; Werch & Gorman, 1988), but little is known about the mediating mechanisms by which high levels of competence skills may be protective. There is evidence that general competence skills enable youth to make better use of drug-specific refusal skills that are in turn associated with decreased smoking and alcohol use (Epstein, Griffin, & Botvin, 2000a, 2000b). However, more work is needed to clarify the developmental mechanisms that might account for the protective effects of personal competence.

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Affect and Adolescent Substance Use

Other theories and research suggest that adolescent substance use represents a form of emotion-focused coping by which youth alleviate feelings of psychological distress, perceived powerlessness, or meaninglessness (Labouvie, 1986; Mainous, Martin, Oler, Richardson, & Haney, 1996). Adolescence is recognized as a period of increased vulnerability to mental health problems, both in terms of transient symptomatology and clinically relevant levels of depression and anxiety (Kazdin, 1993, Petersen, 1988). Youth who struggle with depression, anxiety, or other negative emotions may attempt to offset this experience by using licit and illicit drugs (Crutchfield & Gove, 1984; Labouvie, 1986; Labouvie, Pandina, White, & Johnson, 1990). A recent study on the relation between mental health and substance abuse among adolescents found that adolescents with serious emotional problems were twice as likely to have used cigarettes, alcohol, and marijuana in the past month and were more likely to be dependent on alcohol and drugs compared to youth with low levels of emotional problems (U.S. Department of Health & Human Services, 1999). Reasons for the association between serious emotional problems and substance involvement include the possibility that the mood-altering characteristics of the substance of choice may correspond to the symptoms associated with particular mental disorders (U.S. Department of Health & Human Services). This view is consistent with the *self-medication hypothesis* that has been used to explain drug abuse behavior among drug-dependent adults (Khanzian, 1997; Weiss & Mirin, 1987).

In addition to examining the role of negative affect in fostering substance use, it is important to consider whether psychological well-being can promote positive outcomes and help youth avoid substance use. Research that has examined psychological health among adolescents has found that well-being and distress are best conceptualized as two different but related dimensions rather than opposite ends of a single continuum (Wilkinson & Walford, 1998). In addition, there is a large literature examining the structure of affect (Diener & Emmons, 1984; Warr, Barter, & Browndridge, 1983), including a resurgence of interest in the possible independence of positive and negative affect (e.g., Russell & Carroll, 1999; Watson & Clark, 1997). In terms of adolescent drug use, recent research suggests that it is useful to investigate the roles of both positive and negative affect (e.g., Wills, Sandy, Shinar, & Yaeger, 1999). However, further research is needed that examines the potential protective role of psychological well-being in the etiology of adolescent substance use, including the factors that promote well-being and whether well-being uniquely protects youth when controlling for the role of psychological distress.

Competence and Adolescent Substance Use: Affect as Mediator

There has been a substantial amount of research on the independent roles of competence skills and affect in the etiology of adolescent substance use, although there have been few attempts to integrate these variables into a single cohesive framework. Because of the nature of adolescent development, models that include both factors may be particularly appropriate. During adolescence, young people face a variety of new challenges and developmental tasks that coincide with the biological and physical changes of puberty and experience rapid growth in emotional, cognitive, and social functioning (Lerner & Foch, 1987; Petersen, 1988). Because of individual differences in social, personal, and academic competence skills some adolescents will be more likely than others to fail at these important challenges. Repeated experiences with failure among poorly competent youth may lead to low self-esteem, decreased task persistence, feelings of hopelessness and distress, and related problems (Eccles, Lord, Roeser, Barber, & Jozefowicz, 1997; Witkowski & Stiensmeier-Pelster, 1998). These youth may attempt to regulate negative affect through drug use. On the other hand, highly competent adolescents are likely to enjoy more frequent experiences of success and mastery that may contribute to positive psychological outcomes, such as enhanced well-being and positive self-esteem. These outcomes may serve a protective role in terms of adolescent substance use, because competent, well-adjusted youth may be less motivated to use substances and less influenced by the internal and external factors that promote substance use.

Goals of This Study

The goal of this study was to examine the mechanisms by which competence may be protective in terms of adolescent drug use by testing the potential mediational roles of psychological distress and well-being. Previous research on the stress–coping model of adolescent substance use has focused on moderational analyses to examine drug use as a coping mechanism that may buffer the effects of stress (e.g., Wagner, Myers, & McIninch, 1999; Wills, 1986). However, the present research question differs in focus and is more concerned with the developmental mechanisms that link personal competence skills to substance use. Thus, we used a series of structural equation models (SEMs) to examine both direct and mediated effects to test whether: (a) personal competence is directly associated with decreased later substance use, controlling for baseline levels of substance use; (b) personal competence is associated with less later substance use through its effects on psychological distress; (c) personal competence is associated with less later substance use through its effects on psychological well-being; and (d) personal competence is associated with later substance use through its effects on both distress and well-being.

Method

Sample

Students from 22 public schools in New York State served as untreated controls in a larger drug abuse prevention intervention trial conducted from 1985 to 1987 (Botvin et al., 1990), and these control students were selected for the present study. A total of 849 participants completed surveys in the seventh, eighth, and ninth grades.[1] The sample for the present study was 51% male and predominantly White (91%), with smaller numbers of students that were Black (3%), Asian (3%), or of other ethnic–racial backgrounds (3%). The majority of students (85%) lived in two-parent

[1] From an original sample of 867 students who completed surveys during each year of the 3-year study, 18 cases with 50% or more missing data were eliminated from further analyses. For the remaining 849 participants the average level of missingness was 5%. We used a full-information, maximum-likelihood, regression-based procedure to impute the remaining missing data points for this final sample of $N = 849$.

families, with lower numbers from mother-only (11%), father-only (2%), or other family structures (2%). Most students reported that their mothers (53%) or fathers (64%) had attended at least some college. All students in regular seventh-grade classes (mean age = 12.1 years) of participating schools were selected for inclusion in the study.

Procedure

Students completed a self-report questionnaire that assessed substance use behaviors and several psychosocial variables hypothesized to be associated with the initiation and escalation of substance use in adolescents. Unique identification numbers rather than student names were precoded onto each survey to ensure confidentiality, and each precoded survey was distributed to the appropriate student. These unique ID codes were used to match student surveys over the 3 years of the study. Students were informed that their responses would not be made available to school personnel, teachers, or parents. Questionnaires were administered during a regular classroom period by a team of several data collectors, and all students completed the same version of the questionnaire. The research protocol and consent procedures were reviewed and approved by the Institutional Review Board at Cornell Medical College.

Measures

Latent factors of Personal Competence Skills, Psychological Well-Being, Psychological Distress, and Substance Use were constructed to test the hypothesized models. We calculated scale reliabilities using Cronbach's alphas where appropriate, and they are provided in parentheses later in the article.

Personal Competence Skills. The three indicators of Personal Competence Skills consisted of summary scores from scales measuring decision-making, self-control, and self-regulation skills. Seven items (α = .88) from the Coping Assessment Battery (Wills, 1986) were used to measure decision-making skills. This scale assesses cognitive strategies pertaining to information gathering and applied decision making that individuals use when confronted with a specific problem (e.g., "I think about the choices that exist before I take any action"). Response categories ranged from 1 (*never*) to 5 (*almost always*). Ten items (α = .80) from the Kendall and Wilcox Self-Control Rating Scale (Kendall & Wilcox, 1979) were used to measure self-control skills. The Self-Control Rating Scale assesses the ability to manage impulsive or disruptive behavior, particularly in school settings (e.g., "When I have to wait on line, I do it patiently"). Response categories ranged from 1 (*strongly disagree*) to 5 (*strongly agree*). Eight items (α = .80) from the Rosenbaum Self-Control Schedule (Rosenbaum, 1980) were used to measure self-regulation skills. The Self-Control Schedule measures cognitive strategies that individuals may use in specific situations to manage anxiety or distress (e.g., "If I am feeling sad, I try to think about pleasant things"). Response categories ranged from 1 (*never true*) to 5 (*almost always true*).

Psychological Distress and Psychological Well-Being. Twelve items from the Mental Health Inventory (MHI; Veit & Ware, 1983) were used to assess psychological distress and well-being. In their initial psychometric work with the MHI, Veit and Ware obtained two factors reflecting psychological distress and well-being, and we found this dual structure as well in exploratory factor analyses.[2] Six items from the MHI (α = .83) were used to assess Psychological Distress (e.g., "I felt downhearted and sad" and "I felt moody and brooded about things"), and six items (α = .84) were used to assess Psychological Well-Being (e.g., "I felt cheerful and lighthearted" and "I felt relaxed and free of tension"). Response categories ranged from 1 (*none of the time*) to 5 (*most of the time*), and students were asked to consider a time frame of the last month. Indicators for the latent factors of Psychological Distress and Psychological Well-Being consisted of the mean of random pairs of relevant items to create three parcels for each construct.[3]

Substance Use. Indicators of alcohol, cigarette, and marijuana use were used to reflect a latent construct of Substance Use. By using indicators of different substances, our goal was to capture the common variance among these behaviors and measure more serious levels of substance use involvement (compared to a factor representing any one substance alone). We created an alcohol use indicator score based on the mean of three items that assessed the frequency of drinking, the amount generally consumed at each drinking occasion, and frequency of getting drunk. For the frequency of drinking and drunkenness items, response options ranged from 1 (*I don't drink*) to 9 (*more than once a day*), and the drinking quantity item had response options from 1 (*I don't drink*) to 6 (*more than 6 drinks*) per drinking occasion. We created a cigarette use indicator score based on the mean of three items that assessed the number of cigarettes smoked in the past month on a 7-point scale that ranged from 1 (*none*) to 7 (*2 packs or more per day*), the number of cigarettes smoked in general on a 7-point scale that ranged from 1 (*never*) to 7 (*more than a pack a day*), and whether the participant had ever smoked: 0 (*no*) and 1 (*yes*). We created a marijuana use indicator score based on the mean of two items tapping the frequency of marijuana use on a 9-point scale that ranged from 1 (*never tried it*) to 9 (*more than once a day*) and whether the participant had ever smoked marijuana: 0 (*no*) and 1 (*yes*). All substance use items that did not specify a specific time frame (e.g., in the past month) asked about use "in general." Because the distributions of the resulting substance use composite variables were moderately skewed (because of low base rates, particularly in the seventh grade), we logarithmically transformed each summary score (e.g., Tabachnick & Fidell, 1989).

Data Analysis

Testing of the hypothesized structural models proceeded in a stepwise manner. We examined a confirmatory factor analysis (CFA) model to determine the psychometric adequacy of the hypothesized measurement model. Next, we tested a series of SEMs to examine the longitudinal relations among early competence, distress and well-being, and later substance use. First, following the criteria for testing mediation outlined by Baron and Kenny (1986), we examined an initial model of the direct effect of competence on later substance use, as shown in Figure 1A. Second, a model specifying psychological distress as a potential mediator of the competence–substance use relation was examined, as shown in Figure 1B. Third, a model specifying psychological well-being as a potential mediator of this relation was examined, as shown in Figure 1C. We tested these three initial models separately to determine if distress and well-being relate differentially to competence and substance use.

In a final model, shown in Figure 2, we examined the distress and well-being constructs together in a single model as potential mediators of the competence–substance use relation. In this model, the primary research

[2] An exploratory factor analysis (principal-components analysis with varimax rotation) of 12 MHI items assessed in the seventh grade indicated a two-factor solution, with six items loading on a Psychological Distress factor (loadings ranged from .67 to .73) and six items loading on a Psychological Well-Being factor (loadings ranged from .64 to .80). Thus, for theoretical and empirical reasons we specified Psychological Distress and Psychological Well-Being as separate latent factors in the models that were tested. The correlation between the Psychological Distress and Psychological Well-Being latent factors in the seventh grade was $r = -.62$, $p < .001$, indicating that they share approximately 38% common variance.

[3] A *parcel* is the mean of a number of items used in order to reduce the total number of indicator items to a level that is manageable and appropriate given the hypothesized model and the sample size. Using parcels results in indicators with higher reliability compared to constructs with individual indicators constructed at the item level (MacCallum, Roznowski, & Necowitz, 1992).

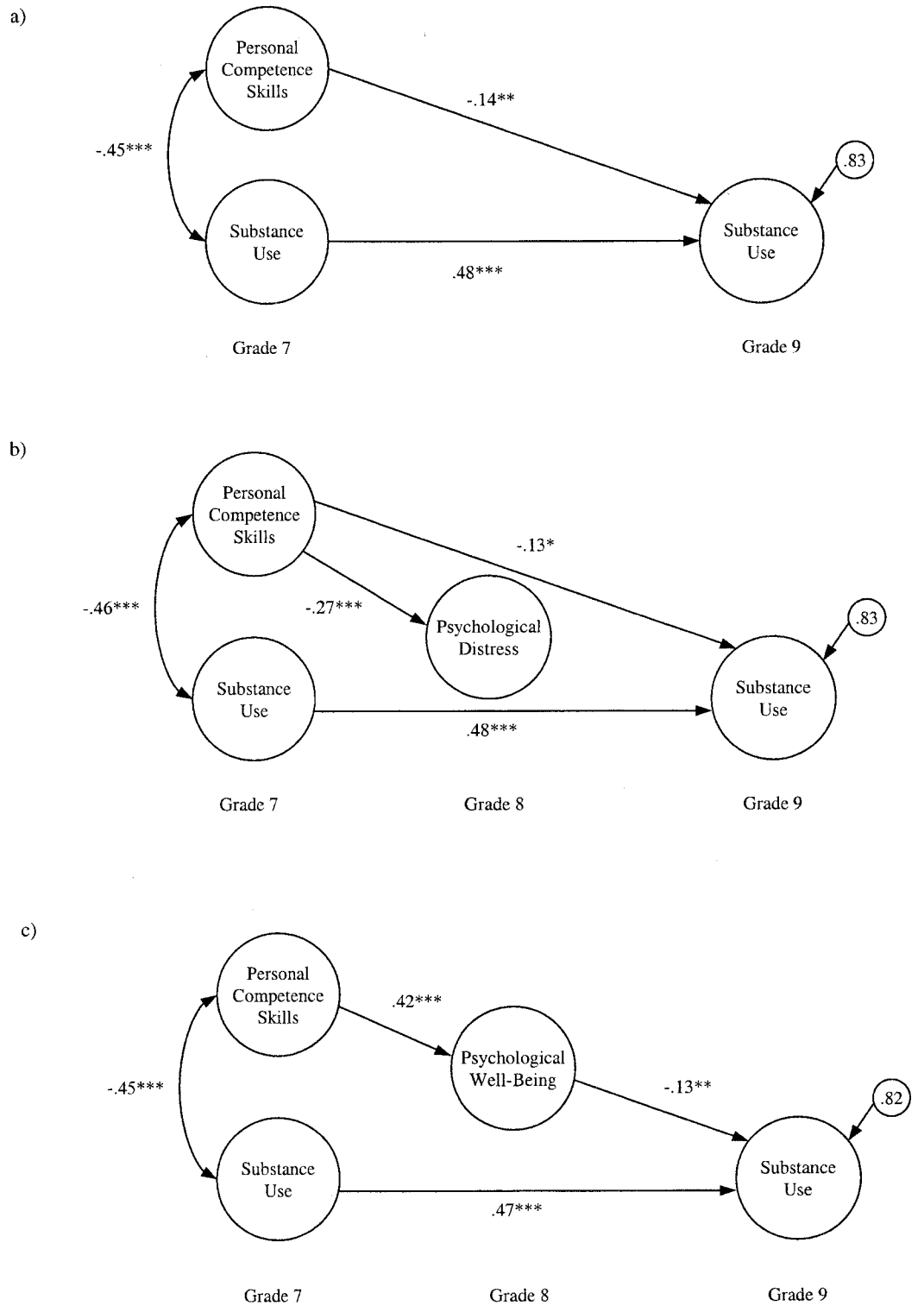

Figure 1. Hypothesized models of early personal competence skills and later substance use: (a) direct effect, (b) distress as mediator, and (c) well-being as mediator. Only significant paths are shown. * $p < .05$. ** $p < .01$. *** $p < .001$.

question was to examine to what extent distress, well-being, or both, mediated the relation between early competence and later substance use. Thus, competence was included in the seventh grade, well-being and distress in the eighth grade, and drug use in the ninth grade. Additional constructs were included according to the following criteria: (a) baseline levels of each construct were included to control for individual differences in the seventh grade, and (b) each construct was included at one later point in time to control for developmental change. For example, personal com-

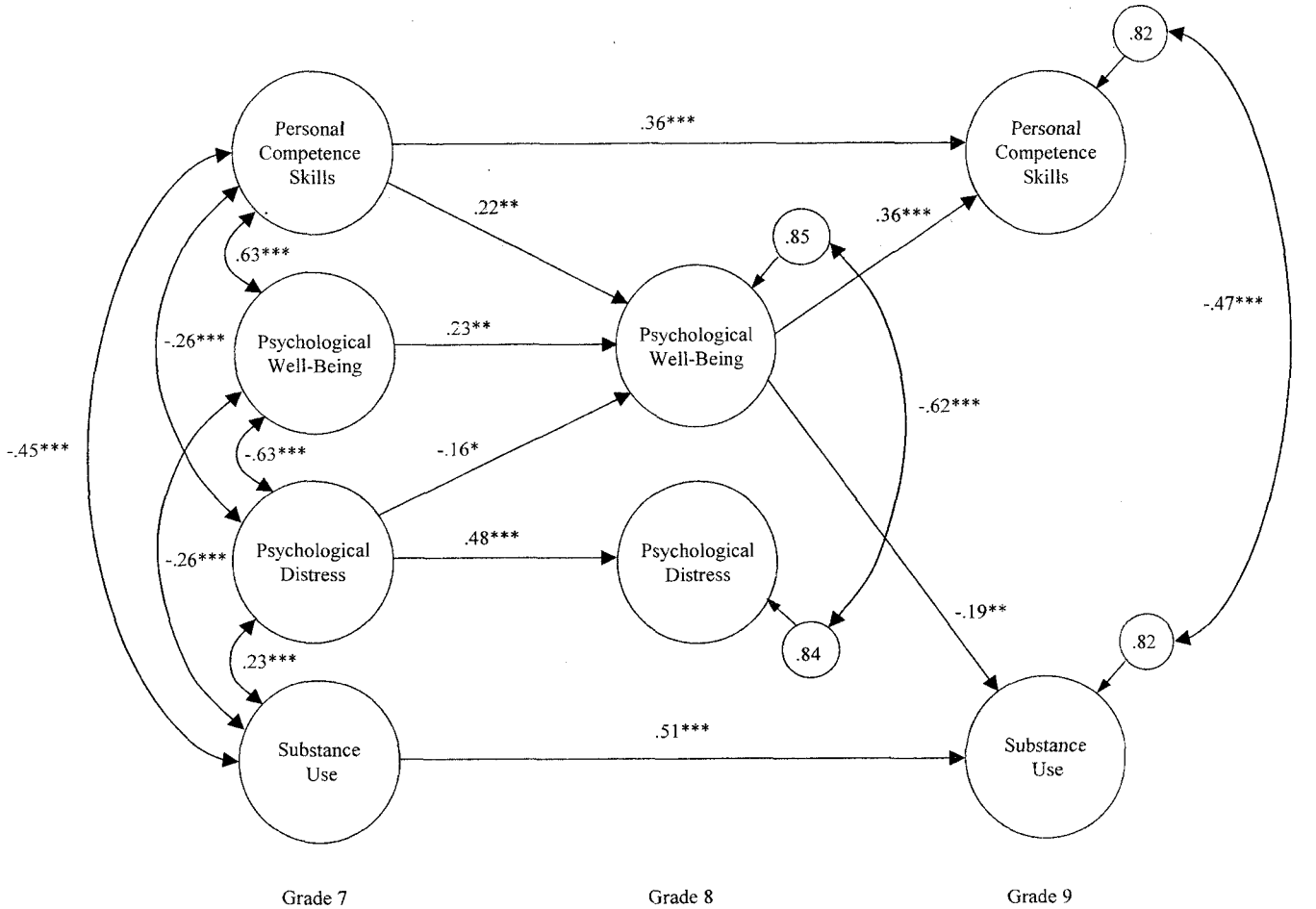

Figure 2. Final structural model of personal competence, well-being, distress, and substance use. Only significant paths are shown. * $p < .05$. ** $p < .01$. *** $p < .001$.

petence in the ninth grade was included to control for changes over time in competence and to examine the reciprocal effects between competence and well-being.[4] We used the EQS computer program (Bentler, 1995) for the confirmatory and structural analyses. Prior to model testing, we rescaled indicator scores by multiplying by a constant in order to make their variances comparable (Bentler).

In evaluating the overall goodness of fit for the CFA model and the SEMs we used the following criteria: (a) the chi-square p value, which, if $p > .05$, indicates that there are no statistically significant discrepancies between the observed data and the hypothesized model; (b) the comparative fit index (CFI), which specifies the amount of covariation in the data that is accounted for by the hypothesized model relative to the null model, adjusting for the sample size (a cutoff of .90 is generally accepted as indicating a good fit, where 1.0 indicates a perfect fit); (c) the standardized root mean squared residual (SRMR), which makes no assumptions about the variable or test statistic distributions, and which should be less than .05; and (d) the χ^2–df ratio, which should be less than 5.0 (Bollen, 1989).

Results

An analysis of lifetime substance use prevalence rates revealed that in the seventh grade 32% of students reported smoking cigarettes, 55% reported alcohol use, and 4% reported marijuana use. By the ninth grade these rates were substantially higher: 55% of students reported smoking cigarettes, 80% reported alcohol use, and 23% reported marijuana use. Thus, although the prevalence rates differed across substances, a substantial proportion of students engaged in each substance use behavior in the ninth grade (the outcome latent factor of primary interest), with the lowest prevalence rate being 23% for marijuana use. Correlations revealed that measures of personal competence skills were moderately intercorrelated (rs ranged from .402 to .474, ps $< .001$) and moderately associated with concurrent and subsequent well-being (rs ranged from .192, $p < .01$, to .383, $p < .001$) but somewhat less consistently related to concurrent and subsequent distress (rs ranged from

[4] We did not test a cross-lagged panel model, because it was not the most direct test of our theoretical model and because a number of limitations have been raised regarding the usefulness of this approach for testing theoretical hypotheses. For example, Rogosa (1980) pointed out that cross-lagged models assume that the variables in the model (and the correlations between them) do not change over time, an assumption that often cannot be met in applied psychological research.

Table 1
Correlations Among Latent Factors From Confirmatory Factor Analysis

Factor	1	2	3	4	5	6	7	8
7th grade								
1. Personal Competence Skills	—							
2. Psychological Well-Being	.627	—						
3. Psychological Distress	−.262	−.626	—					
4. Substance Use	−.440	−.249	.227	—				
8th grade								
5. Psychological Well-Being	.420	.481	−.337	−.229	—			
6. Psychological Distress	−.256	−.407	.527	.144*	−.691	—		
9th grade								
7. Personal Competence Skills	.525	.304	−.140*	−.267	.461	−.275	—	
8. Substance Use	−.339	−.221	.170	.546	−.280	.169	−.535	—

Note. All correlations are significant at $p < .001$, except where noted.
* $p < .01$.

−.045, *ns*, to .337, $p < .001$). These patterns were similar for boys and for girls.[5]

A source of potential sample bias in longitudinal research is the differential loss over time of participants who are at higher risk. In this study approximately 23% of the initial sample did not complete the follow-up assessment in the ninth grade. This is similar to overall attrition rates for similar studies conducted in middle schools (Hansen, Collins, Malotte, Johnson, & Fielding, 1985). Additional analyses showed that students who dropped out were somewhat more likely to use substances at baseline relative to those who remained in the study. For example, 27% of ever-drinkers in the seventh grade dropped out compared to 18% of never-drinkers, $\chi^2(1, N = 1172) = 13.6, p < .001$. Thus, because the possible range of the outcome variables may have been restricted, the parameter estimates may in fact be conservative.

CFA

We tested a measurement model that consisted of the eight latent factors as shown in Figure 2. Each latent factor contained three indicators. The Personal Competence Skills latent factor consisted of the multi-item indicators of decision-making, self-control, and self-regulation skills and had loadings ranging from .62 to .69 in the seventh grade and from .59 to .68 in the ninth grade. The Psychological Distress latent factor had three indicator parcels with loadings from .66 to .76 in the seventh grade and from .71 to .84 in the eighth grade; the Psychological Well-Being latent factor had three indicator parcels with loadings ranging from .72 to .80 in the seventh grade and from .78 to .79 in the eighth grade. The Substance Use latent factor consisted of the indicators of alcohol, tobacco, and marijuana use, with loadings ranging from .52 to .74 in the seventh grade and .71 to .84 in the ninth grade. Thus, the factor loadings for the Substance Use latent construct were acceptable even though prevalence rates differed across substances. Factor loadings for all latent constructs were in the expected direction and were statistically significant ($ps < .0001$), indicating that the measurement model was properly specified. According to the goodness-of-fit criteria, the fit of the CFA model was adequate, $\chi^2(216, N = 849) = 533.4, p < .001$, CFI = .960, SRMR = .044, χ^2–*df* = 2.5.[6] The latent-factor intercorrelations from the CFA model are shown in Table 1. All factors were moderately to strongly intercorrelated, and the patterns of intercorrelations were in the expected directions. In summary, the CFA demonstrated that the measurement model was adequate, with high factor loadings for all indicator variables and good fit indices.

SEMs

A direct effect model showed that competence directly predicted less substance use in the ninth grade, controlling for baseline levels of substance use, as shown in Figure 1A. This model provided a good fit to the data, $\chi^2(21, N = 849) = 75.2, p < .001$, CFI = .976, SRMR = .042, χ^2–*df* = 3.6. Next, as shown in Figure 1B, when distress was added to the direct effect model as a potential mediator the path from competence to later substance use remained relatively unchanged ($\beta = -.13, p < .05$). Despite a significant path from competence to distress ($\beta = -.27, p < .001$), distress did not significantly predict Substance Use ($\beta = .06$, *ns*). Although this model provided a good fit to the data, $\chi^2(45, N = 849) = 125.9, p < .001$, CFI = .975, SRMR = .040, χ^2–*df* = 2.8, the criteria for mediation were not satisfied. However, when well-being was added to the direct effect model as a potential mediator, as shown in Figure 1C, each of the criteria for mediation as outlined by Baron and Kenny (1986) were met: (a) the significant direct path from early competence to later substance use became nonsignificant ($\beta = -.09$), (b) the path from early competence to

[5] Mean comparisons indicated that boys drank more alcohol than girls in the seventh grade, $t(856) = 3.9, p < .001$; and the ninth grade, $t(831) = 2.1, p < .05$; and boys smoked more marijuana than girls in the ninth grade, $t(803) = 2.0, p < .05$. However, girls reported higher levels of distress, $t(856) = 3.8, p < .001$, and higher levels of self-control than boys, $t(812) = 2.6, p < .01$, in the seventh grade. Because there were relatively few gender differences and there was no theoretical rationale for examining the hypothesized model separately for boys and girls, we did not test for gender differences in the final model.

[6] The chi-square *p* value is often used to evaluate whether there are statistically significant discrepancies between the observed data and the hypothesized model Although the chi-square *p* value was significant in this model, indicating that additional models could be fit to the data, this is not uncommon with large models and large sample sizes (e.g., Marsh, Balla, & McDonald, 1988).

well-being was significant ($\beta = .42$, $p < .001$), and (c) the path from well-being to later substance use was significant ($\beta = -.13$, $p < .01$). This model provided a good fit to the data, $\chi^2(45, N = 849) = 127.6$, $p < .001$, CFI = .975, SRMR = .039, χ^2–$df = 2.8$.

The final model examining the effects of competence, distress, and well-being on substance use within a single multivariate framework controlling for developmental change is shown in Figure 2. By including each developmental construct in the model at baseline and at one later time point we could examine whether early Personal Competence Skills predicted changes in subsequent Psychological Distress, Psychological Well-Being, or both, and whether these constructs in turn predicted changes in subsequent Substance Use. The final model provided a good fit to the data, $\chi^2(221, N = 849) = 542.6$, $p < .001$, CFI = .959, SRMR = .045, χ^2–$df = 2.5$.

Several findings are worth noting in the final model. First, Personal Competence Skills and Substance Use were inversely related to a similar magnitude at each of two assessments, sharing approximately 21% of variance in both the seventh grade ($r = -.45$, $p < .001$) and ninth grade ($r = -.47$, $p < .001$); this demonstrates that this association was stable over the junior high school years. Furthermore, Psychological Well-Being and Psychological Distress were inversely related to a similar magnitude at each of two assessments, sharing approximately 38% of variance in both the seventh grade ($r = -.63$, $p < .001$) and eighth grade ($r = -.62$, $p < .001$), indicating that this association was stable over time. However, Personal Competence Skills in the seventh grade were strongly associated with Psychological Well-Being ($r = .63$, $p < .001$) but less strongly associated with Psychological Distress ($r = -.26$, $p < .001$). Second, in terms of the developmental relation over time, Personal Competence Skills significantly predicted later Psychological Well-Being ($\beta = .22$, $p < .01$), which in turn predicted less later Substance Use ($\beta = -.19$, $p < .01$), controlling for baseline levels of Psychological Distress, Psychological Well-Being, and Substance Use and the contemporaneous association between ninth grade Personal Competence Skills and Substance Use. Thus, despite the stable cross-sectional associations just noted, over time Psychological Well-Being fully mediated the relation between early Personal Competence Skills and later Substance Use. Third, Personal Competence Skills did not predict later Psychological Distress, and Psychological Distress did not predict later Substance Use, contrary to prediction. Also, early Substance Use did not predict later Psychological Distress or Psychological Well-Being. Fourth, a reciprocal relation between Personal Competence Skills and Psychological Well-Being was observed longitudinally, such that Personal Competence Skills predicted subsequent Psychological Well-Being ($\beta = .22$, $p < .01$) and Psychological Well-Being predicted later Personal Competence Skills ($\beta = .36$, $p < .001$), as seen in the uppermost triangular section of Figure 2. Last, the final model explained 65% of the variance among all latent constructs, and the significant paths leading to Substance Use in the ninth grade explained 33% of the variance in this construct.

Because the final model unexpectedly failed to show a significant path from eighth grade Psychological Distress to ninth grade Substance Use, we conducted a series of specification searches to identify any potential nonstandard effects of distress on later substance use that may have been present but not captured at the latent-factor level. This analysis examined whether there were any statistically significant paths from the Psychological Distress latent factor or any of its indicators to the subsequent Substance Use latent factor or its indicators, independent of any association between the corresponding latent factors. However, this analysis revealed no significant nonstandard effects. Thus, findings indicated that there was no significant direct relation from Psychological Distress to later Substance Use either at the latent-factor or indicator levels. However, because early Psychological Distress contributed to less later Psychological Well-Being (which in turn predicted less later Substance Use), Psychological Distress did have an indirect effect on subsequent Substance Use through its association with decreased Psychological Well-Being.

Discussion

In this study we examined the developmental mechanisms that link personal competence skills to adolescent substance use during the junior high school years. The results support the hypothesis that competence skills play a protective role in the etiology of adolescent substance use. Competence skills were associated cross-sectionally with less substance use both in the seventh and ninth grades. The magnitudes of these correlations were relatively similar at each measurement point, suggesting that there is a high degree of developmental stability between these constructs. A longitudinal multivariate model, however, revealed that the competence–substance use relation was in fact fully mediated by psychological well-being. A similar developmental mechanism was not observed for psychological distress. These results provide several key insights into the mechanisms through which competence contributes to reduced substance use during early adolescence.

Competence, Well-Being, and Substance Use

A hypothesis of this study was that highly competent adolescents benefit from positive affective outcomes that may lessen internal motivations to use substances. Whereas many previous studies have focused on affective functioning as a single dimension, a strength of this study was that distress and well-being were examined as separate constructs in a series of multivariate models. This proved to be a useful distinction, because distress and well-being were differentially associated with competence skills and substance use. Although competence and distress were correlated negatively at baseline, competence did not predict distress longitudinally; conversely, competence was positively associated with well-being both cross-sectionally and longitudinally. Furthermore, the final longitudinal model revealed a reciprocal relation between competence skills and well-being over time.

Although previous research has shown that competence skills can be protective, this study is the first to our knowledge to show a prominent intermediate role for psychological well-being. The results suggest that personal competence skills may be important precursors for the development of positive outcomes during early adolescence and that one way that competence leads to positive outcomes is through promoting feelings of personal satisfaction and well-being. It is possible that a developmental process occurs in which highly competent youth use their skills to successfully achieve developmental tasks; this in turn leads to a heightened sense of mastery and self-efficacy that enhances psychological

well-being and makes youth less vulnerable to various influences promoting deviant behavior. Well-being may represent a type of internal reward mechanism that promotes a variety of positive behavioral outcomes during early adolescence. This conceptualization is consistent with self-efficacy theory (Bandura, 1977), which suggests that the development of self-efficacy involves an internal reward construct that results from successful task completion. Furthermore, the present finding on the importance of well-being is consistent with conceptualizations of adolescent health that place primary importance on promoting positive mental health, well-being, and psychological resilience (Compas, 1993).

Distress and Substance Use

Substance use as assessed in this study represents the common variance associated with three types of substance use (smoking, drinking, and marijuana use). The results indicated that participants engaged in measurable levels of high-risk, multiple substance use as early as the seventh grade. In addition, there were stable levels of both substance use and psychological distress over time; substance use had the largest magnitude of stability longitudinally, followed by psychological distress. We expected to find that youth who reported high levels of psychological distress would attempt to offset negative emotions through substance use. However, despite a significant cross-sectional association between distress and substance use in the seventh grade and stability over time in each of these constructs, there was no evidence of a direct longitudinal relation: Early distress did not predict significantly later substance use; neither did early substance use predict later distress.

There are several reasons that might help explain why distress was not a longitudinal determinant of substance use in this study. First, although several studies have found that distress is associated with adolescent substance use (Labouvie, 1986; Labouvie et al., 1990; Scheier, Botvin, & Baker, 1997), other research has shown a weak relation between distress and substance use among adolescents (Swaim, Oetting, Edwards, & Beauvais, 1989). The inconsistent results across studies may be related to differences in sample characteristics (e.g., differences in average level of distress or substance use across studies), differences in the measurement of distress, or differences in study design (e.g., cross-sectional relations may be stronger than longitudinal ones). Second, it is possible that the relation between distress and substance use is more complex than proposed in our model; for example, the relation may be indirect or reciprocal in nature. In this study there was evidence of an indirect effect of distress on later substance use through well-being in that distress in the seventh grade predicted less later well-being in the eighth grade, which in turn was associated with less later substance use. Another consideration is that the distress–drug use relation may be reciprocal, such that adolescents initially engage in substance use as an instrumental form of coping, while more problematic drug involvement eventually produces negative consequences and contributes to the reporting of negative psychological symptoms (e.g., Johnson & Kaplan, 1990). In this study, however, the evidence did not support a reciprocal relation between distress and substance use. A third possibility is that participants in the present study may not have been sufficiently distressed to resort to drug use.[7] Perhaps adolescents with relatively higher levels of distress or greater levels of involvement with substance use would show a significant positive association between distress and substance use, as has been shown in clinical populations of adolescents (e.g., Greenbaum, Prange, Friedman, & Silver, 1991). Another possibility, as shown by a recent study conducted by Wills et al. (1999), is that the relation between negative affect and substance use may be reduced among individuals with higher positive affect.

Linking Etiology and Prevention Intervention Research

Over the last 20 years there has been an increasingly important interchange between etiology and prevention research in adolescent substance use (Jones & Battjes, 1985). More recent drug abuse prevention approaches have targeted a broader array of risk and protective factors than those addressed by earlier social influence and drug resistance skills approaches (Botvin & Griffin, 1999). In addition to resistance skills, competence enhancement approaches teach adolescents a variety of personal self-management skills and general social skills in order to reduce vulnerability to prodrug social influences and decrease intrapersonal motivations to smoke, drink, or use illicit drugs. Rigorous evaluation studies have shown that drug abuse prevention approaches emphasizing competence enhancement are effective (e.g., Botvin, Baker, Dusenbury, Botvin, & Diaz, 1995; Botvin et al., 1990). The present findings suggest that increasing protection may play a crucial role in effective prevention programming and that interventions should aim to do so rather than focusing solely on risk reduction. Competence enhancement based interventions that teach students life skills may be effective to the extent that they enhance personal competence skills and promote feelings of perceived self-efficacy and well-being. Furthermore, teaching strategies for managing and controlling behavior in classroom situations, skills for gathering and using information effectively in order to problem solve more efficiently, and other competence skills may have preventive effects on drug use through the promotion of mental health (e.g., a sense of well-being).

Limitations

This study has several limitations that should be noted. First, because this was a school-based study that relied on students' self-reports, the significant relations among variables may partly reflect shared method variance (all data were obtained by self-report questionnaire). Furthermore, the sample consisted primarily of White, suburban youth, and the degree to which these findings generalize to other populations is unclear. Another limitation is that the relatively higher rates of attrition among substance users may have resulted in more conservative parameter estimates for the models. It is also possible that highly distressed students were underrepresented in the present sample, which could account for the weak relations between distress and other measures found in

[7] An analysis of sample means for the distress and well-being scales indicated that students in this study scored higher on well-being than on distress at both measurement points, supporting the notion that the sample was not particularly distressed. In the seventh grade the mean distress score was 13.2 (SD = 4.4), and the mean well-being score was 21.6 (SD = 13.2); in the eighth grade the mean distress score was 14.5 (SD = 4.9), and the mean well-being score was 20.2 (SD = 4.9).

this study. An additional limitation is that, although there were empirical and theoretical reasons for separating the distress and well-being constructs, the two constructs were highly correlated, and thus further replication in other samples and with other measures is needed before definitive statements can be made that well-being and distress are independent determinants of substance use. Finally, the data were collected more than 15 years ago, so further research is needed to replicate the model in more recent data sets.

Further research is needed to fully understand the conditions and mechanisms by which distress and well-being are related to adolescent substance use. For example, both peer cluster (Oetting & Beauvais, 1987) and self-derogation theory (Kaplan, Martin, & Robbins, 1984) propose that adolescents with low self-esteem alleviate emotional distress by seeking out drug-using peers who provide a sense of acceptance. Conversely, future research might also investigate whether good competence indirectly leads to protection from drug use through well-being and adaptive peer selection processes. In addition, future research should examine whether the relations observed in the present predominantly White, school-based sample extend to ethnic minority students, boys and girls, high-risk students (e.g., those with high levels of distress and relatively low self-control) and to other populations, such as in nonschool-based clinical samples. Future studies should investigate whether the protective effect of personal competence skills through psychological well-being extends to other problem behaviors and the promotion of other positive developmental outcomes. Finally, competence enhancement prevention interventions should be evaluated in terms of the degree to which increasing personal self-management skills leads to increased psychological well-being and protection against adolescent substance use and other problem behaviors.

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