Longitudinal Determinants of Substance Use Disorders

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ABSTRACT *Substance use and substance use disorders (SUDs) have been linked with marital discord. Relatively little is known, however, about the antecedents of SUDs, the mediators of these factors over time, or their associations with the spousal/partner relationship among urban adults. A better understanding of the longitudinal pathways to marital conflict and to SUDs should help prevention and intervention programs target their precursors within the developmental period in which they occur. The present study, therefore, examined the longitudinal predictors of an unsupportive spousal/partner relationship and SUDs among a community sample of urban African American and Puerto Rican adults from East Harlem, NY. Participants (N=816) completed structured questionnaires at five time waves, from adolescence to adulthood (mean ages=14, 19, 24, 29, and 32 years). Structural equation modeling examined the effects of earlier environmental and social stressors and intrapersonal and interpersonal factors on later SUDs in adulthood. There was a good fit of the structural equation model (CFI=0.91; RMSEA=0.06; and SRMR=0.06), which revealed three main pathways from adolescence to the spousal/partner relationship and SUDs in adulthood. One pathway linked a weak parent–adolescent attachment relationship with the participant’s psychological symptoms in emerging adulthood ($p<0.01$), which in turn were related to affiliation with deviant and drug-using peers, also in emerging adulthood ($p<0.001$). Peer deviance and drug use were associated with the participant’s substance use in young adulthood ($p<0.001$), which predicted both an unsupportive spousal/partner relationship ($p<0.05$) and SUDs ($p<0.001$) later in adulthood. Other pathways highlighted the continuity of psychological symptoms as related to both substance use in young adulthood ($p<0.001$) and an unsupportive spousal/partner relationship in adulthood ($p<0.001$). Findings showed that the associations of both distal stressors and the parent–adolescent relationship with more proximal intra- and interpersonal problems predicted unsupportive spousal/partner relationships and SUDs among urban adults. Several aspects of the individual’s life, at different developmental stages, provide opportunities for interventions to prevent or reduce unsupportive spousal/partner relationships and SUDs.*

KEYWORDS *Substance use disorders, Spousal/partner relationship, Environmental influences, Parent–adolescent attachment relationship, Peer deviance and drug use, Psychological symptoms*

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INTRODUCTION

Substance use and substance use disorders (SUDs) have adverse effects on multiple areas of adult functioning and well-being, such as greater marital conflict,¹ less educational attainment,² more unemployment,² and psychiatric co-morbidities (e.g., anxiety and mood disorders^{3–6}). Several domains of influence may play a role in the development of SUDs, including family factors (e.g., a weak parent–adolescent attachment relationship, parental substance use^{7–10}), intrapersonal maladjustment (e.g., depression¹¹), interpersonal influences (e.g., deviant peers¹²), environmental and social stressors (e.g., drug availability and discrimination^{13–15}), and substance use.¹⁶ Although prior research has also found that both substance use and psychopathology are associated with less marital satisfaction and functioning,¹⁷ the directionality of these relationships appears complex and is unclear at present.¹⁸ Furthermore, most studies on marital quality and substance use or psychopathology focus on White samples,^{17, 19–21} and alcohol use is assessed much more frequently than the use of other drugs.²⁰ A better understanding of the longitudinal predictors of marital conflict or SUDs among urban adults has been hampered by a paucity of investigations that test a multifactorial model within a prospective design. The present study, therefore, seeks to investigate the factors that affect the developmental pathways to marital conflict and SUDs from adolescence to adulthood among a sample of urban African Americans and Puerto Ricans.

Drug Availability and Perceived Discrimination

African Americans and Puerto Ricans living in urban US environments may face significant stressors that emanate from two sources. One type of stressor pertains to the environment, as urban African Americans and Puerto Ricans are more likely than White individuals to live in neighborhoods characterized by drug availability.²² The second stressor is social in that African American and Puerto Rican young adults experience discrimination because of their race/ethnicity.^{23–25}

Prior research has shown that adolescents who have easy access to or who are offered drugs are more likely to use them.^{13, 26, 27} Environments in which illicit drugs are easily available to adolescents (e.g., via peers) are more likely to present limited opportunities for conventional activities (such as at work²⁸) and may, therefore, engender feelings of being marginalized²⁹ and discriminated against. Perceived discrimination, in turn, is related to impaired psychological functioning^{30, 31} as well as increased internalizing and externalizing problems and psychiatric disorders, such as depression,^{25, 31} delinquency,³² and substance use.^{15, 33, 34}

Family Interactional Theory

Family Interactional Theory (FIT),³⁵ the guiding theoretical framework of this study, originally was conceptualized to understand better the interrelationships among the major psychosocial domains noted above as they related to drug use in adolescence. According to FIT, adolescents who have a distant or conflictual mutual attachment relationship with their parents are less likely to identify with conventional aspects of the parents and more likely to experience intrapersonal distress. Such youth are at-risk for affiliating with a peer group that engages in unconventional and deviant behaviors, including drug use. Affiliation with deviance-prone and drug-using peers, in turn, increases the likelihood of the individual's substance use and SUDs through the mechanisms of modeling and reinforcement as well as increased drug access.⁹

Over time, the original conceptualizations of FIT were broadened to include the role of additional environmental factors and extended beyond adolescence to examine their impact on other constructs at later developmental stages.^{36, 37} The present study draws on several of the conceptual domains posited by FIT to be related to impaired interpersonal functioning, substance use, and SUDs at earlier developmental stages, i.e., environmental and social factors, the parent–adolescent relationship, personal attributes, and the peer group.^{35, 38, 39} Here, we use structural equation modeling (SEM) to further extend FIT to encompass the longitudinal pathways to both marital discord and SUDs among an urban sample of African Americans and Puerto Ricans in the fourth decade of life.

Our developmental model is innovative in that it is based on a theoretical conceptual framework, FIT.³⁵ From a developmental perspective, we examine the participants at three major stages: adolescence, emerging/young adulthood, and adulthood. In addition, we assess the longitudinal impact of perceived discrimination by employing a five-wave design to test for mediating factors between earlier environmental and social influences and both the spousal/partner relationship and SUDs in adulthood. This on-going community sample is unique in its composition of a largely understudied racial/ethnic minority population, which has been followed approximately 18 years.

Psychological Symptoms and Peer Deviance and Drug Use

Psychological symptoms (e.g., depression and hostility) are associated with affiliation with peers who share similar values, beliefs, and behaviors, including drug use.⁴⁰ Although there is extensively replicated support for the roles of peer socialization and peer selection in substance use,⁴¹ far less is known about the long-term effects of earlier peer factors on adult functioning.

Psychological Symptoms, Substance Use, Spousal/Partner Relationship, and SUDs

Both internalizing and externalizing symptoms and disorders have been found to be comorbid with substance use^{42–44} as well as to undermine the marital relationship.^{19, 20, 45–47} As previously noted, however, little is known about the association of externalizing pathology (and, especially, substance use) with the spousal/partner relationship among African American and Puerto Rican adults. The present study is among the first to assess the longitudinal impact of the continuity of psychological symptoms on marital conflict and substance use among an urban community racial/ethnic minority sample. We also build on the findings of previous research on earlier developmental periods by testing for the association of substance use during young adulthood with an unsupportive spousal/partner relationship.

Substance Use and SUDs

Substance use during adolescence and young adulthood is a risk factor for escalation to SUDs.^{16, 48} Gil and colleagues⁴⁹ reported that, compared with substance non-users, African American and Latino adults who had used substances during young adulthood were 6.6 and 2.8 times more likely, respectively, to report SUDs in adulthood. We examine the pathways from drug availability in adolescence to SUDs in adulthood via peer deviance and drug use in emerging adulthood and the participant's substance use during young adulthood. We also assess the role of discrimination in the context of both externalizing and internalizing problems at several developmental stages.

Hypotheses

Our specific mediating hypotheses are:

1. In accord with FIT,³⁵ a distant parent–adolescent mutual attachment relationship (in late adolescence) is associated with the participant's psychological symptoms (in emerging adulthood) which, in turn, are linked with affiliation with a deviance-prone and drug-using peer group (also in emerging adulthood). Affiliation with deviant peers is then related to the participant's substance use (in young adulthood), which predicts both an unsupportive spousal/partner relationship and SUDs (in adulthood).
2. A weak parent–adolescent attachment relationship is also linked with an unsupportive spousal/partner relationship in adulthood via the continuity of the individual's psychological symptoms (from emerging to young adulthood). An unsupportive spouse/partner relationship, in turn, is associated with the participant's SUDs in adulthood. In addition, the continuity of psychological symptoms is linked with substance use in young adulthood.
3. Drug availability (in adolescence) is associated with greater perceived discrimination (in emerging adulthood) as well as having friends who use drugs (also in emerging adulthood). The relationship of perceived discrimination to SUDs (in adulthood) is mediated by the continuity of psychological symptoms, deviance-prone peers, and the participant's own substance use.

METHODS

Participants

The present paper is based on five waves of data collection of an on-going psychosocial study ($N=816$; 52 % African Americans, 48 % Puerto Ricans). Data on the participants were first collected in 1990 (time 1 (T1), $N=1,332$) when participants were students attending schools in the East Harlem area of New York City. The mean age of participants at T1 was 14.1 years (standard deviation; $SD=1.3$ years). At time 2 (T2), the mean age of the participants was 19.2 years ($SD=1.5$ years; 1994–1996; $N=1,190$) and 24.4 years ($SD=1.3$ years) at time 3 (T3; 2000–2001; $N=662$). At times 4 (T4; 2004–2006; $N=838$) and 5 (T5; 2007–2010; $N=816$), the mean ages of participants were 29.2 ($SD=1.4$ years) and 32.3 years ($SD=1.3$ years), respectively.

At T5, 43 % of the participants reported an educational level of 12th grade or less; 37 % of participants reported an educational level of business school, technical school, or some college; 14 % reported having a Bachelor's degree; and 6 % completed or currently were attending graduate school. Twenty-eight percent of participants were married and living together, while another 25 % were cohabiting with a partner. The median annual gross household income was \$48,000 (interquartile range, \$27,001–75,000).

The Institutional Review Boards of the Mount Sinai School of Medicine and New York Medical College (our former affiliations) approved the procedures for the earlier waves of data collection, and the Institutional Review Board of New York University School of Medicine (our current affiliation) approved the study at T4 and T5. A Certificate of Confidentiality was obtained for each wave of the study from the National Institutes of Health. Written informed

assent was obtained at T1 and T2 from all participants who were minors (<18 years) after the procedures had been fully explained, and passive consent procedures were followed with the parents of minors. At each time wave, informed consent was obtained from all participants who were age 18 or older, as was Health Insurance Portability and Accountability Act authorization, effective April, 2003.

Procedures

T1 interviews were conducted in high school classrooms using personal tape players to present the questionnaire. Research study staff members were present, but teachers were not. The participants were allowed to choose between English or Spanish language versions of the questionnaire. At subsequent time waves, interviews were conducted in English, and participants were interviewed in private at home or via telephone if they lived at a considerable distance from New York City. Additional information regarding the study methodology is available from previous reports.^{50, 51}

We compared the demographic variables for the 816 adults who participated at both T1 and T5 with the 516 who participated at T1 but not at T5. There was no significant difference between the T5 participants and the T5 non-participants with respect to the proportion of African Americans and Puerto Ricans ($\chi^2=0.01$, $p=0.9$, $df=1$). However, the percentage of males among T5 non-participants (57 %) was significantly higher than the percentage of males who participated at T5 (40 %; $\chi^2=36.2$, $p<0.001$, $df=1$).

Measures

The latent and manifest variables used in the present study included: drug availability (assessed at T1–T2), parent–adolescent mutual attachment (T2), perceived discrimination (T3), psychological symptoms (measured at both T3 and T4), peer deviance and drug use (T3), participant substance use (T4), and the dependent variables, an unsupportive relationship with the spouse/partner (T5) and SUDs (T5). Each measure had adequate reliability (Cronbach's alpha value). The latent and manifest variables, scales comprising each variable, number of items in each scale, Cronbach's alphas, scale source, sample item, and response ranges are presented in Appendix Table 1. Scales were comprised of manifest variables for latent constructs as shown in Appendix Table 1; for example, the latent construct Drug Availability at T1–T2 was estimated from the two manifest variables, drug offering and drug access. Drug availability at T1 and T2 was included to capture its extent throughout the participant's early/mid-adolescence (see Appendix Table 1).

Finally, SUDs (substance dependence or abuse) was assessed using the University of Michigan Composite International Diagnostic Interview SUDs measure,⁵² which we adapted for consistency with the criteria used in the DSM-IV.⁵³ Substance dependence was ascertained by the presence of three or more of the following criteria during the prior 12 months: tolerance, withdrawal, recurrent use to avoid withdrawal symptoms, impaired control over use, unsuccessful cessation, excessive time thinking about or engaging in use, relinquishing of normal activities for use, and continued use despite physical or psychological problems. If the participant did not meet the criteria for substance dependence, substance abuse was diagnosed by the presence of at least one of the following criteria during the previous 12 months: experiencing the effects or after-effects of the substance at work, at school or during

childcare, feeling the substance's effects or after-effects when one might get hurt (e.g., while driving), legal problems because of the use of the substance, or impaired interpersonal relationships because of use of the substance.

Analytic Plan

We used Mplus⁵⁴ (Version 4.21) to perform SEM. Following Newcomb and Bentler,⁵⁵ we controlled for the effects of gender, ethnicity, low ego control at T1, and depressed mood at T1. SAS (Version 9.3) was used to compute the partial covariance matrix which is presented as supplementary material in Appendix Table 2. We did not specify any correlation of error terms of measures that were observed longitudinally.

The Mplus comparative fit index (CFI), the root mean square error of approximation (RMSEA), and the standardized root mean square residual (SRMR) were used to assess the fit of the model. Values of the CFI between 0.90 and 1.0 indicate a good fit.⁵⁴ For the RMSEA, values below 0.10 indicate a good fit.⁵⁶ Values of the SRMR below 0.08 indicate an acceptable fit.⁵⁷

Missing Data

Sixty-seven percent of the participants provided complete data on each of the 24 variables in the present study. Sixteen (of 24) variables had data for 90 % or more of the respondents. Of the 816 participants who participated at T5, 64.1 % participated in all five time waves, 28.2 % participated in four waves, and 7.7 % participated in three waves of data collection. No participant took part in two or fewer waves. The structural equation algorithm in Mplus dealt with missing data by using maximum likelihood estimation to impute missing data.⁵⁴

RESULTS

We used *t* tests to compare the mean differences of the study variables by race/ethnicity and by gender. As shown in Appendix Table 3, there were more mean differences by gender than by race/ethnicity. Compared with the females in our sample, males reported greater drug offerings and access (T1–T2). Males also reported greater identification with the parents (T2), more warmth from the parents (T2), greater discrimination (T3), more friends who were deviant and used illegal drugs (T3), greater (self-reported) use of tobacco, alcohol, and marijuana (T4), and better teamwork with their spouse/partner (T5). In addition, males (15 %) were more likely to report having SUDs than females (4 %; $p < 0.001$). As compared with males, females also reported more depressed mood (assessed at T1, T3, and T4), greater anxiety (measured at both T3 and T4), and greater ego control at T4.

As regards racial/ethnic differences, Puerto Ricans, as compared with African Americans, reported more depressed mood at T1, T3, and T4, more peer deviance (T3), greater (self) tobacco use (T4), and more satisfaction and teamwork with their spouses/partners (T5). African American and Puerto Rican participants were equally likely to have a diagnosis of SUDs. The presence of SUDs among our sample was comparable to the US national average as reported by Grant and colleagues⁵⁸ and by the National Survey of Drug Use and Health.⁵⁹

We tested the measurement model, as well as the structural model, controlling for participants' gender and race/ethnicity. All factor loadings were

significant ($p < 0.01$). For the structural model, the CFI was 0.91, the RMSEA was 0.06, and the SRMR was 0.06, which was an acceptable model fit. The standardized coefficients and associated z -statistics for the structural model are presented in Fig. 1 (see Fig. 1).

Our model revealed three major pathways to SUDs in adulthood. The first pathway, which was consistent with FIT³⁵ (further discussed below), showed that the parent–adolescent attachment relationship in late adolescence (T2) was inversely related to the participant's psychological symptoms in emerging adulthood (T3) ($z = -2.88$, $p < 0.01$). Psychological symptoms (T3) were associated with affiliation with deviance-prone and drug-using peers (T3) ($z = 4.82$, $p < 0.001$), which, in turn, was related to greater participant substance use in young adulthood (T4) ($z = 6.34$, $p < 0.001$). Participant substance use then predicted both an unsupportive spousal/partner relationship ($z = 2.17$, $p < 0.05$) as well as SUDs in adulthood (T5; $z = 6.97$, $p < 0.001$). The second pathway emphasized the continuity of psychological symptoms from emerging (T3) to young (T4) adulthood ($z = 7.53$, $p < 0.001$). Psychological symptoms (T4), in turn, were associated with an unsupportive spousal/partner relationship ($z = 6.02$, $p < 0.001$) in adulthood (T5), as well as the participant's substance use (in young adulthood; T4; $z = 3.22$, $p < 0.01$). The third main pathway linked greater drug availability in mid-late adolescence (T1–T2) with greater perceived discrimination in emerging adulthood (T3; $z = 2.55$, $p < 0.05$). Perceived discrimination was then related to SUDs in adulthood via the mediation of psychological symptoms in emerging adulthood (T3; $z = 4.30$, $p < 0.001$). As noted above, psychological symptoms (T3) were associated with the affiliation with a deviance-prone peer group (also T3), which in turn, was linked with the participant's substance use in young adulthood (T4). There was also a direct pathway from drug availability to peer deviance and drug use ($z = 4.24$, $p < 0.001$).

FIG. 1 Estimated model: pathways from drug availability (T1–T2), parent–adolescent attachment relationship (T2), perceived discrimination (T3), psychological symptoms (T3 and T4), peer deviance and drug use (T3), and substance use (T4), to an unsupportive spouse/partner relationship (T5) and substance use disorders (SUDs) in adulthood (T5): standardized coefficients. (z -statistics). CFI=0.91; RMSEA=0.06; SRMR=0.06. Gender, ethnicity, low ego control at T1, and depressed mood at T1 were statistically controlled. T1 time 1, T2 time 2, T3 time 3, T4 time 4, T5 time 5. Mean age of respondents at T1=14.1 years, T2=19.2, T3=24.4, T4=29.2, and T5=32.3. * $p < 0.05$; ** $p < 0.01$; *** $p < 0.001$

DISCUSSION

Guided by the theoretical framework of FIT,³⁵ our results suggest the importance of earlier environmental and social factors and the parent–adolescent attachment relationships to later developmental sequences. Our findings also highlight the mediators between these distal domains and the more proximal intra- and interpersonal predictors of unsupportive spousal/partner relationships and SUDs in adulthood. Our study is unique in several ways. First, the multidimensional model spans the developmental stages from adolescence to adulthood, a period of approximately 18 years. Second, we focus on earlier factors, such as drug availability and perceived discrimination, which longitudinally predict substance use and SUDs at later developmental stages. Third, we examine the association of substance use with both the spousal/partner relationship and SUDs among urban ethnic/racial minority adults.

Our findings are in support of Hypothesis 1 and suggest that the application of FIT may be extended to SUDs in adulthood. That is, consistent with the FIT paradigm,³⁵ difficulty in the parent–adolescent mutual attachment relationship is associated with the participant's psychological symptoms. In this vein, Green and colleagues⁶⁰ found that family conflict during adolescence predicted depression in adulthood among African Americans. Psychological symptoms, in turn, were linked with affiliation with deviance-prone peers.^{61, 62} In addition, consistent with FIT and the results of several studies, our model showed that these two factors (i.e., psychological symptoms and a deviant peer group) predict substance use and SUDs.^{12, 32, 41, 63, 64}

The magnitude of the impact of peer influences on substance use in young adulthood is in accord with FIT³⁵ as well as the findings of prior research.^{65, 66} D'Amico and colleagues,⁶³ for example, found that both self-substance use and that of a close friend in emerging adulthood predicted an individual's SUDs in young adulthood. Haller and colleagues⁶⁴ showed that association with a pro-drug use peer group through emerging adulthood predicted a drug use disorder at mean age 32.

According to both FIT³⁵ and Social Learning Theory,⁶⁷ role modeling is one of the mechanisms through which the peer group may influence members' substance use.⁹ Also as posited by FIT, both psychological symptoms as well as substance use may adversely affect interpersonal functioning, such as by undermining a supportive relationship with one's partner or spouse.⁶⁸ In addition, consistent with Social Control Theory,⁶⁹ participants who reported more friends involved in violent, illegal and drug-related activities may have had less exposure to pro-social individuals or institutions, which has been shown to be protective against substance use and abuse.^{40, 61, 70}

Hypothesis 2 was mostly supported by our results. The continuity of psychological symptoms from emerging to young adulthood mediated between a weak parent–adolescent bond and the participant's unsupportive spouse/partner relationship (in adulthood). Contrary to our hypothesis, however, an unsupportive relationship (in adulthood) was not associated with the participant's SUDs. Furthermore, as both hypothesized and reported by prior research,⁴³ our results showed a link between psychological symptoms and substance use. Individuals with psychological problems may be less able to respond adaptively to, for instance, negative life events or other stressors and

more likely to experience emotional dysregulation. According to the self-medication hypothesis,⁷¹ substance use may be a means of coping with these problems.^{72, 73} Both frequent substance use and comorbid psychological problems are risk factors for the development of SUDs.^{16, 74, 75} In addition, maladaptive psychological symptoms or substance use may undermine the choice of an appropriate partner^{76, 77} or evoke withdrawal, anger, aggression, or impaired interpersonal skills (e.g., in communication and conflict resolution)^{78–81} that adversely affect the spousal/partner relationship.

Our model was also in support of Hypothesis 3. Here, FIT is broadened to include the pathway from drug availability through perceived discrimination to psychological symptoms. The association between drug availability (in adolescence) and perceived discrimination (in emerging adulthood) may suggest that adolescents with greater access to drugs had more norm-violating friends and, therefore, felt discriminated against by conventional individuals or institutions (e.g., with respect to school or employment). The relationship between drug availability and discrimination may also reflect a common underlying factor; for example, youth living in neighborhoods characterized by violence, poverty, and the prevalence of drug use may be more likely to experience drug exposure as well as to perceive greater discrimination. Brondolo and colleagues,⁸² for example, demonstrated that African American and Latino adults of lower socioeconomic status (SES) were more likely than those with higher SES to report experiencing race-related stigmatization and threat/harassment, and past-week discrimination. As suggested by Kaplan and colleagues,⁴⁰ youth who experience anger and negative affect related to feeling discriminated against may join forces with similarly affected peers to cope with feelings of “self-derogation.” Feelings of self-derogation, in turn, may result in adolescents and adults engaging in substance use (e.g., as a means of both self-medication and garnering status among their peers^{26, 71, 72}), which, ultimately, may lead to the development of a SUD.

Furthermore, the mediation of the association between discrimination and substance use by psychological symptoms and deviant peer affiliation is consistent with previous research on African American and Latino adults and youth.⁸³ Gibbons and colleagues,⁸⁴ for example, found that distress (depression and anxiety) linked discrimination and substance use among both pre-adolescent African Americans and their parents. For the youth, affiliation with substance-using friends also mediated the pathway from discrimination to substance use.

Limitations and Strengths

Although the present study elucidates the development of SUDs and marital conflict among urban adults, there are some limitations to the findings. First, our results cannot be generalized to other racial/ethnic groups or to rural African Americans and Puerto Ricans. In addition, our data are based on self-report measures and may include some respondent bias (e.g., individuals with negative affect might over-report marital problems) or the under-reporting of substance use. However, there is evidence that self-reported substance use is

generally valid and reliable,^{85, 86} and higher rates of substance use, accompanied by greater variability, might have strengthened our findings.

Our study makes several contributions to the literature. First, our results demonstrate the longitudinal impacts of environmental factors, perceived discrimination, and the parent–adolescent relationship on an unsupportive spousal/partner relationship and SUDs in adulthood. Second, all three predictor domains were directly linked with psychological symptoms, which, in turn, were mediated by a deviance-prone peer group and the participant's substance use with respect to an unsupportive spouse/partner relationship as well as SUDs among urban adults. Thus, our findings suggest a number of important mechanisms that may operate between environmental and social influences and the development of later interpersonal problems and SUDs. Third, to our knowledge, our findings are the first to show that substance use undermines the spousal/partner relationship among an urban community sample of African American and Puerto Rican adults.

CONCLUSIONS

There is a longitudinal interplay of contextual and intra- and interpersonal factors, beginning in adolescence, which may contribute to later marital conflict and SUDs among urban racial/ethnic minority adults. Our results suggest that prevention programs that target youth might include the development of coping skills, which prior research has found to buffer against the adverse effects of discrimination^{87, 88} and, therefore, may ultimately reduce substance use and SUDs.⁸⁹ As advocated by several researchers,^{90–92} some prevention and treatment programs in the USA have been adapted for racial/ethnic minority clients by the inclusion of culturally relevant components, such as the enhancement of ethnic identification and ethnic pride (e.g., The Penn Resilience Program⁹³, The Sisters of Nia⁹⁴, and The Strong African American Families Prevention Intervention Program⁹⁵). In addition, structured school or neighborhood pro-social activities could provide positive outlets to offset the availability of drugs and other adverse influences of deviance-prone peers.⁹⁶ Moreover, our findings indicate the importance of treating psychological problems among African American and Puerto Rican young adults, including the use of couples therapy, to strengthen the spousal/partner relationship as well as to reduce susceptibility to substance involvement and SUDs. Interventions focused on the parent–adolescent attachment relationship, coping with discrimination, emotional dysregulation, and deviant peer affiliations should reduce the impact on substance use of living in a neighborhood where drugs are readily available. Consequently, our results suggest that several aspects of the individual's life, at different developmental stages, provide opportunities for prevention of spousal/partner conflict and SUDs through appropriate and timely interventions.

ACKNOWLEDGMENTS

This research was supported by NIH grants awarded to Dr. Judith S. Brook: Research Scientist Award DA000244 and research grant DA003188 from the National Institute on Drug Abuse, and research grant CA094845 from the National Cancer Institute.

APPENDIX

TABLE 1 Measures: scales, number of items, Cronbach's alpha, source, sample item, and response range

Domain/scale (no. of items)	Cronbach's alpha	Source	Sample item	Range of answer options
Demographics				
Gender	N/A	–	Are you a female?	Female (1); male (2)
Ethnicity	N/A	–	Are you Hispanic?	African American (1); Puerto Rican (2)
Drug availability at T1–T2				
Drug offering (5 items) ^a	0.60	Original	How often has someone on the street offered you marijuana or any other illegal drug?	Never (0) to three or more times (2)
Drug access (4 items) ^a	0.92	Johnston et al. ⁹⁷	How difficult is it to get marijuana?	Very hard to get (1) to very easy to get (4)
Parent–adolescent attachment at T2				
Non-conflictual relationship with parents (6 items)	0.85	Schaefer et al. ⁹⁸	You sometimes break your mother's/father's rules	Very much like you (1) to not at all like you (4)
Identification with the parents (6 items)	0.81	Original	How much do you admire or look up to your parent?	Not at all (1) to in every way (5)
Parental warmth (17 items)	0.87	Aygar et al. ⁹⁹	You can count on your mother/father to help you out if you have problems.	Not at all like parent (1) to very much like parent (4)
Perceived discrimination at T3 (3 items)	0.74	Original	How much have you experienced discrimination at school, by the police or security guards, or that affects your work or where you can live?	Not at all (1) to very much (4)

TABLE 1 (continued)

Domain/scale (no. of items)	Cronbach's alpha	Source	Sample item	Range of answer options
Peer deviance and drug use at T3				
Peer deviance (3 items)	0.85	Gold ¹⁰⁰ and Huizinga et al. ¹⁰¹	How many of your friends have gotten into a serious fight at school or work?	None (1) to most (4)
Peer illegal drug use (2 items) [‡]	N/A	Original	How many of your friends ever used marijuana?	None (1) to most (4)
Psychological symptoms at T3 and T4				
Ego control (3 items at T1, T3, and T4) ^b	0.56 at T1; 0.55 at T3; 0.62 at T4	Original	You never feel like losing your temper at people?	Completely false (1) to completely true (4)
Depressed mood (2 items at T1 [‡] , 8 items at T3, and 5 items at T4)	NA at T1; 0.80 at T3; 0.75 at T4	Derogatis et al. ¹⁰²	Do you sometimes feel unhappy, sad, or depressed?	For 2 items at both T3 and T4, completely false (1) to completely true (4); for 6 items at T3, not at all (1) to extremely (5). For 3 items at T4, not at all (0) to extremely (4)
Interpersonal difficulty (4 items at both T3 and T4)	0.76 at T3; 0.79 at T4	Derogatis et al. ¹⁰²	Over the last few years, how much were you bothered by feeling easily annoyed or irritated?	Not at all (0) to extremely (4)
Anxiety (3 items at both T3 and T4)	0.77 at T3; 0.78 at T4	Derogatis et al. ¹⁰²	Over the last few years, how much were you bothered by feeling fearful?	Not at all (0) to extremely (4)
Substance use at T4				
Tobacco (1 item)	N/A	—	How many cigarettes per day did you smoke (today and in the past few days)?	None (1) to more than one pack a day (6)

Alcohol (1 item)	N/A	–	How many drinks per day have you had in the past 30 days?	None (0) to more than 6 drinks/day (5)
Marijuana (1 item)	N/A	–	How often have you used marijuana in the past year?	Never (0) to once a week or more (4)
Unsupportive spouse/partner relationship at T5 ^b				
Satisfaction with partner (4 items)	0.80	Spanier ¹⁰³	How often do you talk about breaking up, separating, or divorce?	All the time (0) to never (5)
Teamwork with partner (4 items)	0.86	MIDUS (Univ. of Wisconsin) ¹⁰⁴	Are you and your partner a team when it comes to making decisions?	Completely disagree (1) to completely agree (5)
Substance use disorder at T5				
Substance use disorder (12 items)	N/A	American Psychiatric Association ⁵³	In the past 12 months, have you found that you needed to use more of the drug to get the same effect that you did when you first started taking it?	No (0); yes (1)

‡ $p < 0.001$, inter-item correlation for peer illegal drug use at T3 = 0.60 and for depressed mood at T1 = 0.44

^aThe T1 and T2 scores for the drug offering and the drug access scales, respectively, were summed to create measures of T1–T2 drug offering and T1–T2 drug availability

^bThese scales were reversed to obtain low ego control, dissatisfaction with partner, and lack of team work with partner

TABLE 2 Covariance matrix controlling for gender, ethnicity, low ego control at T1, and depressed mood at T1

	1	2	3	4	5	6	7	8	9	10	11	12
Drug offering (T1–T2)	0.04											
Drug access (T1–T2)	0.02	0.63										
Non-conflictual relationship with parents (T2)	–0.03	–0.05	0.63									
Identification with parents (T2)	–0.02	–0.08	0.07	0.76								
Parental warmth (T2)	–0.02	–0.07	0.09	0.43	0.51							
Perceived discrimination (T3)	0.03	0.14	–0.19	–0.01	–0.08	4.09						
Low ego control (T3)	0.02	0.07	–0.20	–0.14	–0.08	0.40	2.27					
Depressed mood (T3)	0.09	0.05	–0.47	–0.50	–0.34	1.49	2.08	17.09				
Anxiety (T3)	0.05	–0.02	–0.24	–0.27	–0.23	0.78	0.94	6.71	5.63			
Interpersonal difficulty (T3)	0.05	0.03	–0.38	–0.38	–0.32	1.19	1.29	8.41	5.03	8.69		
Peer deviance (T3)	0.23	0.40	–0.74	–0.26	–0.01	1.54	1.31	5.01	1.84	2.99	15.22	
Peer illegal drug use (T3)	0.09	0.16	–0.27	–0.12	–0.01	0.44	0.45	1.89	0.82	1.13	4.69	2.14
Low ego control (T4)	0.04	0.09	–0.37	–0.17	–0.15	–0.02	1.28	1.99	1.00	1.30	1.44	0.64
Depressed mood (T4)	0.04	0.07	–0.40	–0.31	–0.36	0.48	1.13	6.84	3.08	4.09	1.68	0.71
Anxiety (T4)	0.02	0.01	–0.27	–0.24	–0.25	0.53	0.66	4.34	3.03	3.06	1.12	0.57
Interpersonal difficulty (T4)	0.04	0.15	–0.53	–0.37	–0.36	0.55	1.17	5.47	2.91	4.63	2.02	0.70
Tobacco use (T4)	0.06	0.07	–0.10	–0.01	–0.03	–0.06	0.06	0.47	0.23	0.30	0.92	0.29
Alcohol use (T4)	0.01	0.08	–0.06	–0.04	–0.02	0.03	0.09	0.19	0.15	0.19	0.33	0.20
Marijuana use (T4)	0.06	0.09	–0.09	–0.05	–0.02	0.17	0.26	0.97	0.37	0.53	1.54	0.60
Satisfaction with partner (T5; reverse scored)	0.10	0.04	–0.29	–0.40	–0.30	0.66	1.05	3.76	1.69	2.19	2.30	0.63
Teamwork with partner (T5; reverse scored)	0.09	0.01	–0.10	–0.61	–0.44	0.06	0.97	1.97	1.33	1.43	1.59	0.57
SUDs (T5)	0.01	–0.00	–0.01	–0.01	0.00	0.00	0.06	0.16	0.06	0.08	0.22	0.08

TABLE 3 Means and standard deviations by ethnicity and gender

Variables	Mean (standard deviation)			Female (<i>n</i> =492)	Male (<i>n</i> =324)	<i>t</i> test
	AA (<i>n</i> =425)	PR (<i>n</i> =391)	<i>t</i> test			
Low ego control (T1)	2.5 (0.9)	2.5 (0.8)	−0.41	2.5 (0.9)	2.6 (0.8)	−1.71
Depressed mood (T1)	2.5 (0.9)	2.7 (0.9)	−3.35***	2.7 (0.9)	2.4 (0.9)	4.92***
Drug offering (T1–T2)	1.0 (0.2)	1.0 (0.2)	−1.60	1.0 (0.2)	1.1 (0.2)	−3.28**
Drug access (T1–T2)	3.0 (0.8)	3.0 (0.8)	0.4	2.9 (0.8)	3.1 (0.8)	−3.65***
Non-conflictual relationship with parents (T2)	2.8 (0.8)	2.7 (0.8)	0.3	2.8 (0.8)	2.7 (0.8)	0.70
Identification with the parents (T2)	3.5 (0.9)	3.5 (0.9)	−0.2	3.4 (0.9)	3.6 (0.8)	−2.30*
Parental warmth (T2)	3.6 (0.7)	3.5 (0.7)	0.7	3.5 (0.7)	3.7 (0.7)	−3.60***
Perceived discrimination (T3)	0.9 (0.7)	1.8 (0.7)	1.86	1.7 (0.6)	2.2 (0.8)	−10.10***
Low ego control (T3)	2.2 (0.8)	2.2 (0.8)	0.29	2.2 (0.8)	2.2 (0.8)	−0.18
Depressed mood (T3)	1.8 (0.5)	1.9 (0.6)	−2.25*	1.9 (0.5)	1.8 (0.6)	2.19*
Anxiety (T3)	1.9 (0.7)	2.0 (0.9)	−1.32	2.0 (0.8)	1.9 (0.8)	2.24*
Interpersonal difficulty (T3)	2.1 (0.7)	2.0 (0.8)	0.61	2.1 (0.7)	2.0 (0.8)	1.05
Peer deviance (T3)	3.8 (1.3)	4.1 (1.5)	−3.39***	3.5 (1.1)	4.6 (1.6)	−9.99***
Peer illegal drug use (T3)	1.9 (0.8)	2.0 (0.8)	−1.16	1.8 (0.8)	2.2 (0.8)	−5.11***
Low ego control (T4)	1.8 (0.6)	1.8 (0.6)	−0.03	1.8 (0.6)	1.9 (0.7)	−2.12*
Depressed mood (T4)	1.4 (0.6)	1.5 (0.7)	−1.98*	1.5 (0.7)	1.3 (0.6)	3.91***
Anxiety (T4)	0.8 (0.8)	0.9 (0.9)	−1.58	0.9 (0.8)	0.7 (0.9)	2.48*
Interpersonal difficulty (T4)	0.9 (0.8)	0.9 (0.9)	−0.97	0.9 (0.8)	0.8 (0.8)	1.76
Tobacco use (T4)	0.6 (1.2)	0.9 (1.4)	−2.80**	0.6 (1.2)	1.0 (1.4)	−3.18**
Alcohol use (T4)	0.8 (0.8)	0.8 (0.8)	0.27	0.7 (0.7)	0.9 (0.9)	−4.14***
Marijuana use (T4)	0.7 (1.4)	0.7 (1.3)	−0.29	0.5 (1.1)	1.1 (1.6)	−5.74***
Satisfaction with partner (T5; reverse-scored)	1.5 (1.0)	1.4 (1.0)	2.09*	1.5 (1.1)	1.4 (0.9)	1.98
Teamwork with partner (T5; reverse-scored)	1.2 (1.0)	1.0 (0.9)	3.28**	1.2 (1.0)	1.0 (0.9)	3.53***
SUDs (T5)	10 % (<i>n</i> =41)	7 % (<i>n</i> =28)	1.28	4 % (<i>n</i> =19)	15 % (<i>n</i> =50)	−5.28***

Answer options for drug offering: never (0)→three or more times (3), for drug access: very hard to get (1)→very easy to get (4), for non-conflictual relationship with parents: very much like you (1)→not at all like you (4), for identification with parents: not at all (1)→in every way (5), for parental warmth: not at all like parent (1)→very much like parent (4), for perceived discrimination: not at all (1)→very much (4), for low ego control at T1, T3, and T4: completely true (1)→completely false (4), for depressed mood at T1, T3, and T4: completely false (1)→completely true (4), for 6 items at T3: not at all (1)→extremely (5), and for 3 items at T4: not at all (0)→extremely (4), for anxiety and interpersonal difficulty: not at all (0)→extremely (4), for peer deviance and peer illegal drug use: none (1)→most (4), for tobacco use: none (1)→more than one pack a day (6), for alcohol use: none (0)→more than 6 drinks/day (5), for marijuana use: never (0)→once a week or more (4), for satisfaction with partner (reverse scored): all the time (5)→never (0), and for teamwork with partner (reverse scored): completely disagree (5)→completely agree (1)

AA African American, PR Puerto Rican

* $p < 0.05$; ** $p < 0.01$; *** $p < 0.001$ —*t* values came from the unequal variance *t* test

REFERENCES

1. Homish GG, Leonard KE, Cornelius JR. Illicit drug use and marital satisfaction. *Addict Behav.* 2008; 33(2): 279–91.
2. Rohde P, Lewinsohn PM, Seeley JR, Klein DN, Andrews JA, Small JW. Psychosocial functioning of adults who experienced substance use disorders as adolescents. *Psychol Addict Behav.* 2007; 21(2): 155–64.
3. Brook JS, Cohen P, Brook DW. Longitudinal study of co-occurring psychiatric disorders and substance use. *J Am Acad Child Adolesc Psychiatry.* 1998; 37(3): 322–30.
4. Currie SR, Patten SB, Williams JV, Wang J, Beck CA, El-Guebaly N, et al. Comorbidity of major depression with substance use disorders. *Can J Psychiatry.* 2005; 50(10): 660–6.
5. Regier DA, Farmer ME, Rae DS, Locke BZ, Keith SJ, Judd LL, et al. Comorbidity of mental disorders with alcohol and other drug abuse. Results from the Epidemiologic Catchment Area (ECA) Study. *JAMA.* 1990; 264(19): 2511–8.
6. Roberts RE, Roberts CR, Xing Y. Comorbidity of substance use disorders and other psychiatric disorders among adolescents: evidence from an epidemiologic survey. *Drug Alcohol Depend.* 2007; 88(suppl 1): S4–13.
7. Arria AM, Mericle AA, Meyers K, Winters KC. Parental substance use impairment, parenting and substance use disorder risk. *J Subst Abuse Treat.* 2012; 43(1): 114–22.
8. Chassin L, Pillow DR, Curran PJ, Molina BS, Barrera M. Relation of parental alcoholism to early adolescent substance use: a test of three mediating mechanisms. *J Abnorm Psychol.* 1993; 102(1): 3–19.
9. Gil AG, Vega WA, Turner RJ. Early and mid-adolescence risk factors for later substance abuse by African Americans and European Americans. *Public Health Rep.* 2002; 117(suppl 1): S15–29.
10. McCutcheon VV, Scherrer JF, Grant JD, Xian H, Haber JR, Jacob T, et al. Parent, sibling and peer associations with subtypes of psychiatric and substance use disorder comorbidity in offspring. *Drug Alcohol Depend.* 2013; 128(1–2): 20–9.
11. Wolitzky-Taylor K, Bobova L, Zinbarg RE, Mineka S, Craske MG. Longitudinal investigation of the impact of anxiety and mood disorders in adolescence on subsequent substance use disorder onset and vice versa. *Addict Behav.* 2012; 37(8): 982–5.
12. Reboussin BA, Hubbard S, Ialongo NS. Marijuana use patterns among African-American middle-school students: a longitudinal latent class regression analysis. *Drug Alcohol Depend.* 2007; 90(1): 12–24.
13. Hossain MB, Wooten SW, Yarber K, Jones SR. Perceived availability and the use of marijuana among adolescents: the mediating effect of perceived health risk related to marijuana. Poster presented at: the annual meeting of the 134th American Public Health Association 2006; Boston, MA.
14. Kwate NOA, Valdimarsdottir HB, Guevarra JS, Bovbjerg DH. Experiences of racist events are associated with negative health consequences for African American women. *J Natl Med Assoc.* 2003; 95(6): 450–60.
15. Lo CC, Cheng TC. Discrimination's role in minority groups' rates of substance-use disorder. *Am J Addict.* 2012; 21(2): 150–6.
16. Swift W, Coffey C, Carlin JB, Degenhardt L, Patton GC. Adolescent cannabis users at 24 years: trajectories to regular weekly use and dependence in young adulthood. *Addiction.* 2008; 103(8): 1361–70.
17. Papp LM, Goeke-Morey MC, Cummings EM. Linkages between spouses' psychological distress and marital conflict in the home. *J Fam Psychol.* 2007; 21(3): 533–7.
18. Kearns-Bodkin JN, Leonard KE. Alcohol involvement and marital quality in the early years of marriage: a longitudinal growth curve analysis. *Alcohol Clin Exp Res.* 2005; 29(12): 2123–34.
19. South SC, Krueger RF, Iacono WG. Understanding general and specific connections between psychopathology and marital distress: a model based approach. *J Abnorm Psychol.* 2011; 120(4): 935–47.

20. Humbad MN, Donnellan MB, Iacono WG, Burt SA. Externalizing psychopathology and marital adjustment in long-term marriages: results from a large combined sample of married couples. *J Abnorm Psychol.* 2010; 119(1): 151–62.
21. Karney BR, Kreitz MA, Sweeney KE. Obstacles to ethnic diversity in marital research: on the failure of good intentions. *J Soc Pers Relatsh.* 2004; 21(4): 509–26.
22. New York State Office of Alcoholism and Substance Abuse Services. 2004 *New York City Risk Profiles for Youth Alcohol and Substance Abuse: PRISMS Prevention Risk Indicators Services Monitoring System.* Albany, NY: NYS OASAS; 2004.
23. Benjamins MR. (2013) Comparing measures of racial/ethnic discrimination, coping, and associations with health-related outcomes in a diverse sample. *J Urban Health.* doi:10.1007/s11524-013-9787-x.
24. Borrell LN, Diez Roux AV, Jacobs DR, Shea S, Jackson SA, Shrager S. Perceived racial/ethnic discrimination, smoking and alcohol consumption in the multi-ethnic study of Atherosclerosis (MESA). *Prev Med.* 2010; 51(3–4): 307–12.
25. Szalacha LA, Erkut S, García Coll C, Alarcón O, Fields JP, Ceder I. Discrimination and Puerto Rican children's and adolescents' mental health. *Cultur Divers Ethnic Minor Psychol.* 2003; 9(2): 141–55.
26. Dembo R, Farrow D, Schmeidler J, Burgos W. Testing a causal model of environmental influences on the early drug involvement of inner city junior high school youths. *Am J Drug Alcohol Abuse.* 1979; 6(3): 313–36.
27. Epstein JA, Botvin GJ, Baker E, Diaz T. Impact of social influences and problem behavior on alcohol use among inner-city Hispanic and black adolescents. *J Stud Alcohol.* 1999; 60(5): 595–604.
28. Dunlap E, Johnson BD, Kotarba JA, Fackler JL. Macro-level social forces and micro-level consequences: poverty, alternate occupations, and drug dealing. *J Ethn Subst Abuse.* 2010; 9(2): 115–27.
29. Anderson TL. A cultural-identity theory of drug abuse. In: Ulmer JT, ed. *Sociology of crime, law & deviance*, vol. 1. Greenwich, CT: JAI Press Inc; 1998: 233–62.
30. Sellers RM, Copeland-Linder N, Martin PP, L'Heureux LR. Racial identity matters: the relationship between racial discrimination and psychological functioning in African American adolescents. *J Res Adolesc.* 2006; 16(2): 187–216.
31. Chou T, Asnaani A, Hofmann SG. Perception of racial discrimination and psychopathology across three U.S. ethnic minority groups. *Cultur Divers Ethnic Minor Psychol.* 2012; 18(1): 74–81.
32. Martin MJ, McCarthy B, Conger RD, Gibbons FX, Simons RL, Cutrona CE, et al. The enduring significance of racism: discrimination and delinquency among Black American youth. *J Res Adolesc.* 2011; 21(3): 662–76.
33. Fuller-Rowell TE, Cogburn CD, Brodish AB, Peck SC, Malanchuk O, Eccles JS. Racial discrimination and substance use: longitudinal associations and identity moderators. *J Behav Med.* 2012; 35(6): 581–90.
34. Gerrard M, Stock ML, Roberts ME, Gibbons FX, O'Hara RE, Weng C, et al. Coping with racial discrimination: the role of substance use. *Psychol Addict Behav.* 2012; 26(3): 550–60.
35. Brook JS, Brook DW, Gordon AS, Whiteman M, Cohen P. The psychological etiology of adolescent drug use: a family interactional approach. *Genet Soc Gen Psychol Monogr.* 1990; 116(2): 111–267.
36. Brook JS, Saar NS, Zhang C, Brook DW. Psychosocial antecedents and adverse health consequences related to substance use. *Am J Public Health.* 2009; 99(3): 563–8.
37. Brook JS, Brook DW, Zhang C, Cohen P. Pathways from adolescent parent–child conflict to substance use disorders in the fourth decade of life. *Am J Addict.* 2009; 18(3): 235–42.
38. Brook JS, Brook DW, Kats N, Arencibia-Mireles O, Finch SJ. Ecology and drug use: universal predictors across time and place. *Psychol Rep.* 2009; 104(3): 989–1006.
39. Brook JS, Pahl T, Balka EB, Fei K. Smoking among New Yorican adolescents: time 1 predictors of time 2 tobacco use. *J Genet Psychol.* 2004; 165(3): 324–40.

40. Kaplan HB, Martin SS, Robbins C. Pathways to adolescent drug use: self-derogation, peer influence, weakening of social controls, and early substance use. *J Health Soc Behav.* 1984; 25(3): 270–89.
41. Fergusson DM, Swain-Campbell NR, Horwood LJ. Deviant peer affiliations, crime and substance use: a fixed effects regression analysis. *J Abnorm Child Psychol.* 2002; 30(4): 419–30.
42. Conway KP, Compton W, Stinson FS, Grant BF. Lifetime comorbidity of DSM-IV mood and anxiety disorders and specific drug use disorders: results from the National Epidemiologic Survey on Alcohol and Related Conditions. *J Clin Psychiatry.* 2006; 67(2): 247–57.
43. Green KM, Zebrak KA, Robertson JA, Fothergill KE, Ensminger ME. Interrelationship of substance use and psychological distress over the life course among a cohort of urban African Americans. *Drug Alcohol Depend.* 2012; 123(1–3): 239–48.
44. Vega WA, Canino G, Cao Z, Alegria M. Prevalence and correlates of dual diagnoses in U.S. Latinos. *Drug Alcohol Depend.* 2009; 100(1–2): 32–8.
45. Pankiewicz P, Majkowicz M, Krzykowski G. Anxiety disorders in intimate partners and the quality of their relationship. *J Affect Disord.* 2012; 140(2): 176–80.
46. Whisman MA, Uebelacker LA, Weinstock LM. Psychopathology and marital satisfaction: the importance of evaluating both partners. *J Consult Clin Psychol.* 2004; 72(5): 830–8.
47. Whisman MA. Marital distress and DSM-IV psychiatric disorders in a population-based national survey. *J Abnorm Psychol.* 2007; 116(3): 638–43.
48. Palmer RH, Young SE, Hopfer CJ, et al. Developmental epidemiology of drug use and abuse in adolescence and young adulthood: evidence of generalized risk. *Drug Alcohol Depend.* 2009; 102(1–3): 78–87.
49. Gil AG, Wagner EF, Tubman JG. Associations between early-adolescent substance use and subsequent young-adult substance use disorders and psychiatric disorders among a multiethnic male sample in South Florida. *Am J Public Health.* 2004; 94: 1603–9.
50. Brook JS, Lee JY, Finch SJ, Brown EN. The association of externalizing behavior and parent–child relationships: an intergenerational study. *J Child Fam Stud.* 2012; 21(3): 418–27.
51. Brook JS, Balka EB, Ning Y, Brook DW. Trajectories of cigarette smoking among African Americans and Puerto Ricans from adolescence to young adulthood: associations with dependence on alcohol and illegal drugs. *Am J Addict.* 2007; 16(3): 195–201.
52. Wittchen HU, Kessler RC. Modifications of the CIDI in the National Comorbidity Survey: the development of the UM-CIDI. <http://www.hcp.med.harvard.edu/ncs/ftpdir/um-cidi.pdf>. Accessed 24 May 2012.
53. American Psychiatric Association. *Diagnostic and statistical manual of mental disorders, 4th edition (DSM-IV)*. Washington, DC: American Psychiatric Association; 1994.
54. Muthén BO. Mplus technical appendices. Los Angeles, CA: Muthén & Muthén, 1998–2004.
55. Newcomb MD, Bentler PM. Impact of adolescent drug use and social support on problems of young adults: a longitudinal study. *J Abnorm Psychol.* 1988; 97(1): 64–75.
56. Kelloway KE. *Using LISREL for structural equation modeling: a researcher's guide*. Thousand Oaks, CA: Sage Publications; 1998.
57. Hu LT, Bentler PM. Cutoff criteria for fit indexes in covariance structure analysis: conventional criteria versus new alternatives. *Struct Equ Model.* 1999; 6(1): 1–55.
58. Grant BF, Stinson FS, Dawson DA, Chou SP, Dufour MC, Compton W, et al. Prevalence and co-occurrence of substance use disorders and independent mood and anxiety disorders: results from the National Epidemiologic Survey on Alcohol and Related Conditions. *Arch Gen Psychiatry.* 2004; 61(8): 807–16.
59. Substance Abuse and Mental Health Services Administration (SAMHSA). Results from the 2010 National Survey on Drug Use and Health: summary of National Findings, NSDUH Series H-41, HHS Publication No. (SMA) 11-4658. Rockville, MD: Substance Abuse and Mental Health Services Administration, 2011.
60. Green KM, Fothergill KE, Robertson JA, Zebrak KA, Banda DR, Ensminger ME. Early life predictors of adult depression in a community cohort of urban African Americans. *J Urban Health.* 2013; 90(1): 101–15.

61. Mason WA, Hitchings JE, McMahon RJ, Spoth RL. A test of three alternative hypotheses regarding the effects of early delinquency on adolescent psychosocial functioning and substance involvement. *J Abnorm Child Psychol*. 2007; 35(5): 831–43.
62. Oetting ER, Deffenbacher JL, Donnermeyer JF. Primary socialization theory. The role played by personal traits in the etiology of drug use and deviance. II. *Subst Use Misuse*. 1998; 33(6): 1337–66.
63. D'Amico EJ, Ellickson PL, Collins RL, Martino S, Klein DJ. Processes linking adolescent problems to substance-use problems in late young adulthood. *J Stud Alcohol*. 2005; 66(6): 766–75.
64. Haller M, Handley E, Chassin L, Bountress K. Developmental cascades: linking adolescent substance use, affiliation with substance use promoting peers, and academic achievement to adult substance use disorders. *Dev Psychopathol*. 2010; 22(4): 899–916.
65. Andrews JA, Tildesley E, Hops H, Li F. The influence of peers on young adult substance use. *Health Psychol*. 2002; 21(4): 349–57.
66. Van Ryzin MJ, Fosco GM, Dishion TJ. Family and peer predictors of substance use from early adolescence to early adulthood: an 11-year prospective analysis. *Addict Behav*. 2012; 37(12): 1314–24.
67. Bandura A. *Social learning theory*. Englewood Cliffs, NJ: Prentice-Hall; 1977.
68. Brook JS, Pahl K, Cohen P. Associations between marijuana use during emerging adulthood and aspects of the significant other relationship in young adulthood. *J Child Fam Stud*. 2008; 17(1): 1–12.
69. Hirschi T. *Causes of delinquency*. Somerset, KY: Transaction Publishers; 2002.
70. Marcos AC, Bahr SJ. Drug progression model: a social control test. *Int J Addict*. 1995; 30(11): 1383–405.
71. Khantzian EJ. The self-medication hypothesis of substance use disorders: a reconsideration and recent applications. *Harv Rev Psychiatry*. 1997; 4(5): 231–44.
72. Boardman JD, Finch BK, Ellison CG, Williams DR, Jackson JS. Neighborhood disadvantage, stress, and drug use among adults. *J Health Soc Behav*. 2001; 42(2): 151–65.
73. Schumacher JA, Homish GG, Leonard KE, Quigley BM, Kearns-Bodkin JN. Longitudinal moderators of the relationship between excessive drinking and intimate partner violence in the early years of marriage. *J Fam Psychol*. 2008; 22(6): 894–904.
74. Dick DM, Aliev F, Viken R, Kaprio J, Rose RJ. Rutgers alcohol problem index scores at age 18 predict alcohol dependence diagnoses 7 years later. *Alcohol Clin Exp Res*. 2011; 35(5): 1011–4.
75. Lopez-Quintero C, Pérez de los Cobos J, Hasin DS, Okuda M, Wang S, Grant BF, et al. Probability and predictors of transition from first use to dependence on nicotine, alcohol, cannabis, and cocaine: results of the national epidemiologic survey on alcohol and related conditions (NESARC). *Drug Alcohol Depend*. 2011; 115(1–2): 120–30.
76. Butterworth P, Rodgers B. Concordance in the mental health of spouses: analysis of a large national household panel survey. *Psychol Med*. 2006; 36(5): 685–97.
77. Low N, Cui L, Merikangas KR. Spousal concordance for substance use and anxiety disorders. *J Psychiatr Res*. 2007; 41(11): 942–51.
78. Lavner JA, Bradbury TN. Patterns of change in marital satisfaction over the newlywed years. *J Marriage Fam*. 2010; 72(5): 1171–87.
79. Marchand JF. Husbands' and wives' marital quality: the role of adult attachment orientations, depressive symptoms, and conflict resolution behaviors. *Attach Hum Dev*. 2004; 6(1): 99–112.
80. Mattson RE, Frame LE, Johnson MD. Premarital affect as a predictor of postnuptial marital satisfaction. *Pers Relatsh*. 2011; 18(4): 532–46.
81. Testa M, Leonard KE. The impact of husband physical aggression and alcohol use on marital functioning: does alcohol "excuse" the violence? *Violence Vict*. 2001; 16(5): 507–16.
82. Brondolo E, Beatty DL, Cubbin C, et al. Sociodemographic variations in self-reported racism in a community sample of Blacks and Latino(a)s. *J Appl Soc Psychol*. 2009; 39(2): 407–29.

83. Brody GH, Kogan SM, Chen YF. Perceived discrimination and longitudinal increases in adolescent substance use: gender differences and mediational pathways. *Am J Public Health*. 2012; 102: 1006–11.
84. Gibbons FX, Gerrard M, Cleveland MJ, Wills TA, Brody G. Perceived discrimination and substance use in African American parents and their children: a panel study. *J Pers Soc Psychol*. 2004; 86(4): 517–29.
85. Harrison LD, Martin SS, Enev T, Harrington D. Comparing drug testing and self-report of drug use among youths and young adults in the general population (DHHS Publication no. SMA 07-4249, Methodology Series M-7). Rockville, MD: Substance Abuse and Mental Health Services Administration, Office of Applied Studies, 2007.
86. Vartiainen E, Seppälä T, Lillsunde P, Puska P. Validation of self reported smoking by serum cotinine measurement in a community-based study. *J Epidemiol Community Health*. 2002; 56(3): 167–70.
87. Brown DL, Tylka TL. Racial discrimination and resilience in African American young adults: examining racial socialization as a moderator. *J Black Psychol*. 2011; 37(3): 259–85.
88. Torres L. Attributions to discrimination and depression among Latino/as: the mediating role of competence. *Am J Orthopsychiatry*. 2009; 79(1): 118–24.
89. Pugh LA, Bry BH. The protective effects of ethnic identity for alcohol and marijuana use among Black young adults. *Cultur Divers Ethnic Minor Psychol*. 2007; 13(2): 187–93.
90. Barrera M Jr, Castro FG, Steiker LK. A critical analysis of approaches to the development of preventive interventions for subcultural groups. *Am J Community Psychol*. 2011; 48(3–4): 439–54.
91. Castro FG, Hernández-Alarcón E. Integrating cultural factors into drug abuse prevention and treatment with racial/ethnic minorities. *J Drug Issues*. 2002; 32: 783–810.
92. U.S. Department of Health and Human Services (2001). Mental Health: Culture, Race, and Ethnicity—A Supplement to Mental Health: a Report of the Surgeon General. Rockville, MD: U.S. Department of Health and Human Services, Substance Abuse and Mental Health Services Administration, Center for Mental Health Services.
93. Chipungu SS, Hermann J, Sambrano S, Nistler M, Sale E, Springer JF. Prevention programming for African American youth: a review of strategies in CSAP's national cross-site evaluation of high-risk youth programs. *J Black Psychol*. 2000; 26(4): 360–85.
94. Belgrave FZ, Reed MC, Plybon LE, Corneille M. The impact of a culturally enhanced drug prevention program on drug and alcohol refusal efficacy among urban African American girls. *J Drug Educ*. 2004; 34(3): 267–79.
95. Murry VM, Brody GH. Partnering with community stakeholders: engaging rural African American families in basic research and The Strong African American Families Preventive Intervention Program. *J Marital Fam Ther*. 2004; 30(3): 271–83.
96. Mahoney JL, Stattin H. Leisure activities and adolescent antisocial behavior: the role of structure and social context. *J Adolesc*. 2000; 23(2): 113–27.
97. Johnston JD, Bachman JG, O'Malley PM. *Monitoring the Future study*, 1986. Ann Arbor: Institute for Social Research, University of Michigan, Survey Research Center; 1986.
98. Schaefer ES. Children's report of parental behavior: an inventory. *Child Dev*. 1965; 36(2): 413–24.
99. Avgar A, Bronfenbrenner U, Henderson CR Jr. Socialization practices of parents, teachers, and peers in Israel: Kibbutz, Moshav, and city. *Child Dev*. 1977; 48(4): 1219–27.
100. Gold M. Undetected delinquent behavior. *J Res Crime Delinq*. 1966; 3(1): 27–46.
101. Huizinga DH, Menard S, Elliot DS. Delinquency and drug use: temporal and development patterns. *Justice Q*. 1989; 6(3): 419–55.
102. Derogatis LR, Lipman RS, Rickels K, Uhlenhuth EH, Covi L. The Hopkins symptom checklist (HSCL): a self-report symptom inventory. *Behav Sci*. 1974; 19(1): 1–15.
103. Spanier GB. Measuring dyadic adjustment: new scales for assessing the quality of marriage and similar dyads. *J Marriage Fam*. 1976; 38(1): 15–28.
104. University of Wisconsin, Institute on Aging. Documentation of scales in MIDUS I. 2004. From the Midlife in the United States: a National Study of Health and Well-Being website. <http://www.midus.wisc.edu/midus1/documentationofscales.pdf>. Accessed 27 Aug 2007.