Published in final edited form as:

J Consult Clin Psychol. 2012 February ; 80(1): 17–28. doi:10.1037/a0026592.

The Adults in the Making Program: Long-term Protective Stabilizing Effects on Alcohol Use and Substance Use Problems for Rural African American Emerging Adults

Gene H. Brody,

Center for Family Research, University of Georgia, Athens, Georgia. Department of Behavioral Science and Health Education, Rollins School of Public Health, Emory University, Atlanta, Georgia

Tianyi Yu,

Center for Family Research, University of Georgia, Athens, Georgia

Yi-fu Chen,

Center for Family Research, University of Georgia, Athens, Georgia

Steven M. Kogan, and

Department of Child and Family Development and Center for Family Research, University of Georgia, Athens, Georgia

Karen Smith

Department of Psychology

Abstract

Objective—This report addresses the long-term efficacy of the Adults in the Making (AIM) prevention program on deterring the escalation of alcohol use and development of substance use problems, particularly among rural African American emerging adults confronting high levels of contextual risk.

Method—African American youths (M age, pretest = 17.7 years) were assigned randomly to the AIM ($n = 174$) or control ($n = 173$) group. Past 3-month alcohol use, past 6-month substance use problems, risk taking, and susceptibility cognitions were assessed at pretest and at 6.4, 16.6, and 27.5 months after pretest. Pretest assessments of parent-child conflict, affiliations with substance-using companions, and perceived racial discrimination were used to construct a contextual risk factor index.

Results—A protective stabilizing hypothesis was supported; the long-term efficacy of AIM in preventing escalation of alcohol use and substance use problems was greater for youths with higher pretest contextual risk scores. Consistent with a mediation-moderation hypothesis, AIM-induced reductions over time in risk taking and susceptibility cognitions were responsible for the AIM $\times$ contextual risk prevention effects on alcohol use and substance use problems.

Conclusions—Training in developmentally appropriate protective parenting processes and self-regulatory skills during the transition from adolescence to emerging adulthood for rural African

Karen Smith is now a counselor at Alps Road Elementary School, Athens, Georgia.

Publisher's Disclaimer: The following manuscript is the final accepted manuscript. It has not been subjected to the final copyediting, fact-checking, and proofreading required for formal publication. It is not the definitive, publisher-authenticated version. The American Psychological Association and its Council of Editors disclaim any responsibility or liabilities for errors or omissions of this manuscript version, any version derived from this manuscript by NIH, or other third parties. The published version is available at www.apa.org/pubs/journals/ccp

Americans may contribute to a self-sustaining decreased interest in alcohol use and a lower likelihood of developing substance use problems.

Keywords

African American; emerging adulthood; intervention; prevention; substance use

Nearly 10 million African American families live in the rural coastal plain that stretches across South Carolina, Georgia, Alabama, Mississippi, and Louisiana. This region is one of the most economically disadvantaged areas in the United States (Proctor & Dalaker, 2003; Wimberly & Morris, 1997). The socioeconomic challenges that characterize the rural South are particularly consequential for rural African Americans as they make the transition from adolescence to emerging adulthood. When they leave school, many rural African Americans have no jobs; eventually, they find part-time or full-time employment performing simple functions in retail and service-sector jobs that offer little training and no opportunity for advancement (Offner & Holzer, 2002; Sum et al., 2002). Many rural African American emerging adults are thus confronted with challenging environments that provide minimal resources to help them embark on beneficial life paths (Fuligni & Hardway, 2004). Some who see no pathway to adequate subsistence, much less the attainment of life course goals, cope by increasing alcohol consumption (Paschall, Flewelling, & Faulkner, 2000). Escalation of alcohol use has prognostic significance for rural African American youths' educational and occupational opportunities and attainment, involvement with the criminal justice system, mental health, and physical health (Centers for Disease Control and Prevention, 2000). These circumstances and the resulting need for prevention programs designed for rural African American emerging adults led to the development of the Adults in the Making (AIM) program (Brody, Chen, Kogan, Smith, & Brown, 2010).

AIM is a universal family-centered preventive intervention that was designed to enhance protective family and self-regulatory processes that promote resilience and deter the use of alcohol (the drug of choice for rural African Americans during the transition to emerging adulthood; Brody, Chen, & Kogan, 2010) and the development of substance use problems. A cluster of protective parenting processes were identified from longitudinal, epidemiological research with rural African Americans and targeted in AIM. This cluster includes the provision of developmentally appropriate emotional and instrumental support, occupational and educational mentoring, and racial socialization that includes strategies for dealing with discrimination. AIM training experiences for adolescents included enhancement of developmentally appropriate, planful self-control skills and problem-focused coping in response to racial discrimination; development and pursuit of educational or occupational plans; and formation of strategies for accessing support from community resources.

A recent study (Brody, Chen, Kogan, et al., 2010) showed that AIM was efficacious in deterring alcohol use and risk behavior across an interval that began before and ended after high school graduation (a span of 16.6 months). The present research builds on this efficacy study in three ways. First, we examined the effects of AIM on alcohol use and the development of substance use-related problems over a longer period of time, 27.5 months after the pretest. Second, we tested a protective-stabilizing hypothesis that participation in AIM would be particularly efficacious for youths experiencing high levels of contextual risk at the baseline assessment. Third, we tested hypotheses about the processes through which the posited AIM $\times$ contextual risk interaction would operate. We hypothesized that AIM reductions in two proximal risk factors, risk taking and susceptibility cognitions, would account for the program's efficacy among youths experiencing high levels of contextual

risk. In the following sections, we present the study hypotheses and the theoretical and empirical support for them.

Although AIM was designed to enhance protective mechanisms for all African Americans during the transition to emerging adulthood, its components were intentionally designed to deter escalation of alcohol use and the development of problems associated with substance use among adolescents dealing with challenging contextual risks. The first purpose of the study was to test the hypothesis that rural African American adolescents assigned randomly to participate in AIM who were experiencing high levels of contextual risk at baseline will evince a slower rate of increase in alcohol use and in problems related to the use of alcohol and other substances than will similar adolescents assigned randomly to the control condition across the 27.5 months separating the pretest and the Wave 4 assessment. This hypothesis is conceptually similar to a protective interaction effect in the resilience literature, in which a resilience resource (participation in AIM) reduces the negative impact of a risk factor on development over time (Luthar, 2006). Confirmation of this hypothesis is theoretically important because it would demonstrate that the developmental progression from contextual risk to increases in alcohol use and substance use problems among rural African Americans is not immutable.

The formulation of contextual risk in this study was guided by Rutter's (1983) approach to the analysis of complex systems in human development. In this approach, proximal and distal qualities of the social environment are modeled collectively in what have come to be called contextual risk models. Proximal and distal risk factors for the outcome of interest are identified from the literature; cumulative contextual risk is then calculated by a simple summation of the multiple risk factors (Rutter, 1983, 1993). The chief advantage of Rutter's cumulative risk metric is its ability to model simultaneously multiple risk factors without the major statistical and interpretive liabilities of multiplicative interactions. Interactions, particularly higher-order terms, have low statistical power, and researchers' ability to comprehend higher-level (greater than three-way) interactions is limited. In this study, prominent proximal risk factors for the escalation of alcohol use among rural African Americans were identified from the etiology literature; exposure to these risks constituted the cumulative risk metric. The proximal risks that comprised the contextual risk index are discussed next.

Among rural African Americans, a cluster of contextual risk factors consistently sponsors higher rates of alcohol use across preadolescence, adolescence, and emerging adulthood (King, Burt, Malone, McGue, & Iacono, 2005; Merline, Jager, & Schulenberg, 2008). These risks include parent-child relationships characterized by high levels of conflict and rancor, affiliations with deviant companions, and perceived racial discrimination. Conflicted parent-child relationships contribute to the initiation and escalation of alcohol use through (a) increasing the likelihood that youths will reject parental alcohol use norms (Brody, Flor, Hollett-Wright, & McCoy, 1998; Brody, Ge, Katz, & Arias, 2000); (b) interfering with the development of self-regulatory skills (Brody & Ge, 2001); and (c) inducing negative affective states, such as anger, sadness, and depression, which occasion alcohol use as a means of alleviating distress (Weinberg & Glantz, 1999). Etiologic research with rural African American preadolescents and adolescents and other populations also shows that affiliation with companions who use alcohol or other substances consistently has been found to lead to escalation of use (Brody, Chen, & Kogan, 2010; Elliott, Ageton, & Huizinga, 1985; Mosbach & Leventhal, 1988). This occurs not only because the peer group provides reinforcement for deviant behaviors but also because the peers are themselves alienated from conventional pursuits, such as academic achievement or vocational training. Thus, a closed loop may develop in which group members reinforce each others' detachment from conventional goals and the use of alcohol and other substances increases.

In addition to risk factors associated with compromised parent-adolescent relationships and affiliation with substance-using companions, African Americans in rural Southern communities often experience racial discrimination (Brody, Chen, Kogan, et al., 2010; Brody, Chen, et al., 2006; Simons, Chen, Stewart, & Brody, 2003). This is a particularly pernicious stressor that induces anger, frustration, and depressive symptoms, which can compromise physical and mental health outcomes across time (Pearlin, Schieman, Fazio, & Meersman, 2005). Numerous studies support this proposition, indicating that racial discrimination forecasts alcohol consumption, smoking, and the use and abuse of other drugs (Pascoe & Smart Richman, 2009). Of particular import are findings demonstrating that the direction of causality flows from perceived discrimination to outcomes and not the reverse (Brody, Chen, et al., 2006; Brody, Kogan, & Chen, in press).

The second purpose of this study was to provide an understanding of the ways in which the hypothesized interaction between participation in AIM and contextual risk status results in decreases in alcohol use and the development of substance use problems. We conjectured that African American adolescents confronted with relatively high levels of contextual risk, including the challenges associated with life in rural Southern communities, may come to believe they have little to lose by abandoning planful, conventional orientations in favor of a present orientation that promotes “living in the moment.” These adolescents are at heightened risk of discounting short- and long-term consequences, increasing risk-taking tendencies, and developing susceptibility cognitions (intentions and willingness to use substances) that increase their likelihood of using alcohol and other drugs. On the basis of this reasoning, we proposed a hypothesis that African American youths who participated in AIM and who experienced relatively high levels of contextual risk would evince decreases in risk-taking tendencies and susceptibility cognitions for alcohol use whereas similar youths in the control condition would evince stable high levels of these risk mechanisms over time, and that these changes would serve as mediators connecting AIM with decreases in alcohol use and in problems associated with the use of alcohol and other substances.

Empirical evidence justifies a focus on risk taking and susceptibility cognitions as proximal risk mechanisms for alcohol use and the development of substance use problems. Risk-taking adolescents and emerging adults are more likely to initiate and escalate alcohol use and develop alcohol-related disorders and negative alcohol-related consequences (Bechara & Damasio, 2002; Skeel, Pilarski, Pytlak, & Neudecker, 2008). Of particular importance for the purposes of this study, risk-taking tendency meets the criteria for a prevention-targeted risk mechanism not only because it is a demonstrated proximal risk mechanism for the escalation of alcohol use and substance use problems, but also because its development has been shown to be partly under the control of family and other contextual influences (Cloninger, Sigvardsson, & Bohman, 1988). Susceptibility cognitions, composed of intentions and willingness to use substances along with a favorable image of drinkers, also meet these criteria. These cognitions develop at a relatively early age and serve as a proximal risk mechanism in longitudinal, etiological research forecasting onset and escalation of the use of alcohol and other substances (Chassin, Tetzloff, & Hershey, 1985; Cleveland, Gibbons, Gerrard, Pomery, & Brody, 2005). The family environment plays an important role in shaping these cognitions as parents communicate their own norms about use and their own perceptions of users (Blanton, Gibbons, Gerrard, Conger, & Smith, 1997; Brody et al., 2004). In addition, results from the Strong African American Families prevention trial involving rural African American preadolescents demonstrated that the development of susceptibility cognitions was impeded among youths who took part in the prevention program (Brody, Murry, et al., 2006).

Summary of the Present Study

In this study, rural African American 17-year-olds participated in the AIM randomized prevention trial. Youths completed four waves of data collection spanning 27.5 months from pretest to the last long-term assessment using procedures that have been shown to yield reliable data from rural African Americans. These procedures include computer-based interviewing, matching of interviewers and participants by ethnicity, and extensive reassurances concerning confidentiality. We examined hypotheses about AIM $\times$ contextual risk interactions and mediation effects to delineate the risk mechanisms that were ameliorated by participation in AIM and account for the long-term efficacy of AIM among adolescents experiencing high levels of contextual risk.

Participants

Participants included 347 African American youths in the last 2 years of secondary school at the beginning of the study (M age = 17.7, SD = 0.77). The families had an average of 2.4 children. Of the youths in the sample, 58.5% were female; 63.6% lived in single-mother-headed households. Primary caregivers, whose mean age was 44.0, were the target youths' biological mothers. A majority of the youths' caregivers (78.7%) had completed high school or earned a GED. The median family income of \$1,948.25 per month was representative of the sampled population (Boatright, 2005). Although the youths' primary caregivers worked an average of 38.5 hours per week (SD = 11.1), 41.8% of their families lived below federal poverty standards, and another 15% lived within 150% of the poverty threshold. Youths' families were representative of the areas in which they lived (Boatright, 2005); they can be described as working poor.

Participants were recruited from six rural counties in Georgia. Schools in the counties provided lists of students in the targeted age range. Families were contacted by phone in random order to discuss participation. Of 740 families screened for eligibility, 560 (76%) were eligible to participate. Of these, 347 (58%) agreed to take part in the study, a rate similar to those reported for other family-centered prevention trials (Spoth & Redmond, 2000). Refusal rates were similar across the intervention and control conditions. The reason most commonly given for nonparticipation was a lack of time. Figure 1 presents the flow of participants through the trial. Of the participating families, 174 were assigned to the intervention condition and 173 were assigned to the control condition. Families provided data at pretest (Wave 1, 2.5 months pre-intervention), at posttest (Wave 2, 6.4 months after pretest), and at two long-term follow up assessments (Wave 3, 16.6 months after pretest; Wave 4, 27.5 months after pretest). Wave 4 data were collected from 289 (83.3%) families. To preserve the random nature of the group assignments, the analyses included all families from intervention counties who provided data at all four waves regardless of the number of prevention sessions that they actually attended (an intent-to-treat analysis). This includes 27 primary caregivers and 26 youths who did not attend any prevention sessions. Although this may have reduced the magnitude of the differences between the prevention and control groups, excluding these families would have introduced self-selection bias into the findings. To evaluate differential attrition across experimental conditions, two-factor multivariate analyses of variance (MANOVAs) were conducted with the intervention and control groups for each intervention-targeted behavior, demographic characteristic, and outcome measure for families who did and did not provide data at Wave 4. No significant Intervention status $\times$ Attrition interaction effects emerged for any of the variables.

Procedure

To enhance rapport and cultural understanding, African American students and community members served as field researchers to collect data. Prior to data collection, the researchers

received 12 hours of training in administering the protocol. The instruments and procedures were developed and refined with the help of a focus group of 40 African American community members who were representative of the population from which the sample was drawn. The focus group process has been described in detail elsewhere (Brody, Murry, Kim, & Brown, 2002).

At each wave of data collection, one home visit lasting 2 hours was made to each family. Both the field researchers and the project staff who assigned families for them to visit were unaware of the families' assignments to the intervention or control group. Primary caregivers consented to their own participation and the participation of youth under age 18; youth assented or, if 18 or older, consented to their own participation. At the home visit, self-report questionnaires were administered to caregivers and youth in an interview format. Each interview was conducted privately, with no other family members present or able to overhear the conversation. Each family was paid \$100 at each assessment. All procedures were approved by the University of Georgia Institutional Review Board.

Intervention Implementation, Attendance, and Fidelity

The AIM prevention program, modeled after an existing family-based skills-training intervention in a group format for rural African American preadolescents (see Brody et al., 2004), consists of six consecutive weekly group meetings held at community facilities, with separate parent and youth skill-building curricula and a family curriculum. Each of the six meetings includes separate, concurrent training sessions for parents and youth, followed by a joint parent–youth session during which the families practice the skills they learned in their separate sessions. Concurrent and family sessions each last 1 hour. Thus, both parents and youth receive 12 hours of prevention training.

Parents in the prevention condition were taught how to provide developmentally appropriate emotional and instrumental support, provide ongoing racial socialization that included strategies for dealing with discrimination, provide occupational and educational mentoring, promote autonomy and adult responsibility, and encourage responsible decisions about risk behaviors. Program content was delivered by narrators on videotapes that also depicted family interactions illustrating targeted behaviors. African American group leaders presented the prevention curriculum, organized role-playing activities, guided discussions among parents, and answered parents' questions. Youth were taught how to develop a future orientation, plan to meet goals, identify people in their communities who could help them attain goals, cope with barriers and racial discrimination, and formulate self-care strategies. Videotapes were also used in the youth sessions, along with structured activities, role playing, and group discussions.

AIM group leaders took part in three training sessions over a 4-day period. The trainers were African American women with varied backgrounds, including teaching, social work, and homemaking. Salient characteristics for trainers included engaging personalities and experience with the dissemination of information in a group format. These criteria were applied consistently across intervention sites. Before conducting any intervention sessions, group leaders demonstrated their mastery of the prevention curriculum and the prescribed method of presenting it. Eight teams, each of which included three group leaders, conducted a total of 36 prevention groups. Group size ranged from 4 to 13 families, with an average of 8 families and 16 individuals attending each session. Of the pretested families, 67% took part in four or more sessions, with 35% attending all six of them. Families took part in an average of four sessions. Each team of group leaders was videotaped while conducting program sessions. For each group, two parent and two youth sessions were selected randomly and scored for adherence to and coverage of the prevention curriculum. Coverage of the curriculum components exceeded 80% for the parent and youth sessions.

Measures

Demographics—Participant age and gender, family monthly income, maternal age, and number of children in the household were recorded. Maternal education was measured on a scale ranging from 1 (*grades 1 to 4*) to 10 (*doctorate or professional degree*). Poverty status was based on per capita income and federal guidelines.

Contextual risk factor index—The contextual risk factor construct, expressed as an index and assessed at Wave 1, was composed of parent-child conflict, affiliations with deviant companions, and perceived racial discrimination. Parent-child conflict was measured using two scales. On the first, a seven-item version of the Ineffective Arguing Inventory (IAI; Kurdek, 1994) adapted for use with parents and children, youths rated statements about the conflicts they had with their parents on a scale ranging from 0 (*disagree strongly*) to 4 (*agree strongly*), $\alpha = .74$. Examples include, “You and your parent’s arguments are left hanging and unsettled” and “You and your parent go for days being mad at each other.” In previous studies with rural African American samples, this scale forecast youths’ self-control, externalizing symptoms, and internalizing symptoms (Brody et al., 2002; Brody et al., 2005). On the second, the arguing subscale from the Discussion Quality Scale (DQS; Brody et al., 1998), youths reported how frequently they and their parents argued about their choices of friends, school or job, alcohol and drugs, and sex, using a scale ranging from 1 (*never*) to 4 (*always*), $\alpha = .70$. Responses to this scale have predicted rural African American youths’ alcohol use norms and actual alcohol use (Brody et al., 1998). The IAI and DQS items were then summed to form an indicator of parent-child conflict, $\alpha = .78$. The deviant companions construct was composed of the mean of youths’ self-reports on two scales. Youths reported the proportions of their close friends, ranging from 0 (*none*) to 2 (*all*), who engaged in any of 15 deviant or risk-taking behaviors drawn from Elliott et al.’s (1985) work with delinquent youths. Behaviors included using substances, selling drugs, getting in trouble with the police, skipping school, and damaging property; $\alpha = .87$. On a scale ranging from 1 (*never*) to 3 (*often*), youths also reported how often their current or last romantic partners engaged in a similar set of behaviors, $\alpha = .83$. The two scales assessing deviant activities of close friends and romantic partners were summed to create a deviant companions index; $\alpha = .87$. This scale has forecast substance use among rural African American adolescents (Brody, Chen, & Kogan, 2010). Instances of perceived racial discrimination were assessed with the Racist Hassles Questionnaire (Brody, Chen, et al., 2006; Simons et al., 2003). The nine items in this scale were based on experiences that rural African Americans identified as forms of discrimination common in their communities. Examples include being treated rudely or disrespectfully and being the target of racial insults. Respondents indicated the frequency of discriminatory experiences during the past 6 months on a scale ranging from 0 (*never happened*) to 2 (*happened a lot*), $\alpha = .86$. This scale has forecast externalizing and internalizing symptoms (Brody, Murry, et al., 2006; Simons et al., 2003) and substance use (Brody et al., in press) among rural African American youths. The measures of parent-child conflict, affiliations with deviant companions, and perceived racial discrimination were standardized and summed to form the risk factor construct, $\alpha = .86$.

Risk taking—At each wave, youths completed Eysenck’s Risk-Taking Scale (Eysenck & Eysenck, 1977), which includes six items (e.g., “I enjoy taking risks”; “I would enjoy fast driving”; “I would do almost anything on a dare”) that were rated on a scale ranging from 1 (*not at all true*) to 5 (*very true*). Cronbach’s alphas ranged from .76 to .87 across the study.

Susceptibility cognitions—The measures that comprise susceptibility cognitions were administered at each wave. This construct was composed of behavioral willingness and intentions to use alcohol and other drugs, and prototypes of peers who use alcohol and other

substances. Youths' willingness to use substances was measured with three items, worded as in previous studies (Brody et al., 2004). A scenario was presented: "Suppose you were with a group of friends and there were some drugs there that you could have if you wanted. How willing would you be to do the following things: (a) take some and use them; (b) use enough to get high; and (c) take some with you to use later?" Responses ranged from 1 (*not at all*) to 3 (*very*); Cronbach's alphas ranged from .73 to .89 across the study. The susceptibility cognition measure also included an eight-item scale composed of two items measuring intentions to engage in each of four substance-use behaviors: smoking cigarettes, smoking marijuana, drinking alcohol, and drinking alcohol excessively. The items were, "Do you plan to use [substance] in the next year?" and "How likely is it that you will use [substance] in the next year?" (Warshaw & Davis, 1985). Cronbach's alphas ranged from .77 to .82 across the study. The measure of prototypical images of drinkers (Brody et al., 2004) was introduced with the lead-in statement, "Take a moment to think about the type of person your age who frequently drinks alcohol. We are not talking about anyone in particular, just your image of people your age who frequently drink alcohol." Using a response set ranging from 1 (*not at all*) to 4 (*very*), youths indicated how "popular," "smart," "cool," "attractive (good looking)," and "dull (boring)" they considered such peers to be. Youths also indicated, on the same response set, how similar they considered themselves to be to alcohol-drinking peers. The six items were summed to create a variable measuring youths' images of drinkers; Cronbach's alphas ranged from .73 to .82 across the study. The intentions, willingness, and prototypical images items were then combined and used as an indicator of susceptibility cognitions; Cronbach's alphas ranged from .78 to .86 across the study for the combined indicator.

Alcohol use and substance use problems—At each wave, youths reported, on a scale ranging from 1 (*zero*) to 7 (*40 or more*), the number of days during the past 3 months on which they had a drink of alcohol (Johnston, O'Malley, & Bachman, 2000). The 10-item Minnesota Survey of Substance Use Problems (Harrison, Fulkerson, & Beebe, 1998) was used to measure the adolescents' substance use problems. Youths were asked to report how many times during the past 6 months they had experienced problems with substance use, such as failure to fulfill role obligations, use in physically hazardous situations, legal problems, and use despite social/interpersonal problems. The response set ranged from 0 (*zero*) to 6 (*11 or more*). Youths' responses to the substance use problems scale were summed. Because the scale comprised count data, internal consistency was not computed.

Data Analysis

To test the study hypotheses, we conducted latent growth modeling (LGM) using Mplus 6.0 (L. K. Muthén & Muthén, 1998–2010). Missing data were handled using full information maximum likelihood (FIML) estimation, which yields unbiased parameter estimates and appropriate standard errors when data are missing at random (MAR; B. O. Muthén & Muthén, 1998). Because of the relatively low rates of alcohol use and substance use problems among rural African American adolescents (Brody & Ge, 2001; Cleveland et al., 2005), both variables were modeled as binary variables: Any report of alcohol use during the past 3 months or of a substance use problem during the past 6 months was coded as 1 and the absence of such reports was coded as 0. The binary rates of alcohol use and substance use problems from Wave 1 to Wave 4 are presented in Table 1. Latent growth curve models with ordinal outcomes were used for the binary variables (B. O. Muthén, 2001). We tested a mediated-moderation model (Little, Bovaird, & Card, 2007; Preacher, Rucker, & Hayes, 2007) to examine the hypothesis that $AIM \times$ contextual risk interaction effects on alcohol use and substance use problems are mediated by the interaction's effects on risk taking and susceptibility cognitions.

Participant age within the AIM and control groups varied at all waves of data collection. These variations were managed in the growth models by specifying growth as a function of age rather than a function of data collection wave; the random *t*-score option in Mplus was used. The models included two individual growth parameters: (a) an intercept parameter with time centered at age 16, and (b) a linear slope parameter representing the average linear change in alcohol use and substance use problems over time. Because families were nested within sites, it was possible that alpha levels could be inflated. Intraclass correlations (ICCs), however, were low for all the study variables. Because all ICCs were less than .05, latent growth modeling could be used to analyze the data without biasing any parameter estimates (Heck, 2001).

Results

Preliminary Analyses

The prevalence rates for alcohol use and substance use problems among participants from pretest to Wave 4 are presented in Table 1. Overall, 18.5% of participants reported alcohol use and 9.5% reported substance use problems at pretest. In general, prevalence rates for alcohol use and substance use problems increased in a linear fashion over time. At Wave 4, 34.6% of participants reported alcohol use and 17.3% reported a substance use problem.

Associations of AIM and Contextual Risk with Trajectories for Alcohol Use and Substance Use Problems

Contextual risk was regressed on the intercept of alcohol use (alcohol use prevalence at Wave 1); participation in AIM, contextual risk, and the AIM $\times$ contextual risk interaction were regressed on the slope of alcohol use. Participant gender was included as a control variable in each model. As shown in Table 2 (left column, above), contextual risk was positively associated with the intercept of alcohol use, indicating that participants who experienced high levels of contextual risk were likely to report alcohol use at the beginning of the study. A significant AIM $\times$ contextual risk interaction predicted the slope of alcohol use. As predicted, the interaction, depicted at the top of Figure 2, suggests that participants in the control group who experienced high levels of contextual risk were more likely than AIM participants to increase their alcohol use over time. No significant differences between the control and AIM groups emerged for alcohol use when contextual risk was low.

Turning to the analysis of substance use problems, as shown in Table 2 (right column, above), contextual risk was positively associated with the intercept of substance use problems, indicating that participants who experienced high levels of contextual risk were also likely to report a substance use problem at the beginning of the study. A significant AIM $\times$ contextual risk interaction predicted the slope of substance use problems. Unpacking the interaction (Figure 2, bottom) demonstrated, as predicted, that participants in the control group who experienced high contextual risk reported a greater increase over time in substance use problems than did participants in the AIM group. No differences emerged between participants in the control and intervention groups when contextual risk was low.

Associations of AIM and Contextual Risk with Trajectories for Risk Taking and Susceptibility Cognitions

The LGMs were estimated separately for the hypothesized mediators, risk taking and susceptibility cognitions, which we conjectured would account for AIM's prevention effects among participants experiencing higher levels of contextual risk. Contextual risk was regressed on the intercept and AIM participation, contextual risk, and the AIM $\times$ contextual risk interaction were regressed on the slope of risk taking and susceptibility cognitions in the LGM. Participant gender was included as a control variable. As shown in Table 2 (left

column, below), both participant gender and contextual risk were positively associated with the intercept for risk taking, indicating that male participants and those who experienced high levels of contextual risk reported higher levels of risk taking at the beginning of the study. Analyses of the slope for risk taking revealed that random assignment to AIM significantly predicted the slope of risk taking; participants in the AIM group reported greater decreases in risk taking over time than did those in the control group. A significant $\text{AIM} \times \text{contextual risk}$ interaction also predicted the slope of risk taking. Unpacking the interaction (see Figure 3, top) suggested that youths in the control/high risk group evinced high and stable levels of risk taking. Conversely, youths in the AIM/high risk group evinced a decrease in risk taking over time. Youths in the low risk group evinced low, stable levels of risk taking over time regardless of their assignment to AIM or the control group.

Turning to the analysis of susceptibility cognitions, contextual risk significantly predicted the intercept for susceptibility cognitions (Table 2, right column, below); participants experiencing high contextual risk at pretest reported high levels of susceptibility cognitions. A significant $\text{AIM} \times \text{contextual risk}$ interaction also predicted the slope of susceptibility cognitions. Figure 3 (bottom) reveals a pattern similar to that for risk taking. High and stable levels of susceptibility cognitions for the control/high risk group and declining levels for the AIM/high risk group emerged. Again, youths experiencing low contextual risk evinced low and stable levels of susceptibility cognitions.

Risk Taking and Susceptibility Cognitions Mediate the Relations between AIM and Contextual Risk and the Trajectories of Alcohol Use and Substance Use Problems

Two parallel growth models (L. K. Muthén & Curran, 1997) were executed to test the mediated moderation hypothesis that AIM effects on decreasing risk taking and susceptibility cognitions for adolescents experiencing high levels of contextual risk would account for its efficacy in reducing alcohol use and substance use problems among the high risk group. The models depicted in Figure 4 demonstrated that: (a) the $\text{AIM} \times \text{contextual risk}$ interactions for susceptibility cognitions found in previous analyses, as expected, also were found in the mediation model; (b) the paths from the slope of susceptibility cognitions to the slopes for alcohol use and for substance use problems were positive and significant; and (c) the paths from the $\text{AIM} \times \text{contextual risk}$ interaction to the slopes for alcohol use and substance use problems became nonsignificant when the $\text{AIM} \times \text{contextual risk}$ interaction effect on susceptibility cognitions was included in the models. Thus, one mechanism responsible for AIM's efficacy in preventing increases in alcohol use and substance use problems among rural African American youths experiencing high levels of contextual risk was its effect on deterring the development of cognitions that make the use of alcohol and other substances attractive.

The two parallel growth models were executed again with risk taking as the focal mediator. The results for alcohol use and substance use problems, depicted in Figure 5, differed in one respect from those for susceptibility cognitions. Both an AIM main effect and an $\text{AIM} \times \text{contextual risk}$ interaction effect on reductions in risk taking were found, and these reductions in risk taking mediated the $\text{AIM} \times \text{contextual risk}$ interaction on the development of alcohol use and of substance use problems.

Discussion

In this study, repeated measurements of alcohol use and substance use problems were obtained from a representative sample of African Americans living in the rural South as they transitioned into emerging adulthood. These data revealed two major findings. First, participation in AIM interacted with contextual risks to forecast alcohol use and substance use problems and to reveal a consistent pattern in which AIM provided the strongest long-

term benefit for those who were at higher contextual risk prior to intervention. Second, this pattern resulted from prevention effects on reducing risk taking and susceptibility cognitions.

The study findings take on particular importance when the participants' developmental stage is considered. As emerging adults reach 21 years of age and attain the legal right to purchase alcohol, they gain the potential to assume more control over the timing and extent of their alcohol use. As Arnett (2000) noted, emerging adults can pursue new, risky experiences, such as driving after drinking, with greater freedom than can individuals in any other developmental period. The years prior to and following the 21st birthday may, therefore, be crucial times for participation in AIM, which was designed to equip emerging adults to deal with the challenges that come with the removal of legal barriers to alcohol use, increasing autonomy, increasing influence from friends and romantic partners, and waning parental control.

The reduction in past 3-month alcohol use that AIM sponsors has important public health and clinical implications. From a public health perspective, the goal of programs like AIM for adolescents and emerging adults is to shift the alcohol consumption curve so that fewer youths in the population distribution are frequent or problem drinkers. This shift not only will lead to decreases in drunk driving fatalities but also will reduce other threats that alcohol use poses to adolescents' and emerging adults' mental health, educational and occupational engagement, and family relationships. From a clinical perspective, the results suggest that an inoculation of developmentally appropriate protective parenting processes and self-regulatory skills during late adolescence, particularly for youths who confront contextual risks, may contribute to a self-sustaining trajectory of relative disinterest in alcohol use when friends and acquaintances begin to model and sanction it. An advantage of imparting these protective processes via a universal program such as AIM is its avoidance of stigma. Neither adolescents nor caregivers are enrolled in AIM on the basis of pre-existing characteristics. Caregivers and youths take part to promote adolescent well-being, a universal benefit that participants are likely to embrace. Other research documents that universal programs reach high percentages of at-risk youths and families while enhancing the protective capacities of those at low risk (Dishion & Kavanagh, 2000).

Tests of the mediated-moderation hypothesis demonstrated two pathways through which the AIM $\times$ contextual risk interactions occurred. Paths from reductions in risk taking and susceptibility cognitions to the development of alcohol use and substance use problems accounted for the effects of the AIM $\times$ contextual risk interaction on the outcomes. To our knowledge, the present study is the first to show that intervention-induced reductions of these risk mechanisms are also responsible for the prevention of substance use problems. Typically, evaluations of family-centered and other substance use prevention programs have focused on amount of use without regard to deterring substance use-related problems. This finding is important because substance use problems, by definition, impact functioning in various spheres of life (e.g., family, occupational, educational, interpersonal) and contribute to compromised physical and psychological functioning (O'Neill, Parra, & Sher, 2001).

Exposure to risk during early childhood has been associated consistently with concurrent and, in a smaller number of studies, subsequent psychosocial and cognitive difficulties (Bradley & Wildman, 2002; Heckman, 2006). Researchers know much less about exposure to contextual risk and the development of emerging adults' use of alcohol and other substances, or the problems that can arise from use. We have shown that cumulative risk exposure is positively associated with escalation of alcohol use and substance use problems among rural African Americans during the beginning of emerging adulthood, particularly for youths who did not take part in AIM. As important as these results are, they do not

address the relative contributions of each of the risk indicators to the study findings. Sample size limitations preclude such analyses in the present study. Other longitudinal prevention trials with larger samples may be better able to disaggregate the relative contributions of risk factors to mediated-moderation processes that account for prevention effects.

Limitations of the present research should be noted. We do not know whether AIM would be effective outside of the rural Southern areas for which it was developed because some of its prevention components were selected in response to the particular needs of youths in the region. It is possible to adapt AIM for youths living in other areas such as urban settings, then evaluate its efficacy. Although we do not know how much adaptation would be necessary, we believe that only modest changes would be needed. It also is not known whether nonspecific factors, such as disparities in time and personal attention devoted to the AIM and control groups, may have carried forward across 26 months to be responsible for the long-term effects that emerged. Although this seems unlikely, it remains an empirical question to be addressed in future studies. Finally, sample size constraints prevented us from exploring gender moderation of study results. This issue should be examined in future prevention research with emerging adults. These issues notwithstanding, the results document the long-term impact of a preventive intervention in deterring alcohol use and the development of substance use problems among rural African American emerging adults confronting high levels of contextual risk.

Acknowledgments

This research was supported by Awards Numbers R01DA019230 and P30DA027827 from the National Institute on Drug Abuse. The content is solely the responsibility of the authors and does not necessarily represent the official views of the National Institute on Drug Abuse or the National Institutes of Health.

References

- Arnett JJ. Emerging adulthood: A theory of development from the late teens through the twenties. *American Psychologist*. 2000; 55:469–480.10.1037/0003-066X.55.5.469 [PubMed: 10842426]
- Bechara A, Damasio H. Decision-making and addiction (part I): Impaired activation of somatic states in substance dependent individuals when pondering decisions with negative future consequences. *Neuropsychologia*. 2002; 40:1675–1689.10.1016/S0028-3932(02)00015-5 [PubMed: 11992656]
- Blanton H, Gibbons FX, Gerrard M, Conger KJ, Smith GE. Role of family and peers in the development of prototypes associated with substance use. *Journal of Family Psychology*. 1997; 11:271–288.10.1037/0893-3200.11.3.271
- Boatright, SR. The Georgia county guide. Athens: Center for Agribusiness and Economic Development; 2005.
- Bradley G, Wildman K. Psychosocial predictors of emerging adults' risk and reckless behaviors. *Journal of Youth and Adolescence*. 2002; 31:253–265.10.1023/A:1015441300026
- Brody GH, Chen Y-f, Kogan SM. A cascade model connecting life stress to risk behavior among rural African American emerging adults. *Development and Psychopathology*. 2010; 22:667–678.10.1017/S0954579410000350 [PubMed: 20576186]
- Brody GH, Chen Y-f, Kogan SM, Smith K, Brown AC. Buffering effects of a family-based intervention for African American emerging adults. *Journal of Marriage and Family*. 2010; 72:1426–1435.10.1111/j.1741-3737.2010.00774.x [PubMed: 20976130]
- Brody GH, Chen Y-f, Murry VM, Ge X, Simons RL, Gibbons FX, et al. Perceived discrimination and the adjustment of African American youths: A five-year longitudinal analysis with contextual moderation effects. *Child Development*. 2006; 77:1170–1189.10.1111/j.1467-8624.2006.00927.x [PubMed: 16999791]
- Brody GH, Flor DL, Hollett-Wright N, McCoy JK. Children's development of alcohol use norms: Contributions of parent and sibling norms, children's temperaments, and parent-child discussions. *Journal of Family Psychology*. 1998; 12:209–219.10.1037/0893-3200.12.2.209

- Brody GH, Ge X. Linking parenting processes and self-regulation to psychological functioning and alcohol use during early adolescence. *Journal of Family Psychology*. 2001; 15:82–94.10.1037/0893-3200.15.1.82 [PubMed: 11322087]
- Brody GH, Ge X, Katz J, Arias I. A longitudinal analysis of internalization of parental alcohol-use norms and adolescent alcohol use. *Applied Developmental Science*. 2000; 4:71–79.10.1207/s1532480xads0402_2
- Brody GH, Kogan SM, Chen Y-f. Perceived discrimination and longitudinal increases in adolescent substance use: Gender differences and mediational pathways. *American Journal of Public Health*. in press.
- Brody GH, Murry VM, Gerrard M, Gibbons FX, Molgaard V, McNair LD, et al. The Strong African American Families program: Translating research into prevention programming. *Child Development*. 2004; 75:900–917.10.1111/j.1467-8624.2004.00713.x [PubMed: 15144493]
- Brody GH, Murry VM, Kim S, Brown AC. Longitudinal pathways to competence and psychological adjustment among African American children living in rural single-parent households. *Child Development*. 2002; 73:1505–1516.10.1111/1467-8624.00486 [PubMed: 12361315]
- Brody GH, Murry VM, Kogan SM, Gerrard M, Gibbons FX, Molgaard V, et al. The Strong African American Families program: A cluster-randomized prevention trial of long-term effects and a mediational model. *Journal of Consulting and Clinical Psychology*. 2006; 74:356–366.10.1037/0022-006x.74.2.356 [PubMed: 16649880]
- Brody GH, Murry VM, McNair LD, Chen Y-f, Gibbons FX, Gerrard M, et al. Linking changes in parenting to parent-child relationship quality and youth self-control: The Strong African American Families program. *Journal of Research on Adolescence*. 2005; 15:47–69.10.1111/j.1532-7795.2005.00086.x
- Centers for Disease Control and Prevention. Youth risk behavior surveillance—United States, 1999. *Morbidity and Mortality Weekly Report*. 2000; 49
- Chassin, LA.; Tetzloff, C.; Hershey, M. Self-image and social-image factors in adolescent alcohol use; *Journal of Studies on Alcohol*. 1985. p. 39-47. Retrieved from http://www.jsad.com/jsad/article/SelfImage_and_SocialImage_Factors_in_Adolescent_Alcohol_Use/3422.html
- Cleveland MJ, Gibbons FX, Gerrard M, Pomery EA, Brody GH. The impact of parenting on risk cognitions and risk behavior: A study of mediation and moderation in a panel of African American adolescents. *Child Development*. 2005; 76:900–916.10.1111/j.1467-8624.2005.00885.x [PubMed: 16026504]
- Cloninger CR, Sigvardsson S, Bohman M. Childhood personality predicts alcohol abuse in young adults. *Alcoholism: Clinical and Experimental Research*. 1988; 12:494–505.10.1111/j.1530-0277.1988.tb00232.x
- Dishion TJ, Kavanagh K. A multilevel approach to family-centered prevention in schools: Process and outcome. *Addictive Behaviors*. 2000; 25:899–911.10.1016/S0306-4603(00)00126-X [PubMed: 11125778]
- Elliott, DS.; Ageton, SS.; Huizinga, D. Explaining delinquency and drug use. Beverly Hills, CA: Siegel; 1985.
- Eysenck SB, Eysenck HJ. The place of impulsiveness in a dimensional system of personality description. *British Journal of Social and Clinical Psychology*. 1977; 16:57–68. [PubMed: 843784]
- Fuligni, AJ.; Hardway, C. Preparing diverse adolescents for the transition to adulthood; *Future of Children*. 2004. p. 99-119. Retrieved from <http://www.futureofchildren.org/futureofchildren/publications/journals/article/index.xml?journalid=39&articleid=128>
- Harrison, PA.; Fulkerson, JA.; Beebe, TJ. DSM-IV substance use disorder criteria for adolescents: A critical examination based on a statewide school survey; *American Journal of Psychiatry*. 1998. p. 486-492. <http://ajp.psychiatryonline.org/cgi/content/abstract/155/4/486>
- Heck, RH. Multilevel modeling with SEM. In: Marcoulides, GA.; Schumacker, RE., editors. *New developments and techniques in structural equation modeling*. Mahwah, NJ: Erlbaum; 2001. p. 89-128.

- Heckman JJ. Skill formation and the economics of investing in disadvantaged children. *Science*. 2006 June 30.;1900–1902.10.1126/science.1128898 [PubMed: 16809525]
- Johnston, LD.; O'Malley, PM.; Bachman, JG. Monitoring the Future national survey results on drug use, 1975–1999. Volume I: Secondary school students (NIH Publication No. 00-4802). Bethesda, MD: National Institute on Drug Abuse; 2000.
- King SM, Burt SA, Malone SM, McGue M, Iacono WG. Etiological contributions to heavy drinking from late adolescence to young adulthood. *Journal of Abnormal Psychology*. 2005; 114:587–598.10.1037/0021-843X.114.4.587 [PubMed: 16351382]
- Kurdek, LA. Conflict resolution styles in gay, lesbian, heterosexual nonparent, and heterosexual parent couples; *Journal of Marriage and the Family*. 1994. p. 705-722. Retrieved from <http://www.jstor.org/stable/352880>
- Little, TD.; Bovaird, JA.; Card, NA., editors. Modeling contextual effects in longitudinal studies. Mahwah, NJ: Erlbaum; 2007.
- Luthar, SS. Resilience in development: A synthesis of research across five decades. In: Cicchetti, D.; Cohen, DJ., editors. *Developmental psychopathology: Vol. 3. Risk, disorder, and adaptation*. 2. Hoboken, NJ: Wiley; 2006. p. 739-795.
- Merline A, Jager J, Schulenberg JE. Adolescent risk factors for adult alcohol use and abuse: Stability and change of predictive value across early and middle adulthood. *Addiction*. 2008; 103(Suppl 1): 84–99.10.1111/j.1360-0443.2008.02178.x [PubMed: 18426542]
- Mosbach P, Leventhal H. Peer group identification and smoking: Implications for intervention. *Journal of Abnormal Psychology*. 1988; 97:238–245.10.1037/0021-843X.97.2.238 [PubMed: 3385077]
- Muthén, BO. Second-generation structural equation modeling with a combination of categorical and continuous latent variables: New opportunities for latent class/latent growth modeling. In: Collins, LM.; Sayer, A., editors. *New methods for the analysis of change*. Washington, DC: American Psychological Association; 2001. p. 291-322.
- Muthén, BO.; Muthén, LK. *Mplus user's guide: The comprehensive modeling program for applied researchers*. Los Angeles, CA: Authors; 1998.
- Muthén LK, Curran PJ. General longitudinal modeling of individual differences in experimental designs: A latent variable framework for analysis and power estimation. *Psychological Methods*. 1997; 2:371–402.10.1037/1082-989X.2.4.371
- Muthén, LK.; Muthén, BO. *Mplus user's guide*. 6. Los Angeles, CA: Authors; 1998–2010.
- O'Neill SE, Parra GR, Sher KJ. Clinical relevance of heavy drinking during the college years: Cross-sectional and prospective perspectives. *Psychology of Addictive Behaviors*. 2001; 15:350–359.10.1037/0893-164X.15.4.350 [PubMed: 11767268]
- Offner, P.; Holzer, H. *Left behind in the labor market: Recent employment trends among young Black men*. Washington, DC: Brookings Institution; 2002.
- Paschall MJ, Flewelling RL, Faulkner DL. Alcohol misuse in young adulthood: Effects of race, educational attainment, and social context. *Substance Use and Misuse*. 2000; 35:1485–1506. [PubMed: 10993385]
- Pascoe EA, Smart Richman L. Perceived discrimination and health: A meta-analytic review. *Psychological Bulletin*. 2009; 135:531–554.10.1037/a0016059 [PubMed: 19586161]
- Pearlin LI, Schieman S, Fazio EM, Meersman SC. Stress, health, and the life course: Some conceptual perspectives. *Journal of Health and Social Behavior*. 2005; 46:205–219.10.1177/002214650504600206 [PubMed: 16028458]
- Preacher, KJ.; Rucker, DD.; Hayes, AF. Addressing moderated mediation hypotheses: Theory, methods, and prescriptions; *Multivariate Behavioral Research*. 2007. p. 185-227. Retrieved from <http://search.ebscohost.com/login.aspx?direct=true&db=psych&AN=2007-11442-007&site=ehost-live>
- Proctor, BD.; Dalaker, J. *Poverty in the United States: 2002 (Current Population Reports, P60-222)*. Washington, DC: U.S. Bureau of the Census; 2003. Retrieved from http://www.dlc.org/documents/Census_2002_Poverty.pdf
- Rutter, M. Stress, coping, and development: Some issues and some questions. In: Garnezy, N.; Rutter, M., editors. *Stress, coping, and development in children*. Baltimore, MD: Johns Hopkins University Press; 1983. p. 1-41.

- Rutter M. Resilience: Some conceptual considerations. *Journal of Adolescent Health*. 1993; 14:626–631.10.1016/1054-139X(93)90196-V [PubMed: 8130234]
- Simons RL, Chen Y-f, Stewart EA, Brody GH. Incidents of discrimination and risk for delinquency: A longitudinal test of strain theory with an African American sample. *Justice Quarterly*. 2003; 20:827–854.10.1080/07418820300095711
- Skeel RL, Pilarski C, Pytlak K, Neudecker J. Personality and performance-based measures in the prediction of alcohol use. *Psychology of Addictive Behaviors*. 2008; 22:402–409.10.1037/0893-164X.22.3.402 [PubMed: 18778133]
- Spoth RL, Redmond C. Research on family engagement in preventive interventions: Toward improved use of scientific findings in primary prevention practice. *Journal of Primary Prevention*. 2000; 21:267–284.10.1023/A:1007039421026
- Sum, A.; Khatiwada, I.; Pond, N.; Trubsky, M.; Fogg, N.; Palma, S. Left behind in the labor market: Labor market problems of the nation's out-of-school, young adult populations. Chicago, IL: Center for Labor Market Studies, Northeastern University; 2002.
- Warshaw PR, Davis FD. Disentangling behavioral intention and behavioral expectation. *Journal of Experimental Social Psychology*. 1985; 21:213–228.10.1016/0022-1031(85)90017-4
- Weinberg NZ, Glantz MD. Child psychopathology risk factors for drug abuse: Overview. *Journal of Clinical Child Psychology*. 1999; 28:290–297.10.1207/S15374424jccp280301 [PubMed: 10446678]
- Wimberly, RC.; Morris, LV. *The Southern Black Belt: A national perspective*. Lexington, KY: TVA Rural Studies Press; 1997.

Figure 1.
Participant flow through the AIM trial.

Figure 2. Growth in proportions of alcohol use and substance use problems by AIM and contextual risk. Low risk: 1 *SD* below the mean; high risk: 1 *SD* above the mean.

Figure 3. Growth in risk taking and susceptibility cognitions by AIM and contextual risk. Low risk: 1 *SD* below the mean; high risk: 1 *SD* above the mean.

Figure 4.

Susceptibility cognitions as a mediator for the effect of AIM and contextual risk on alcohol use and substance use problems with gender controlled. Numbers on top refer to coefficients for the pathways to alcohol use. Numbers on the bottom in parentheses refer to coefficients for the pathways to substance use problems.

* $p < .05$. ** $p < .01$. *** $p < .001$.

Figure 5.

Risk taking as a mediator for the effect of AIM and contextual risk on alcohol use and substance use problems with gender controlled. Numbers on top refer to coefficients for the pathways to alcohol use. Numbers on the bottom in parentheses refer to coefficients for the pathways to substance use problems.

* $p < .05$, ** $p < .01$, *** $p < .001$.

Table 1
Numbers and Prevalence Rates of Alcohol Use and Substance Use Problems for Each Time Point

Wave	Alcohol Use, Proportion		Alcohol Use, Quantity		Substance Use Problems, Proportion		Substance Use Problems, Quantity	
	No <i>n</i> (%)	Yes <i>n</i> (%)	<i>M</i> (<i>SD</i>)		No <i>n</i> (%)	Yes <i>n</i> (%)	<i>M</i> (<i>SD</i>)	
Pretest	282 (81.3)	65 (18.7)	.20 (.44)		314 (90.5)	33 (9.5)	.31 (1.54)	
Wave 2	239 (77.6)	69 (22.4)	.25 (.50)		288 (93.5)	20 (6.5)	.30 (1.86)	
Wave 3	211 (69.0)	95 (31.0)	.39 (.66)		264 (86.3)	42 (13.7)	.58 (2.05)	
Wave 4	189 (65.4)	100 (34.6)	.46 (.75)		239 (82.7)	50 (17.3)	1.10 (4.50)	

Associations among AIM, Contextual Risk, and Growth in Alcohol Use, Substance Use Problems, Risk Taking, and Susceptibility Cognitions

Table 2

Predictors	Growth Parameters of Alcohol Use		Growth Parameters of Substance Use Problems	
	Intercept	Slope	Intercept	Slope
1. Male	.18	(.61)	-.03	(.19)
2. Contextual risk	.69***	(.16)	-.03	(.05)
3. AIM	--		-.06	(.10)
4. AIM × Risk	--		-.09*	(.04)
M	.00	(.00)	.59***	(.14)
Residual variance	4.43*	(2.14)	.14	(.25)
			1.82*	(.93)
			.01	(.02)

Predictors	Growth Parameters of Risk Taking		Growth Parameters of Susceptibility Cognitions	
	Intercept	Slope	Intercept	Slope
1. Male	1.37*	(.65)	.04	(.20)
2. Contextual risk	.64***	(.18)	.03	(.06)
3. AIM	--		-.29*	(.12)
4. AIM × Risk	--		-.12*	(.06)
M	10.35***	(.36)	-.07	(.14)
Residual variance	12.11***	(2.97)	.65	(.38)
			1.99**	(.67)
			.08	(.06)

Note. Standard errors are in parentheses.

* p < .05.
** p < .01.
*** p < .001.