Published in final edited form as:

Subst Use Misuse. 2010 November ; 45(13): 2113–2129. doi:10.3109/10826081003682248.

Using the Primary Socialization Theory to Predict Substance Use and Sexual Risk Behaviors Between Black and White Adolescents

Shelley A. Francis¹ and Roland J. Thorpe²

¹Division of Public Health, Department of Epidemiology and Biostatistics, School of Medicine, Case Western Reserve University, Cleveland, Ohio, USA

²Center for Health Disparities Solutions, The Johns Hopkins Bloomberg School of Public Health, Baltimore, Maryland, USA

Abstract

Using the Primary Socialization Theory (PST), we examined substance use and sexual risk-taking behaviors between Black ($N = 1,464$) and White ($N = 3,946$) adolescents in the National Longitudinal Study of Adolescent Health, Wave 1, public use (Add Health). Self-reported substance use and sexual risk-taking behaviors, PST constructs, and covariates were assessed using regression modeling techniques. Black youth were more likely to initiate sex, while White youth were more likely to report lifetime alcohol use. The PST predicted risk for White but not Black youth. The study's limitations are noted, and implications for future research are discussed.

Keywords

Adolescents; HIV; substance use; behavioral theories; sexual risk taking; risk behaviors

Introduction

Substance use in conjunction with sexual activity is not uncommon among youth today. According to the Centers for Disease Control and Prevention (CDC), alcohol is the psychoactive substance most commonly used during adolescence. Its use is associated with motor-vehicle crashes, unintentional injury, deaths, and risky sexual behavior (CDC, 2005, Shrier, Emans, Woods, & Durant, 1997). In 2003, almost one half of high school students reported drinking in the previous 30 days. Current drinking and binge drinking (i.e., alcohol use in the past 30 days, five or more drinks on one occasion) increased significantly between 9th and 12th grades for both male and female students (CDC, 2005; Smith, 1997). However, among youth of color we find different trends. For example, alcohol use among non-Hispanic Black male and female students was substantially lower than among non-Hispanic White and Hispanic students.

Marijuana is another substance commonly used during the adolescent years (www.drugstory.org). Among youth who use drugs, approximately 60% use only marijuana.

Copyright © 2010 Informa Healthcare USA, Inc.

Address correspondence to Shelley A. Francis, DrPH, Division of Health Behavior and Health Promotion, College of Public Health, The Ohio State University, 174 W. 18th Avenue, 3138C Smith Lab, Columbus, OH 43210. sfrancis@cph.osu.edu.

Declaration of Interest

The authors report no conflict of interest. The authors alone are responsible for the content and writing of this paper.

Each year, there are approximately two thirds of new marijuana users who are between the ages of 12 and 17 (www.drugstory.org). According to the CDC, current marijuana use among high school students increased from 15% in 1991 to 27% in 1999 and then decreased to 20% in 2005 (CDC, 2006; Marijuana and Youth Fact Sheet, 2007). The 2005 National Youth Risk Behavior Survey found that 38% of youth in grades 9–12 reported lifetime marijuana use, while 20% reported current use (used one or more times in the last 30 days); similar trends for current marijuana use are seen among non-Hispanic Black/African American, non-Hispanic White, and Hispanic adolescents (CDC, 2005).

Mixing substance use and sexual behavior can put youth at risk for HIV, other STDs, and unintended pregnancy. Therefore, researchers need to have a better understanding of substance use patterns across race and ethnicity in order to design interventions that will decrease substance use, which may reduce the likelihood that adolescents will engage in risky sexual behavior.

To gain a better understanding of the mechanisms that predict adolescent risk behavior, researchers have developed behavioral theories in order to identify factors that may reduce risk-taking behaviors. Using such theories, researchers have identified factors at the individual, family, and community levels that play a significant role in delaying sexual activity and substance use, such as high levels of school and family connectedness, satisfaction with the mother–child relationship, positive peer influence, and high religiosity, to name a few (Romer, Stanton, Galbraith, Feigelman, Black, Li, 1999; Smith, 1997; Wallace and Forman, 1998; Youniss, McClellan, and Yates, 1999). One of these health behavior theories, the Primary Socialization Theory (PST), seeks to explain adolescent risk behaviors by understanding their social context (Oetting and Donnermeyer, 1998). The theory proposes that adolescents learn behaviors from the family, school, and peer contexts.

Previous studies using this theory have focused primarily on substance use among White, middle-class adolescents (Oetting and Donnermeyer, 1998; Rai et al., 2003). To our knowledge, there are no empirical studies using the PST to examine relationships among social and environmental contexts and risky behaviors between Black and White adolescents from a nationally representative sample. Therefore, this study seeks to determine whether the PST constructs—family, school, and peer—are associated with adolescent sexual behaviors and lifetime substance use and whether this relationship varies by race/ethnicity.

Methods

Study Design and Sample

The National Longitudinal Study of Adolescent Health (Add Health), a prospective study of approximately 20,000 adolescents, was designed to examine the determinants of health and health-related behaviors of adolescents in grades 7–12, beginning in the 1994–1995 school year (Bearman and Udry, 2000). This study made use of public use Wave I data on 1,464 Black adolescents and 3,946 White adolescents randomly chosen from the restricted data set. All Add Health protocols were reviewed and approved by the Institutional Review Board for the Protection of Human Subjects in the School of Public Health at the University of North Carolina at Chapel Hill. Secondary data analyses of the contractual data set were conducted under a data security plan approved by the Institutional Review Board and the Add Health Data Manager.

Variable Specification

Dependent Variables—Our study included five dependent variables—two substance use outcomes and three sexual behaviors. Lifetime alcohol use was coded as one if participants

responded they had ever had a drink of beer, liquor, or wine. Lifetime marijuana use was coded one if participants reported they had tried marijuana. Participants reporting ever having sex were coded one, and participants who reported no condom use at first and recent sex were coded one for nonuse (condoms).

PST Measures—The variables that operationalized the PST constructs included family, school, and peers (Oetting & Donnermeyer, 1998).

Family Variable—Family Connectedness: On the basis of previous empirical work by Resnick, Harris, and Blum (1993), Resnick et al. (1997), Sieving, McNeely, and Blum (2000), and Hair and Moore (2002), maternal connectedness, which will be used as a proxy for the family connectedness measure, was constructed from two questions with responses from a 5-point Likert scale (“not at all” to “very much”). The responses were summed (Cronbach’s $\alpha = .82$) and dichotomized at the 50th percentile (Jaccard, Dittus, and Gordon, 1996; Resnick et al., 1997; Sieving et al., 2000). Low family connectedness was coded as one (see Figure 1 for detailed questions).

School Variable 1—School Connectedness: This measure was based on Likert-scale responses from seven questions (“never” to “every day”) that were summed (Cronbach’s $\alpha = .89$) and dichotomized at the 50th percentile (Bonny, Britto, Klostermann, Hornung, and Slap, 2000; McNeely, Nonnemaker, and Blum, 2002). Low school connectedness was coded as one.

School Variable 2—Student’s Grades: Adolescents’ grades included four measures. Adolescents were asked to provide their grades in English, science, math, and history on a 5-point grade scale. The grade point average (GPA) is the average of the five grades and was dichotomized at 3.3 (C+ on a 5-point scale), with a GPA of less than 3.3 (C+) being coded as one.

Peer Variable 1: This variable was constructed on the basis of a question that examined peer approval of engaging in sexual intercourse. The question was assessed by a 5-point Likert scale (“strongly agree” to “strongly disagree”; Bearman and Udry, 2000). Youth who strongly agree or agree that their peers would respect them more for engaging in sexual activity were coded as one.

Peer Variable 2: This variable was constructed on the basis of a question that asked how many of the participant’s three best friends drank alcohol at least once a month. The responses were dichotomized on the basis of none of the friends drank versus one to three of their friends drank in the last month. Participants who reported that one to three of their friends drank in the last month were coded one.

Peer Variable 3: This variable was constructed on the basis of a question that asked how many of the participant’s three best friends used marijuana at least once a month. The responses were dichotomized on the basis of none of the friends used marijuana versus one to three of their friends used marijuana in the last month. Participants who reported that one to three of their friends used marijuana in the last month were coded one.

Independent Variables—Adolescents’ age, biological sex, and maternal socioeconomic status (SES), measured by the mother’s highest level of education, were included in the regression analyses. These variables were selected on the basis of their association with youth sexual behavior in previous studies (Guo et al., 2002; Tapert, Aarons, Sedlar, and Brown, 2001). Except for adolescent age, which was measured as a continuous variable, all

covariates were coded as binary variables, with one representing the risk factor (e.g., low SES, males).

Data Analysis—Using the PST framework, we examined associations between the family, peer, and school constructs and each of the outcome variables. Student's *t* and chi-square tests were used to examine mean and proportional differences across racial categories for the components of the PST construct and the independent and dependent variables. Logistic regression models were used to examine associations between the PST constructs (family, peer, and school) and adolescent risk behaviors (lifetime substance use and sexual risk taking). In Add Health, each adolescent has a grand sample weight that reflects likelihood of sample inclusion (i.e., how many adolescents he or she “represents” nationally). Sampling weights have been applied in all analyses, and study design effects have been taken into account in the calculation of variance estimates using Stata survey software (Bearman and Udry, 2000). All analyses were performed using Stata SE 9.0.

Results

In Table 1, we examined demographic and social characteristics by race. Black adolescents were more likely to be older than White youth, and their mothers were less likely to be high school graduates than Whites. No racial differences were observed with respect to biological sex.

Maternal Connectedness

The majority of adolescents felt close to their mother and believed that their mothers cared about them.

Peer

The majority of White and Black adolescents neither agree nor disagree that their peers would respect them more if they had sex now. Fifty-nine percent of White youth and 49% of Black youth said one to three of their best friends drank at least once a month. Thirty-three percent of White youth and 34% of Black youth said one to three of their best friends had used marijuana in the last month.

School Connectedness

White adolescents were more likely than were Blacks to get along with their teachers, get along with other students, feel that teachers were fair, feel safe at school, and feel close to people at school. No differences were observed between Black and White adolescents with regard to feeling that they were a part of the school or feeling happy at school.

Sexual Behavior

Black youth were more likely to report ever having sex than their White counterparts, but a racial difference for contraception use at first and recent sex was not apparent.

Substance Use

Blacks reported lower rates of lifetime alcohol use and similar rates of lifetime marijuana use compared with White youth.

Table 2 displays the associations between the PST constructs and substance use by adolescents' race group while controlling for age, maternal SES, and biological sex.

Lifetime Alcohol Use

On Table 3, among White adolescents the PST theory as a whole did not predict lifetime alcohol use. White youth who reported high perception of peer respect for engaging in sex were more likely to report lifetime alcohol use compared with those with low perception [odds ratio (OR) = 1.67, 95% confidence interval (CI) (1.29, 2.18)]. Among White adolescents with low GPAs [OR = 1.34, 95% CI (1.05, 1.70)], one to three of their best friends drank in the last month [OR = 4.26, 95% CI (3.42, 5.30)], and one to three of their best friends used marijuana in the last month [OR = 2.83, 95% CI (2.09, 3.82)]. Those who reported low school connectedness [OR = 1.28, 95% CI (1.02, 1.61)] were more likely to use alcohol compared with those with high GPAs or high school connectedness or whose best friends did not drink alcohol or use marijuana in the last month. For Black adolescents, three out of the six constructs were significant predictors of alcohol use. Youth who reported high perception of peer respect for engaging in sex were more likely to report lifetime alcohol use compared with youth with low perception [OR = 1.41, 95% CI (1.00, 1.98)]. Adolescents who reported that one to three of their friends drank in the last month [OR = 3.17, 95% CI (2.02, 4.96)] and used marijuana [OR = 1.76, 95% CI (1.14, 2.71)] were more likely to report alcohol use compared with youth whose best friends did not drink alcohol or use marijuana in the last month.

Lifetime Marijuana Use

Among White adolescents the PST theory as a whole predicted lifetime marijuana use. Adolescents who reported that one to three of their best friends drank alcohol in the last month were more likely to use marijuana [OR = 2.59, 95% CI (1.85, 3.64)] than those whose best friends did not drink in the last month. Adolescents who reported that one to three of their best friends used marijuana in the last month were more likely to use marijuana [OR = 9.07, 95% CI (7.53, 10.93)] than those whose best friends did not use marijuana in the last month. Adolescents who reported low school [OR = 1.84, 95% CI (1.43, 2.37)] and family connectedness [OR = 1.66, 95% CI (1.28, 2.16)] were more likely to report lifetime marijuana use, while adolescents who reported low GPAs [OR = 1.33, 95% CI (1.05, 1.69)] were more likely to report marijuana use than youth with high GPAs. For Blacks, three out of six variables predicted lifetime marijuana use. Adolescents with low GPAs [OR = 1.67, 95% CI (1.13, 2.48)] were more likely to report lifetime marijuana use than those with high GPAs. Adolescents with low school connectedness [OR = 2.17, 95% CI (1.28, 3.69)] and those who reported that one or more of their best friends used marijuana in the last month were more likely to use marijuana [OR = 6.92, 95% CI (3.97, 12.06)] than those whose friends did not use marijuana.

Next, we examined associations between the PST constructs and sexual initiation and contraception use at first and recent sex while controlling for confounders.

Sexual Initiation

In Table 3, among White adolescents, the PST theory predicted sexual initiation. Youth who had low GPAs were more likely to have sex than those with high GPAs [OR = 1.52, 95% CI (1.24, 1.88)]. Adolescents who reported that one or more of their best friends drank alcohol and used marijuana in the last month were more likely to initiate sexual intercourse [OR = 2.22, 95% CI (1.71, 2.88); OR = 2.90, 95% CI (2.36, 3.57)] than were those whose friends did not drink and use marijuana in the last month. Youth who reported low school connectedness [OR = 1.63, 95% CI (1.33, 2.02)] and low family connectedness [OR = 1.40, CI (1.18, 1.68)] were more likely to initiate sex compared with those with high school and family connectedness. For Blacks, adolescents who reported that one or more of their best friends used marijuana in the last month were more likely to initiate sex [OR = 2.49, 95% CI (1.51, 4.13)] compared with those whose friends did not use marijuana.

Contraception Use at First Sex

Among White adolescents, no PST constructs were statistically significant predictors for contraception use at first sex (see Table 3). Among Blacks, two PST constructs (school and peer) predicted contraception use at first sex. Youth with low GPAs were less likely to use contraception at first sex than were those with high GPAs [OR = 0.67, 95% CI (0.47, 0.95)]. Adolescents who reported that one or more of their best friends used marijuana in the last month were more likely to use contraception at first sex [OR = 1.73, 95% CI (1.06, 2.79)] than youth whose friends did not use marijuana. Adolescents reporting low school connectedness were more likely to use contraception at first sex compared with youth with high school connectedness [OR = 1.78, 95% CI (1.17, 2.71)].

Contraception Use at Recent Sex

In Table 4, among both White and Black adolescents, no PST constructs were statistically significant predictors for contraception use at recent sex.

Discussion

Using the PST, we examined the extent to which the PST constructs were associated with adolescents' sexual behaviors and substance use. We assessed whether the PST as a whole explains risk behaviors for Black and White youth. We found statistically significant race differences. That is, among White adolescents, the PST predicted lifetime marijuana use and initiation of sexual intercourse. However, for Black adolescents, the PST did not predict risk-taking behavior. We also sought to examine whether disparities exist for adolescents' substance use and HIV risk behaviors and found statistically significant differences for lifetime alcohol use and sexual initiation.

PST as a Predictor for Lifetime Substance Use

Among White adolescents, we found that the PST predicted lifetime marijuana use. Our findings are consistent with results from other studies that have used the PST to examine substance use in White adolescents (Oetting and Donnermeyer, 1998). Previous studies have also indicated that adolescents with low GPAs, high perception of peer involvement in sex or drugs, low family connectedness, and low school connectedness were more likely to engage in risky behaviors such as substance use and sexual activity (Beal, Ausiello, and Perrin, 2001; Oetting and Donnermeyer, 1998; Resnick et al., 1997; Stanton, Li, Black, Ricardo, Galbraith, Feigelman, and Kaljee, 2002). In contrast, among Black adolescents the PST was not a good predictor for lifetime substance use. For alcohol use, three out of the six variables that operationalized the PST constructs were statistically significant (high perception of peer sex, peers drank in the last month, and peers smoked marijuana in the last month). Consistent with previous studies, low GPA and low school connectedness were the predictors associated with lifetime marijuana use for Black adolescents.

PST as a Predictor for Sexual Activity

Among White adolescents, PST predicted sexual initiation. Of the PST constructs, the peer variables (peers drank in the last month and peers smoked marijuana in the last month) were the strongest predictors that adolescents had initiated sexual intercourse. Among Black adolescents, however, the only variable that predicted sexual initiation was whether peers smoked marijuana in the last month. For contraceptive use at first sex, Black youth with low GPAs, those whose peers who had smoked marijuana in the last month, and those who reported low school connectedness were more likely to use contraception at first sex. In general, the empirical literature finds that older youth, males, and youth who are less connected to their families and schools are more likely to engage in risk behaviors

(McNeely et al., 2002; Resnick et al., 1997). Consistent with this finding, youth with low GPAs and low school connectedness may be less likely to use contraception because they are less connected to school (e.g., do not get along with teachers and students, do not feel safe at school, do not feel part of school) and may be less likely to learn the importance of contraceptive use. No PST constructs predicted contraception use at recent sex.

As part of this study, we sought to examine the prevalence of substance use and HIV risk-taking behaviors among Black and White youth to see if disparities in behaviors exist. In Table 1, we found that Black youth were more likely than White youth to initiate sexual intercourse (57% vs. 35%, $p < .001$), and Black adolescents were less likely to report lifetime alcohol use (44% vs. 58%, $p < .001$). Similar patterns were found for contraceptive use and lifetime marijuana use. These findings are consistent with previous empirical literature that found African American youth had lower rates of alcohol use and higher rates of sexual initiation compared with White adolescents (*CDC Adolescent Chartbook*, 2000; Ku, Sonenstein, and Pleck, 1993; Wallace et al., 2002).

In these analyses, we found differences in the ability of the theory to predict risk among Whites and Blacks. We give some possible reasons for these differences. The theory posits that the school, family, and peers (1) are the primary socialization sources during adolescence and (2) are the mechanism through which adolescents learn behaviors and that (3) the communication of norms is strongly influenced by families. However, we believe that among marginalized youth (e.g., African American youth, poor families), there may be limited family support (e.g., parent(s) may spend limited time with children because of work hours; there may be limited bonding and communication; and norms are not transmitted by family), thereby explaining the lack of significance for the family construct in the regression models (Garcia, 1999). Oetting, Donnermeyer, Trimble, and Beauvais (1998) have also stated that culture determines norms for substance use and how it is communicated through the primary socialization constructs. As a result, different cultural and ethnic groups may tolerate adolescent substance use and potentially other risk-taking behaviors such as sexual activity (Oetting et al., 1998). Other secondary socialization sources such as the media, community groups, and religious organizations may provide cultural influences. However, among non-White adolescents it is possible that the secondary socialization constructs may act as primary socialization sources. This hypothesis needs further exploration.

In addition, many predominantly African American communities are plagued by unsafe neighborhoods, violence, and unsafe and inferior schools, which are associated with increased risk for adolescent risk-taking behaviors and mental health disorders (Albert, Brown, and Flanigan, 2003; Beveridge and Catsambis, 2003; Hadley-Ives et al., 2000; Shumow, Vandell, and Posner, 1999). In this sample, we found statistically significant differences in the school connectedness measures. Black youth were less likely to feel safe at school, less likely to get along with students and teachers, less likely to feel close to people at school, less likely to feel teachers were fair and less likely to feel safe at school than were White youth.

These differences in the school connectedness measures could explain why Black adolescents feel a lack of bonding to schools, which in turn may lead to bonding to other sources, e.g., peers and gangs, and to transmitting norms from other sources, such as the media and neighborhood.

According to Garcia (1999), “children who have been abandoned and betrayed by their families and their schools, out of necessity, look to other sources with which to bond, and this may ultimately make the peer group the most powerful socializing forces.” In addition to the peer group, adolescents regardless of race/ethnicity may seek to emulate images and

norms that are transmitted from the media such as their favorite musicians, music videos, TV shows, and celebrities. Although, the PST includes some of the aforementioned constructs (media) as secondary factors, depending on the cultural group, secondary factors may actually be primary socialization sources. Suggestions for future study include modification of the theory by incorporating and assessing secondary socialization factors such as culture, media, and neighborhood constructs as primary socialization constructs. Inclusion of these factors may provide further explanation of the racial disparities for youth engagement in risk behaviors.

Our findings are consistent with the literature in that youth who are doing well in school, who are engaged, who are connected to the family and school, and who have a low perception of peer involvement in risk behaviors are less likely to engage in risky behaviors such as substance use and sexual activity. These results indicate that the PST is a good predictor of marijuana use for White adolescents but, as modeled, only predicts some risk behaviors for Blacks.

Although the theory as a whole had limited predictive value for risk behaviors among Black adolescents, several of the PST constructs were significant predictors for risk, which provides vital information for program developers. This study suggests that although the PST may be a good predictor for White youth, some modification may be needed in order to better explain risk-taking behaviors among Black youth. However, we did find for both Blacks and Whites that the peer construct consistently predicted engagement in risk behaviors. This provides support for Oetting and Donnermeyer's (1998) contention that during adolescence the peer group is the most significant source for transmitting norms. Our findings support the need to develop population-specific interventions for substance use and HIV risk prevention.

Limitations and Strengths

This study has several limitations that need to be acknowledged because of their potential impact on the interpretation of findings. The use of secondary data meant that the data content, quality, and intent were outside the researchers' control. As a result, some components of the PST were not optimally operationalized. The PST is an ecological model that attempts to include social, community, cultural, and environmental factors as predictors of health. However, Add Health did not collect data regarding community, cultural, and environmental factors. In addition, the outcomes—contraception use at first and recent sex—were rather broad. An outcome question that captured condom use at first and recent sex would have provided a better parallel to existing empirical studies. Because of the broad nature of the contraception outcome questions, we are unable to determine whether the adolescents used birth control pills or condoms as their method of contraception, which has implications for HIV risk. The cross-sectional nature of the data did not allow us to assess the temporal sequence among relationships.

Despite these limitations, this study has numerous strengths. It is one of the few quantitative studies that examined the utility of the PST for predicting adolescent risk-taking behaviors among Black and White adolescents from a nationally representative sample. In addition, although this study uses self-reported behaviors, adolescent contraception and substance use questions were assessed using Audio Computer-Assisted Self-Interviews methods, which have been shown to be a more reliable way to capture data of a sensitive nature compared with paper-based surveys (Ghanem, Hutton, Zenilman, Zimba, and Erbeling, 2005; Murphy, Durako, Muenz, and Wilson, 2000; Rogers et al., 2005).

This study found statistically significant differences between Black and White adolescents on the social constructs that are associated with risk-taking behaviors. It lends empirical

support to the practice of designing culturally appropriate interventions and provides a better understanding of the contexts that predict adolescents risk-taking behaviors by race among a nationally representative sample. Interventionists should focus on developing programs that include strategies for increasing and fostering positive connections between the various social contexts that adolescents face.

Acknowledgments

This research uses data from the Add Health project, a program project designed by J. Richard Udry (PI) and Peter Bearman and funded by grant P01-HD31921 from the National Institute of Child Health and Human Development to the Carolina Population Center, University of North Carolina at Chapel Hill, with cooperative funding from 17 other agencies. Persons interested in obtaining data files from the National Longitudinal Study of Adolescent Health should contact Add Health, Carolina Population Center, 123 West Franklin Street, Chapel Hill, NC 27516-2524 (<http://www.cpc.unc.edu/addhealth>). The author would like to thank Dr. Sana Loue for editorial feedback. Dr. Francis's research was supported by funding from the National Institute of Health's Center for Health Disparities Loan Repayment Program, award no. 1 L60 MD001984-01. Dr. Thorpe's research was supported by a grant from the National Center for Minority Health and Health Disparities (P60MD000214-01) and has furthermore been funded by the National Institutes of Health.

Biographies

Roland J. Thorpe, Jr., is an assistant scientist in the Department of Health Policy and Management at The Johns Hopkins Bloomberg School of Public Health and Core Faculty of the Hopkins Center for Health Disparities Solutions. Dr. Thorpe is a gerontologist and epidemiologist whose research agenda focuses on the association of race, SES, and segregation with health and functional outcomes among middle- to old-age adults. Some of his most recent work appears in *Social Science & Medicine* and *Addiction*.

Dr. Shelley A. Francis is currently a senior instructor in the Division of Public Health in the Epidemiology and Biostatistics Department in the School of Medicine at Case Western Reserve University. Her research focuses on examining health disparities, HPV and cervical cancer, HPV vaccine acceptability among disadvantaged populations, and correlates of HIV risk and substance use among adolescents. Dr. Francis's most recent work appears in the *Journal of Religion and Health*, *Annals of Tropical Medicine and Parasitology*, and *Sexually Transmitted Disease*.

References

- Albert, B.; Brown, S.; Flanigan, CM., editors. 14 and younger: the sexual behaviors of young adolescents. Washington, DC: National Campaign to Prevent Teen Pregnancy; 2003.
- Beal A, Ausiello J, Perrin JM. Social influences on health-risk behavior among minority middle school students. *Journal of Adolescent Health*. 2001; 28(6):474–480. [PubMed: 11377991]

- Bearman, P.; Udry, J. The National Longitudinal Study of Adolescent Health: research design. 2000. Retrieved July 18, 2005 from <http://www.cpc.unc.edu/projects/AddHealth>
- Beveridge, AA.; Catsambis, S. Adolescent at-risk behaviors: a multi-level analysis of family, neighborhood and school factors affecting adolescent behavioral outcomes; Paper presented at the annual meeting of the American Sociological Association; Atlanta, GA: Atlanta Hilton Hotel; 2003 August. Retrieved April 22, 2008 from http://www.allacademic.com/meta/p107527_index.html
- Bonny AE, Britto MT, Klostermann BK, Hornung RW, Slap GB. School disconnectedness: identifying adolescents at risk. *Pediatrics*. 2000; 106(5):1017–1021. [PubMed: 11061769]
- CDC. Adolescent health chartbook. Hyattsville, Maryland: Centers for Disease Control and Prevention, U.S. Department of Health and Human Services, National Center for Disease Control and Prevention; 2000.
- CDC. 2003 Youth Risk Behavior Survey. 2005. Retrieved 28 February 2006 from <http://www.cdc.gov/HealthyYouth/yrbs/pdfs/trends-alcohol.pdf>
- CDC. Youth Risk Behavior Surveillance—United States, 2005. *Morbidity & Mortality Weekly Report*. 2006; 55(SS-5):1–108. [PubMed: 16410759]
- Garcia SA. Primary Socialization Theory: comments on racism, sexism, generational neglect, abuse, and abandonment. *Substance Use and Misuse*. 1999; 34(7):1005–1011. [PubMed: 10359218]
- Ghanem KG, Hutton HE, Zenilman JM, Zimba R, Erbeling EJ. Audio computer self interview and face to face interview modes in assessing response to bias among STD clinic patients. *Sexually Transmitted Infections*. 2005; 81:421–425. [PubMed: 16199744]
- Guo J, Chung I, Hill KG, Hawkins JD, Catalano RF, Abbott RD. Developmental relationships between adolescent substance use and risky sexual behavior in young adulthood. *Journal of Adolescent Health*. 2002; 31(4):354–362. [PubMed: 12359381]
- Hadley-Ives E, Stiffman AR, Rubin Stiffman A, Elze D, Johnson SD, Dore P. Measuring neighborhood and school environments: perceptual and aggregate approaches. *Journal of Human Behavior in the Social Environment*. 2000; 3(1):1–28.
- Hair, E.; Moore, K.; Garrett, S.; Kinukawa, A.; Lippman, L.; Michelsen, E. Psychometric analyses of the parent–adolescent relationship scale in the National Longitudinal Survey of Youth—1997; Paper presented for the Positive Outcomes Conference; Washington, DC: Child Trends; 2003 March.
- Jaccard J, Dittus P, Gordon V. Maternal correlates of adolescent sexual and contraceptive behavior. *Family Planning Perspectives*. 1996; 28(4):159–165. 185. [PubMed: 8853281]
- Ku L, Sonenstein F, Pleck J. Factors influencing first intercourse for teenage men. *Public Health Reports*. 1993 November–December. 108:680–694. [PubMed: 8265752]
- Marijuana and youth fact sheet. Retrieved January 15, 2007 from <http://www.drugstory.org/pdfs/MJAndYouthFacts.pdf>
- McNeely C, Nonnemaker JM, Blum RW. Promoting school connectedness: evidence from the National Longitudinal Study of Adolescent Health. *Journal of School Health*. 2002; 72(4):138–146. [PubMed: 12029810]
- Murphy DA, Durako S, Muenz LR, Wilson CM. Marijuana use among HIV-positive and high-risk adolescents: a comparison of self-report through audio computer-assisted self-administered interviewing and urinalysis. *American Journal of Epidemiology*. 2000; 152(9):805–813. [PubMed: 11085391]
- Oetting E, Donnermeyer JF. Primary socialization theory: the etiology of drug use and deviance. *Substance Use and Misuse*. 1998; 33(4):995–1026. [PubMed: 9548633]
- Oetting R, Donnermeyer JF, Trimble JE, Beauvais F. Primary Socialization Theory: culture, ethnicity, and cultural identification. The links between culture and substance use. *Substance Use and Misuse*. 1998; 33(10):2075–2107. [PubMed: 9744843]
- Rai A, Stanton B, Wu Y, Li X, Galbraith J, Cottrell L, et al. Relative influences of perceived parental monitoring and perceived peer involvement on adolescent risk behaviors: an analysis of six cross-sectional data sets. *Journal of Adolescent Health*. 2003; 33:108–118. [PubMed: 12890602]
- Resnick M, Bearman PS, Blum RW, Bauman KE, Harris KM, Jones J, et al. Protecting adolescents from harm: findings from the National Longitudinal Study on Adolescent Health. *Journal of the American Medical Association*. 1997; 278(10):823–832. [PubMed: 9293990]

- Resnick M, Harris L, Blum RW. The impact of caring and connectedness on adolescent health and well-being. *Journal of Pediatric and Child Health*. 1993; 29 Suppl.:S3–S9.
- Rogers SM, Willis G, Al-Tayyib A, Villarroel MA, Turner CF, Ganapathi L, et al. Audio computer assisted interviewing to measure HIV risk behaviors in a clinic population. *Sexually Transmitted Infections*. 2005; 81:501–507. [PubMed: 16326855]
- Romer D, Stanton B, Galbraith J, Feigelman S, Black MM, Li X. Parental influence on adolescent sexual behavior in high-poverty settings. *Archives of Pediatrics and Adolescent Medicine*. 1999; 153:1055–1062. [PubMed: 10520613]
- Shrier L, Emans SJ, Woods ER, Durant RH. The association of sexual risk behaviors and problem drug behaviors in high school students. *Journal of Adolescent Health*. 1997; 20:377–383. [PubMed: 9168385]
- Shumow L, Vandell DL, Posner J. Risk and resilience in the urban neighborhood: predictors of academic performance among low-income elementary school children. *Merrill-Palmer Quarterly*. 1999 April;45:1–17.
- Sieving R, McNeely CS, Blum RW. Maternal expectations, mother-child connectedness, and adolescent sexual debut. *Archives of Pediatric Adolescent Medicine*. 2000; 154:809–816.
- Smith C. Factors associated with early sexual activity among urban adolescents. *Social Work*. 1997; 42(4):334–346. [PubMed: 9228830]
- Stanton B, Li, Black, Ricardo, Galbraith, Feigelman, Kaljee. Longitudinal influence of perceptions of peer and parental factors on African American adolescent risk Involvement. *Journal of Urban Health*. 2002; 79(4):536–548. [PubMed: 12468673]
- Tapert SF, Aarons GA, Sedlan GR, Brown SA. Adolescent substance use and sexual risk-taking behavior. *The Journal of Adolescent Health: Official Publication of the Society for Adolescent Medicine*. 2001; 28(3):181–189. [PubMed: 11226840]
- Wallace J, Bachman J, O'Malley PM, Johnston LD, Schulenberg JE, Cooper SE. Tobacco, alcohol, and illicit drug use: racial and ethnic differences among US high school seniors, 1976–2000. *Public Health Reports*. 2002; 117 Suppl. 1:S67–S75. [PubMed: 12435829]
- Wallace J, Forman T. Religion's role in promoting health and reducing risk among American youth. *Health Education and Behavior*. 1998; 25(6):721–741. [PubMed: 9813744]
- Youniss J, McClellan J, Yates M. Religion, community service, and Identity in American Youth. *Journal of Adolescence*. 1999; 22:243–253. [PubMed: 10089122]

Construct	Variable Name	Item
Family	Family communication	1. How often do you talk to family members or friends about your health?
Age	How often do you talk to family members or friends about your health?	1. How often do you talk to family members or friends about your health? 2. How often do you talk to family members or friends about your health? 3. How often do you talk to family members or friends about your health?
Health	Health	1. How often do you talk to family members or friends about your health? 2. How often do you talk to family members or friends about your health? 3. How often do you talk to family members or friends about your health?
Health communication	Health communication	1. How often do you talk to family members or friends about your health? 2. How often do you talk to family members or friends about your health? 3. How often do you talk to family members or friends about your health?

Figure 1.
Constructs for operationalizing the PST using the add health data.

	Race	Frequency
Age		
18-24	45%	17%
25-34	35%	15%
35-44	15%	10%
45-54	5%	5%
55-64	2%	2%
65+	1%	1%
Total		
	100%	50%

Figure 2.
Prevalence of Risk Taking Behaviors among Add Health participants by race/ethnicity at Wave 1

Table 1Characteristics of 5410 Add Health participants by race/ethnicity at Wave 1^a

Variables	Black	White
Age, mean (range)	16.2 (15.7, 16.6)	15.9 (15.68, 16.12)
Biological sex		
Males (%)	51	51
Maternal education (SES),%		
<HS	15	11*
Family/maternal connectedness		
Feels close to mom	4.63 (4.57, 4.69)	4.53 (4.49, 4.57)*
Mom cares	4.85 (4.82, 4.88)	4.85 (4.83, 4.87)*
Peer		
Peer approval of risk-taking behaviors	3.34 (3.26, 3.41)	3.67 (3.61, 3.73)*
Best friends drank in last month (%)	49	59
Best friends use weed in last month (%)	34	33
School connectedness		
Getting along with teachers, mean (range)	3.96 (3.88, 4.04)	4.105 (4.06, 4.15)*
Getting along with students, mean (range)	4.00 (3.90, 4.09)	4.12 (4.08, 4.16)*
Close to people at school, mean (range)	3.62 (3.55, 3.70)	3.72 (3.67, 3.770)**
Feel part of school, mean (range)	3.84 (3.77, 3.92)	3.86 (3.80, 3.92)
Happy at this school, mean (range)	3.61 (3.50, 3.73)	3.68 (3.62, 3.75)
Teachers are fair, mean (range)	3.38 (3.27, 3.49)	3.50 (3.44, 3.55)*
Feel safe at school, mean (range)	3.62 (3.52, 3.73)	3.87 (3.79, 3.94)*
GPA, mean (range)	2.58 (2.51, 2.65)	2.87 (2.82, 2.92)*
Dependent Variables		
Ever had sex (%)	57	35*
Contraception use at first sex ^a (%)	65	67
Contraception use at recent sex ^a (%)	68	69
Lifetime alcohol use (%)	44	58*
Lifetime marijuana use (%)	24	29

Note: Student's *t* tests and chi-square analyses were used to examine racial differences.

^aExamines only adolescents who report engaging in vaginal/sexual intercourse.

*
p < .01.

**
p < .05

Table 2

Multivariate ORs and 95% CIs for the association between demographic characteristics, PST constructs, and substance use behaviors by race in the Add Health study Wave I

Predictors	Alcohol use		Marijuana use	
	White	Black	White	Black
Older youth ^a	1.18 (1.08, 1.31)	1.02 (0.87, 1.20)	1.18 (1.06, 1.31)	0.93 (0.73, 1.18)
Males ^b	0.81 (0.65, 1.01)	0.89 (0.62, 1.27)	1.15 (0.90, 1.48)	1.72 (0.99, 2.97)
Low SES ^c	1.17 (0.78, 1.75)	0.67 (0.37, 1.20)	0.98 (0.69, 1.38)	0.86 (0.35, 2.13)
Low GPA ^d	1.34 (1.05, 1.70)	0.96(0.63, 1.46)	1.33 (1.05, 1.69)	1.67 (1.13, 2.48)
High perception of peer sex	1.67 (1.29, 2.18)	1.41 (1.00, 1.98)	1.12 (0.85, 1.47)	1.19 (0.68, 2.09)
Peers drink	4.26 (3.42, 5.30)	3.17 (2.02, 4.96)	2.59 (1.85, 3.64)	1.46 (0.89, 2.38)
Peers smoke weed	2.83 (2.09, 3.82)	1.76 (1.14, 2.71)	9.07 (7.53, 10.93)	6.92 (3.97, 12.06)
Low school connectedness	1.28 (1.02, 1.61)	1.37 (0.94, 1.98)	1.84 (1.43, 2.37)	2.17 (1.28, 3.69)
Low family connectedness	1.18 (0.93, 1.50)	1.34 (0.92, 1.96)	1.66 (1.28, 2.16)	1.13 (0.67, 1.89)

^aReference category is younger youth.

^bReference category is female adolescents.

^cReference category is high SES.

^dReference category is C+ or higher GPA.

Table 3

Multivariate ORs and 95% CIs for the association between demographic characteristics, PST constructs, and sexual initiation and condom use behavior by race in the Add Health study Wave I

Predictors	Ever had sex		Contraceptive use at first sex	
	White	Black	White	Black
Older youth ^a	1.85 (1.70, 2.01)	1.37 (1.16, 1.62)	0.92 (0.81, 1.05)	0.94 (0.79, 1.14)
Males ^b	0.78 (0.64, .96)	1.79 (1.13, 2.85)	1.04 (0.74, 1.47)	1.65 (1.04, 2.63)
Low SES ^c	2.22 (1.59, 3.12)	1.30 (0.71, 2.35)	1.45 (0.96, 2.22)	1.10 (0.63, 1.95)
Low GPA ^d	1.52(1.24, 1.88)	1.40 (0.98, 1.99)	0.84 (0.66, 1.08)	0.67 (0.47, 0.95)
High perception of peer sex	—	1.18 (0.80, 1.75)	1.05 (0.77, 1.42)	1.00 (0.65, 1.56)
Peers drink	2.22 (1.71, 2.88)	1.54 (1.00, 2.36)	0.87 (0.52, 1.44)	0.79 (0.38, 1.64)
Peers smoke weed	2.90 (2.36, 3.57)	2.49 (1.51, 4.13)	1.32 (0.94, 1.86)	1.73 (1.06, 2.79)
Low school connectedness	1.63 (1.33, 2.02)	1.45 (0.97, 2.16)	1.02 (0.76, 1.39)	1.78 (1.17, 2.71)
Low family connectedness	1.40 (1.176 1.68)	1.44(0.94, 2.21)	1.27 (0.94, 1.72)	0.99 (0.55, 1.81)

Note: For the empty entry, peer sex was dropped from model owing to a high number of missing responses by White males.

^a Reference category is younger youth.

^b Reference category is female adolescents.

^c Reference category is high SES.

^d Reference category is C+ or higher GPA.

Table 4

Multivariate ORs and 95% CIs for the association between demographic characteristics, PST constructs, and condom use at recent sex by race in the Add Health study Wave I

Predictors	Contraception use at recent sex	
	White	Black
Older youth ^a	0.91 (0.79, 1.05)	1.11 (0.86, 1.43)
Males ^b	0.79 (0.59, 1.08)	0.86 (0.56, 1.32)
Low SES ^c	1.80 (1.21, 2.67)	0.81 (0.41, 1.59)
Low GPA ^d	1.02 (0.77, 1.34)	0.85 (0.58, 1.24)
High perception of peer sex	1.15 (0.86, 1.54)	0.97 (0.59, 1.59)
Peers drink	1.00 (0.66, 1.53)	0.92 (0.51, 1.64)
Peers smoke weed	1.02 (0.75, 1.40)	1.71 (0.94, 3.12)
Low school connectedness	1.30 (0.94, 1.81)	1.27 (0.82, 1.98)
Low family connectedness	0.92 (0.69, 1.24)	1.19 (0.73, 1.95)

^aReference category is younger youth.

^bReference category is female adolescents.

^cReference category is high SES.

^dReference category is C+ or higher GPA.