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Mechanisms of Family Impact on African American Adolescents' HIV-Related Behavior

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Abstract

A longitudinal model that tested mediating pathways between protective family processes and HIV-related behavior was evaluated with 195 African American youth. Three waves of data were collected when the youth were 13, 15, and 19 years old. Evidence of mediation and temporal priority were assessed for three constructs: academic engagement, evaluations of prototypical risk-taking peers, and affiliations with risk-promoting peers. Structural equation modeling indicated that protective family processes assessed during early adolescence were associated with HIV-related behavior during emerging adulthood and that academic engagement, evaluations of prototypical risk-taking peers, and affiliations with risk-promoting peers accounted for this association. Evidence of a specific pathway emerged: protective family processes → academic engagement negative → evaluations of prototypical risk-taking peers→ affiliations with risk-promoting peers→ HIV-related behavior. Academic engagement also was a direct predictor of HIV-related risk behavior.

Each year, approximately 25% of sexually active adolescents and emerging adults contract sexually transmitted infections (STIs) including HIV (W. C. Miller et al., 2004). African American emerging adults are particularly at risk, experiencing disproportionately high rates

of HIV and other STIs (Centers for Disease Control and Prevention [CDC], 2008; W. C. Miller et al., 2004). For example, non-Hispanic African Americans aged 19 to 24 years are nearly 20 times more likely to be infected with HIV than are emerging adults in any other racial group (Morris et al., 2006). These data underscore the importance of identifying the etiological processes that place African Americans at risk for engaging in HIV-related risk behaviors during emerging adulthood.

Common HIV-related risk behaviors among adolescent and emerging adults include unprotected sexual intercourse, “casual” sex, multiple sexual partners, and substance use (DiClemente & Crosby, 2003). Studies indicate that powerful factors protecting African American adolescents from these HIV-related risk behaviors originate in the family environment (Perrino, Gonzalez-Soldevilla, Pantin, & Szapocznik, 2000). *Protective family processes*, those factors evincing direct or interactive associations with reduced risk behavior, include parent-child relationship quality, parental authority and monitoring, internalization of parental norms, and communication about risk behavior (Perrino et al., 2000). For some HIV-related risk behaviors, such as substance use, family factors may be more protective for African American than for European American youth (Wallace et al., 2002).

Socioeconomic distress and contextual disadvantages such as disorganized or unsupportive neighborhoods confer challenges on many African American parents; however, protective family processes have been found to be most effective for families experiencing such difficulties (Brody, Chen et al., 2006; Rutter, 1985). Based on these findings, programs have been developed specifically for economically stressed families (Brody et al., 2004). These studies underscore both the feasibility and the utility of addressing protective family processes with parents who experience economic and other contextual stressors. An important step in refining etiological models of risk behavior and the programs they inform is to examine the mechanisms of action that link protective family processes to youth risk behavior. The present study addresses this need.

In the present study, we tested a model of the pathways that link protective family processes in early adolescence to HIV-related risk behavior in emerging adulthood (see Figure 1). We hypothesized three intervening processes through which protective family processes may be related to HIV-related risk behavior: academic engagement, evaluations of prototypical risk-taking peers, and affiliation with risk-promoting peers. Consistent with prior research (Dishion & McMahon, 1998), we hypothesized a direct pathway between protective family processes and affiliations with risk-promoting peers, which, in turn, was specified as a proximal predictor of HIV-related risk behavior. We extend previous research by examining two intervening processes, evaluations of prototypical risk-taking peers and academic engagement, that empirical and theoretical literatures suggest may connect protective family processes to peer affiliations.

Protective Family Processes and HIV-Related Behavior

A range of protective family processes reduce HIV-related risk behaviors (Perrino et al., 2000). Parent-child relationship quality is associated consistently with adolescents’ abstinence from sexual activity, postponement of intercourse, relations with fewer sexual partners, and consistent use of contraception (Jaccard, Dittus, & Gordon, 1996). Most of the evidence shows that parental supervision and monitoring of children is another important relationship dimension related to adolescents’ HIV-related behavior. Parental supervision of dating activities (Hogan & Kitagawa, 1985) and parental monitoring of teens (Luster & Small, 1994) are associated with teens’ abstinence from intercourse, delay of sexual debut, and relations with fewer sexual partners. Several studies suggest that parent-adolescent

communication about sexual behavior is linked to low levels of sexual risk behavior among African American adolescents and emerging adults (DiClemente et al., 2001; K. S. Miller et al., 1999). This finding is inconclusive, however, as some studies suggest that parents increase their communication as a reaction to their children's risk behavior (DiIorio, Pluhar, & Belcher, 2003). Youth whose parents communicate clear norms that discourage risk behavior are less likely to engage in risky sexual behavior or abuse substances (Brody, Flor, Hollett-Wright, & McCoy, 1998).

Protective Family Processes, Risk-Promoting Peers, and HIV-Related Risk Behavior

In the model presented in Figure 1, we specify affiliations with risk-promoting peers as a proximal antecedent to emerging adult HIV-related risk behaviors. Peers are important behavioral referents during adolescence (Igra & Irwin, 1996) and studies frequently report similarities in levels and types of risk behaviors, including sexual behavior, among groups of friends (Boyer et al., 2000;Perkins, Luster, Villarruel, & Small, 1998). Despite the importance of peers during adolescence, parents continue to influence youths' affiliations with risk-promoting peers and vulnerability to their influence. Adolescents who describe their relationships with their parents as coercive or conflictual are more likely to be involved with risk-promoting peer groups (Metzler, Noell, Biglan, Ary, & Smolkowski, 1994). Conversely, adolescents whose parents use more authoritative parenting styles are likely to belong to peer groups that support conventional parental norms (Brown, Mounts, Lamborn, & Steinberg, 1993). Direct parental influences on adolescents' peer relationships are hypothesized to occur through limitations on adolescents' access to situations that provide opportunities for risky sexual behavior, including involvement with risk-promoting peers (Paikoff, 1995). Accordingly, we expect African American youths' experience of protective family processes to predict their affiliations with peers who engage in HIV-related risk behaviors.

Protective Family Processes, Evaluations of Prototypical Risk-Taking Peers, and Risk Behavior

Studies suggest that youth attitudes may mediate the association of protective family processes with youths' peer affiliations (Brook, Brook, Gordon, Whiteman, & Cohen, 1990; Gibbons, Gerrard, & Lane, 2003). According to prototype theory, adolescents have clear prototypical images of the "types" of youth who engage in risky sexual behavior (Gibbons et al., 2003). Youths' evaluations of prototypical risk-taking peers (e.g., how "cool" someone is who takes HIV-related risks) are associated with adolescents' desire to affiliate with peers whose behavior is consistent with that image. Empirical studies have validated this link in predicting alcohol and smoking outcomes (Cleveland, Gibbons, Gerrard, Pomery, & Brody, 2005; Gerrard, Gibbons, Stock, Vande Lune, & Cleveland, 2005); however, the link remains to be investigated for HIV-related risk behavior.

Parents are an important influence on youths' evaluations of prototypical risk-taking peers (Blanton, Gibbons, Gerrard, Conger, & Smith, 1997). Prospective investigations of African American children have linked parental monitoring, warmth, and risk-related communication with youths' negative prototype evaluations of peers who smoke (Gerrard et al., 2005) or drink alcohol (Cleveland et al., 2005), which, in turn, predicted youths' own initiation of smoking and alcohol use. The present study extends past research by investigating the prospective associations of protective family processes with evaluations of prototypical HIV-related risk-taking youth. Because youth are unlikely to conceptualize peers in terms of HIV risk, we used three measures to operationalize a latent evaluation of

prototypical HIV-related risk-taking peers. These included prototype evaluations of youth who, at age 15, "have sex regularly," "get pregnant or get someone pregnant," and "use alcohol or drugs." We hypothesized that close, satisfying parent-child relationships characterized by clear parental authority, risk communication, and parental norms that discourage risk behavior would promote youths' development of negative prototype evaluations of peers who engage in HIV-related risk behavior. Negative evaluations of prototypical risk-taking peers, in turn, would lead to fewer affiliations with risk-promoting peers.

Protective Family Processes, Academic Engagement, and Risk Behavior

Academic engagement is a key protective factor related to almost all health risk behaviors, including those related to HIV risk (Resnick et al., 1997). Aspects of academic engagement, including achievement, positive experiences, and educational expectations, forecast the onset of intercourse and frequency of unprotected intercourse (Cernkovich & Giordano, 1992; Schvaneveldt, Miller, Berry, & Lee, 2001). Ecological perspectives on adolescent development stress the potential for family environments to influence youths' participation in social systems such as school, which in turn influences problematic behavior and developmental outcomes (Perrino et al., 2000). We hypothesized that protective family processes would predict youths' academic engagement and that the association of academic engagement with subsequent HIV-related risk behavior would be mediated by affiliations with risk-promoting peers (see Figure 1). African American youth who experience more protective family processes are likely to acquire the skills necessary for becoming planful, self-regulated students who are engaged in school and achieve academically (Brody, Murry, Kim, & Brown, 2002; Taylor & Lopez, 2005). Other researchers have found that youth who do not experience protective family processes are less conventional in general, and less invested in schoolwork and academic achievement specifically (Crosnoe, 2001; Hill & Craft, 2003).

Surprisingly little research has examined the associations among academic engagement, peer affiliations, and adolescents' HIV-related risk behavior other than substance use. Kumpfer and Turner (1991) found that family climate predicted substance use indirectly through its effects on school bonding, self-efficacy, and peers' influences. Williams, Ayers, Abbott, Hawkins, and Catalano (1999) also found that family relationships had both a direct effect on substance use and an indirect effect through the mediators of school bonding, academic skills, and social skills. Extrapolating from these findings, we expect youth who experience high levels of protective family processes to be highly engaged in school, to affiliate with other academically engaged youth, and to avoid affiliations with risk-promoting peers.

Associations among Putative Mediators

In the present study, we consider empirically, as well as theoretically, the temporal sequencing among mediating variables. Plausible alternative hypotheses exist to the hypotheses in Figure 1. For example, in Figure 1 we hypothesized that evaluations of prototypical risk-taking peers would predict affiliations with them. Affiliations with risk-promoting peers, however, could lead to increasingly positive evaluations of them, particularly as a youth begins to identify with a risk-taking group; these processes could emerge simultaneously. We explicitly examine this possibility and other patterns of influence among mediators in our analyses.

Method

Participants

Study hypotheses were tested using three waves of data collected from siblings of the target participants in the Family and Community Health Study (FACHS). Families were recruited from 259 census-defined Block Group Areas (BGAs) in Georgia and Iowa, which were selected to represent the diverse communities in which African American families live outside of densely populated urban areas. Rural, suburban, and small metropolitan areas were sampled. From these BGAs, researchers randomly selected households with fifth-grade students for participation. The recruitment rate was 72%. Data were gathered from the fifth graders, their caregivers, and a subsample of older siblings within 3 years of the target youths' ages. The present study focuses on these older siblings, as their data permitted a test of the study hypotheses across adolescence into early adulthood. Primary caregivers received $100, younger siblings received $70, and older siblings received $30 at each wave for their participation in the study. The Georgia and Iowa samples were combined after data analyses indicated that they were comparable on demographic and family process variables (Cutrona, Russell, Hessling, Brown, & Murry, 2000). A total of 867 African American families participated in the first wave of FACHS, including 291 families with eligible older siblings. The older siblings' mean ages at the three waves of data collection were 13 (*SD* = . 81) 14.9 (*SD* = 0.88), and 18.8 (*SD* = 1.08) years, respectively. Of the 291 siblings recruited at wave 1, 257 participated in wave 2, and 247 participated in wave 3. The 195 siblings who provided data at all waves were included in the sample for this study. Attrition was not associated with any study variables.

Comparisons of the demographic characteristics of families from each community sampled in FACHS with those of county-level census data indicated that these families were representative of the communities from which they were recruited. Of the primary caregivers, 86% were biological mothers, 6% were fathers, 2% were grandmothers, 3 % were foster or adoptive parents, and 3% were stepparents, other relatives, or non-relatives. Overall, 93% of the primary caregivers were female. They reported a mean number of 4.5 children living in their homes. Median family income was $20,803. One third of the families lived at or below the poverty line. Education among caregivers at wave 1 ranged from less than high school (19%) to advanced graduate degrees (3%). The mode was a high school diploma (42%). Income and education levels did not vary by state. The mean ages of the primary caregivers at the three waves of data collection were 36.8 (*SD* = 8.1), 38.5 (*SD* = 8.0), and 41.7 years (*SD* = 8.0), respectively. Full or part-time employment was reported by 71% of the primary caregivers.

Procedures

At waves 1 and 2, African American university students and community members, who received 20 hours of training on assessment protocols, served as field researchers to collect data in participants' homes. Participants were assessed individually using a written questionnaire. A field researcher introduced the questionnaire items and response sets to each participant, emphasizing the confidentiality of the data, and remained available to answer any questions the participant might have about particular items. At wave 3, the field researchers interviewed the older siblings by telephone. Researchers received 5 hours of additional training on conducting the phone interview, including how to re-establish rapport and emphasize the confidentiality of responses. The participants' privacy was protected by a Certificate of Confidentiality from the U.S. Department of Health and Human Services.

Measures

Protective family processes—A protective factor index was developed for each youth at wave 1 based on four protective family processes: relationship quality, parental authority, risk communication, and parental norms. For each protective process, youth above the mean of the distribution on each measure were given a score of "1" on that protective factor and those below the mean of the distribution were given a score of "0." Scores on each protective factor were then summed; the index had a possible range of 0 to 4. This strategy is consistent with the observations that multiple dimensions of parent-child relationships are experienced simultaneously (Ostaszewski & Zimmerman, 2004), no single factor is responsible for protective effects for all individuals (B. C. Miller, 2002), and various aspects of family functioning have an additive effect on adolescent functioning (Herman et al., 1997). Using an index that consists of the number of protective factors present also permits a robust examination of intervening mechanisms that is not dependent on a particular protective family process.

To minimize potential reporter bias in the assessment of protective family processes, we aggregated parent and youth perspectives that were significantly correlated (Bank, Dishion, Skinner, & Patterson, 1990). Data from parents and youth were available for two of the four family protective processes measures; the other two family process measures include youth self-reports only. The four scales assessed at wave 1 that were used to develop the protective family process index follow.

Two items assessed general *relationship quality* from the caregivers' and youths' perspectives: "How satisfied are you with your relationship with your caregiver/child?" and "How happy are you with the way things are between you and your caregiver/child?" The response set for the first question was 1 (*very unsatisfied)* to 5 (*very satisfied*) and for the second question, 1 (*very unhappy*) to 5 (*very happy*). Cronbach's alpha for this scale was .83 for youth and .84 for caregivers. Youth and caregiver reports were significantly correlated ($r = .27$, $p < .01$) and subsequently aggregated.

Youth reported on *parental authority* using two items: "How much does your caregiver decide who you date?" and "How much does your caregiver decide who you can be friends with?" The response set for these items was 1 (*not at all*) to 4 (*a lot*). Cronbach's alpha for the scale was .70. *Risk communication* was assessed from youth and caregiver perspectives on a 7-item scale that indexed the frequency of caregivers' discussions with the youth during the past year of various risk-related behaviors and issues (e.g., "In the past year, how often has your caregiver talked to you about sexual intercourse/sexually transmitted diseases/using drugs?"). The response set was 1 (*never*) to 4 (*many times*). Cronbach's alpha for the scale was .94 for youth and .93 for caregivers. Caregivers' and youths' reports were significantly associated ($r = .21$, $p < .01$) and subsequently aggregated. Youth reported their perceptions of their *primary caregivers' norms* regarding substance use and sexual risk behavior. For five risk behaviors (e.g., having sex, using drugs), youth were asked, "What would your [caregiver] do if you…" The response options were 1 (*tell you to stop*), 2 (*not approve, but not tell you to stop*), 3 (*not care*), 4 (*approve*), or 5 (*approve and encourage you to continue*). Cronbach's alpha was .85.

Evaluations of prototypical risk-taking peers—Scales assessing youths' images of peers who have sex regularly, get pregnant or get someone pregnant, and use substances (Gibbons & Gerrard; 1995) were used as indicators of youths' evaluations of prototypical risk-taking peers. Youth completed these scales at waves 1 and 2. Each scale was introduced with the lead-in statement, "Take a moment to think about the type of kid your age who has sex regularly/gets (or gets someone) pregnant/uses drugs or alcohol. We are not thinking about anyone in particular, just your image of kids who [has sex/gets pregnant/uses drugs or

alcohol].” Using a scale ranging from 1 (*not at all*) to 4 (*very*), the youth reported how popular, careless, smart, cool, attractive (good looking), immature (childish), and *dull (boring)* they considered such peers to be. The items for careless, immature, and dull were reverse coded. Reliabilities for the sex, pregnancy, and substance use prototype evaluations exceed .70 at each wave.

Academic engagement—Three indicators constituted the academic engagement construct at waves 1 and 2: self-reported grades, school motivation, and positive relationships with teachers. Youth reported their grade point average on a single item with a response set of 0 (*F*) to 11 (*A*+) and completed two subscales of an academic engagement measure that Conger and Elder (1994) developed. The school motivation subscale consisted of six items (e.g., “I try hard at school,” “Grades are important to me”); the response set was 1 (*strongly disagree*) to 5 (*strongly agree*). Cronbach alphas at both waves 1 and 2 exceeded .78. A three-item subscale with the same response set addressed relationships with teachers (e.g., I get along well with my teachers,” “I feel very close to at least one of my teachers”). Cronbach’s alphas were .65 at wave 1 and .69 at wave 2.

Risk-promoting peer affiliations—Three indicators measured at waves 1 and 2 constituted this construct: peer norms regarding being sexually active, peer substance use, and peer norms regarding unprotected sex. A three-item scale addressed perceived norms regarding sex. The first item, “How many of your friends think having sex is OK for someone your age?” included a response set of 1 (*none of them*) to 5 (*almost all of them*). For the second item, “How would your friends react if you have sex?” the response options were 1 (*tell you to stop*), 2 (*not approve, but not tell you to stop*), 3 (*not care*), 4 (*approve*), or 5 (*approve and encourage you to continue*). For the third item, “How many of your friends are sexually active?” response options were 1 (*none of them*) to 5 (*all of them*). Reliabilities for the three-item scale exceeded .76 across waves. A four-item scale assessed the proportion of the youth’s friends who smoked tobacco, drank alcohol, engaged in binge drinking, and smoked marijuana; response options were 1 (*none of them*) to 5 (*all of them*). Reliabilities exceeded .78 across waves. A single item indexed peer norms regarding condom use. Participants responded to the item, “How many of your friends think having sex without a condom is OK for someone your age?” on a scale of 1 (*none of them*) to 5 (*all of them*).

HIV-related risk behavior—Four single-item indicators were used to assess this construct at wave 3. In the first item, youth reported their lifetime number of sexual partners, which was log transformed to correct a positive skew. In the second item, youth indicated how often they used substances before sexual activity; the response set was 1 (*never*) to 4 (*most of the time*) and included the response choice 5 (*never had sex)*. In response to the third item, youth reported their frequency of condom use; the response set was 1 (*all of the time*) to 4 (*never*) and included the response choice 5 (*never had sex)*. In response to the fourth item, youth reported the frequency with which they had sex with someone they didn’t know well during the past year; the response set was 1 (*never*) to 5 (*6 or more times*). All analyses of HIV-related risk behavior at wave 3 controlled for sexual behavior at wave 1, when youth had reported the frequency in the past year with which they “had sex” and “had sex without a condom”. The response set ranged from 1 (*never*) to 5 (*6 or more times*). These two items were correlated, $r = .57$, $p < .01$ and subsequently aggregated to form a wave 1 HIV-related risk behavior variable.

Plan of Analysis

The analytic plan for assessing the heuristic model pictured in Figure 1 was based on Baron and Kenny’s (1986) causal steps method. Mediation is supported when significant

associations emerge between (a) the exogenous variable (protective family processes) and the outcome (HIV-related risk behavior), (b) the exogenous variable and the mediator(s) (academic engagement, evaluations of prototypical risk-taking peers, risk-promoting peer influences), and (c) the mediator(s) and the outcome. The inclusion of the mediator also must attenuate the association between the exogenous variable and the outcome for mediation to be supported. The significance of the mediation can be determined with a Sobel (1982) test. Mediation is further supported by appropriate temporal ordering of the variables of interest. We specified the exogenous variable at wave 1 (age 13), the mediators at wave 2 (age 15), and the outcome at wave 3 (age 18). Controlling baseline sexual behavior at wave 1 permitted an assessment of mechanisms that mediate risky sexual behavior across adolescence. We first discuss a baseline model with family protective processes at wave 1 predicting HIV-risk related behavior at wave 3 (Model 1), controlling for wave 1 sexual behavior. In step 2, we assessed the mediating effect of each of the putative mediators (Models 2-4). To examine the sequencing of mediators pictured in Figure 1, we conducted three lagged, reciprocal analyses between pairs of mediators using data from waves 1 and 2 (Models 5-7). These models suggest that one mediator contributes to residualized variability over time in the other but not vice versa, or that neither variable has temporal precedence over the other. Based on these analyses, we executed a final model (Model 8) incorporating necessary revisions. Measurement models were confirmed on each of the 8 models prior to hypothesis testing.

All analyses were performed with structural equation modeling (SEM) in AMOS 5.0 with full information maximum likelihood estimation (FIML). FIML tests the model against all data present; thus, missing data due to nonresponse does not result in missing cases. Model fit was assessed using the chi-square, $\chi^2/df < 2.0$, the Comparative Fit Index (CFI), and the Root Mean Square Error of Approximation (RMSEA).

Results

Table 1 presents the correlation matrix, means, and standard deviations for all study variables. At wave 3, the majority of the sample (82%) reported having sexual intercourse in their lifetime and having had sex in the past year (80%). The median number of sexual partners for the sample at wave 3 was 3.

Measurement Models

Measurement models were executed to confirm the hypothesized latent constructs (Table 2). For the latent HIV-related behavior construct, we examined if emerging adults' self-reports of their condom use, lifetime partners, having sex with someone they did not know well, and using substances during sexual activity formed a latent HIV-related risk behavior construct. For the 18% of the sample who had never had sex, youth received a "0" on the partner item and were dropped from the other items. In the confirmatory analyses, the condom use item did not load adequately on the construct (β =.06, ns). We thus considered this item separately in subsequent analyses. The measurement model for the remaining three items fit the data adequately with factor loadings exceeding .4. For the mediating variables, all measurement models fit the data adequately and indicated a single underlying construct. All scales loaded significantly on their respective constructs in the predicted directions, with factor loadings exceeding .4. Table 2 presents model fit data for the measurement models for each of the 8 models to be discussed.

Baseline Hypothesis

Model 1 in Table 3 presents the baseline hypothesis that protective family processes at wave 1 would predict HIV-related risk behavior 6 years later at wave 3. The analysis confirmed

the baseline hypothesis (see row 1, Table 3). For each unit increase in protective family processes at wave 1 (age 13), HIV-related risk behavior 6 years later decreased by .2, net of variation predicted by wave 1 sexual behavior. Protective family processes, however, did not significantly predict condom use at wave 3.

Mediational Hypotheses

Models 2 through 4 in Table 3 summarize the tests of the hypotheses that each mediator would demonstrate a significant indirect effect on the HIV-related risk behavior construct. Each model fit the data adequately or well. Family protective processes were significantly associated with each mediator. Two of the mediators (affiliations with risk-taking peers and academic engagement) were significantly associated with HIV-related behavior. The link between evaluations of prototypical risk-taking peers and HIV-related risk behavior approached significance ($p < .10$). Evidence of a significant mediating effect emerged for the peer and academic engagement models. The effect found at baseline between protective family processes and risk behavior (model 1) was nonsignificant in the presence of the mediator and the indirect effect was significant based on a Sobel (1982) test. When these models were executed with the condom use item as the outcome, no significant links emerged between the mediators and condom use. Affiliation with risk-promoting peers and evaluations of prototypical risk-taking peers approached significance ($p < .10$).

Lagged Reciprocal Analyses

Models 5 through 7 in Table 4 display the results of lagged reciprocal analyses conducted for each pair of mediators. These models provide evidence regarding the likely directions of effects among academic engagement, prototype evaluations, and peer affiliations at Wave 2. Each of the three models tested (academic ↔ peer, prototype evaluation ↔ peer, academic ↔ prototype evaluation) fit the data well (see Table 2). According to model 5, residual variability (i.e., baseline levels controlled) in academic engagement predicted prototype evaluations, but not vice versa. Model 6 indicated that residual variability in academic engagement predicted risk-promoting peer affiliations but not vice versa. Model 7 indicates that evaluations of prototypical risk-taking peers predicted affiliations with risk-promoting peers but not vice versa. In contrast to the heuristic model (Figure 1), these analyses suggest that academic engagement is likely to precede evaluations of prototypical risk-taking peers.

Final Model

Based on the lagged reciprocal analyses, the following paths were specified in an omnibus model: Wave 1 protective family processes→ Wave 2 academic engagement→ Wave 2 prototype evaluation→ Wave 2 risk-promoting peers→ Wave 3 HIV-related risk behavior. To examine if these links represented a fully mediated path where each variable's association with distal variables was fully mediated by the successor variable in the pathway, we tested direct paths from protective family processes to prototype evaluations and to risk-promoting peer affiliations. In contrast to the significant paths that emerged in models 3 and 4, these paths were not significant in the multi-mediator model and were subsequently dropped. This was followed by specification of direct paths from academic engagement and prototype evaluations to HIV-related risk behavior. None of these paths were significant and were subsequently dropped from the final model (number 8) presented in Figure 3. This model fit the data well: $\chi^2(72) = 95.67$, $p = .033$; $\chi^2/df = 1.33$ CFI = .966; RMSEA = .041 (.013, .062). Protective family processes at wave 1 predicted youths' academic engagement 2 years later. Academic engagement at age 15 was associated with HIV-related behavior at age 19 both directly and indirectly through evaluations of prototypical risk-taking peers at wave 2. Youth who had developed positive images of risk-taking peers at age 15 were more likely at that age to affiliate with risk-promoting peers,

forecasting their HIV-related behavior at age 19. Because we did not find significant prospective predictors of condom use, no model was executed for that outcome.

Because youth self-reports were used in assessing both family protective processes and mediators of HIV risk-related behavior, there is a potential for self-report bias. We therefore reanalyzed the final model using a protective family process index with the two measures for which parent-report only was available (risk communication and relationship quality). The model with parent report [$\chi^2(72) = 101.44$, $p = .013$; $\chi^2/df = 1.41$ CFI = .9657; RMSEA = .046 (.022, .066)] replicated the previous findings. The link between protective family processes and academic engagement was attenuated but still significant ($\beta = .19$, $p < .05$).

To test the generalizability of the final model across gender, we conducted a series of multigroup analyses contrasting models for males and females (Byrne, 2001). For these analyses, we first estimated a two-group invariance model by imposing equality constraints on every estimate. We then relaxed one equality constraint at a time for each of the regression coefficients in the model, allowing the coefficient to differ across groups, and re-estimated the model. If the coefficients differed across groups, relaxing the equality constraint would result in a significant improvement in fit. Two paths were significantly different for males versus females. Relaxing the equality constraint on the link between protective family processes and academic engagement resulted in a significant change in model fit based on the chi-square [ΔX^2 (1) = 12.53, $p < .001$].This path was significantly stronger for females ($\beta = .32$, $p < .001$) than for males ($\beta = .23$, $p = .005$), though both were significant. Stability in HIV-related behavior from wave 1 to wave 3 was also conditioned by gender [ΔX^2 (1) = 4.91, $p = .027$]. This path was significantly stronger for males ($\beta = .41$, $p < .001$) than for females ($\beta = .21$, $p = .038$).

Discussion

Using a longitudinal design, we tested a model specifying the processes linking family protective processes in early adolescence to HIV-related risk behavior during emerging adulthood with a sample of African American youth. The results indicated that protective family processes assessed in early adolescence were associated significantly with HIV-related behavior in emerging adulthood; academic engagement, evaluations of prototypical risk-taking peers, and affiliations with risk-promoting peers accounted for this link. The results of lagged analyses suggest a particular sequence of intervening intrapersonal and social processes through which family protective processes might be associated with later outcomes. Protective family processes predicted academic engagement, which in turn was associated with negative evaluations of prototypical risk-taking peers, which was associated with peers who did not promote risk behavior—the most proximal predictor of HIV-related behavior. Academic engagement, a proximal predictor of protective family processes, directly predicted HIV-related risk behavior across time, net of the effects of prototype evaluations and affiliations with risk-promoting peers.

Study results are consistent with past research demonstrating that positive family relationships foster conventional attitudes in youth that subsequently affect their selection of risk-promoting peers (Brody et al., 1998; Brook & Brook, 1996). Youth who experienced more protective family processes reported high levels of academic engagement and, indirectly, negative evaluations of prototypical risk-taking peers. When prototype evaluations and academic engagement were modeled as mediators of affiliations with risk-promoting peers, no direct effects of protective family processes on risk-promoting peer affiliations were evident. This may be contrasted to direct effects models of parenting on peer affiliations (Dishion & McMahon, 1998). The lack of direct effects may be the result of considering multiple protective family processes in addition to parental monitoring, which

tends to correlate most strongly (compared with other family processes) with peer affiliations.

The finding that academic engagement was a proximal predictor of protective family relationships is consistent with findings that family factors such as relationship quality and parental monitoring foster academic achievement and engagement among African American youth (Brody et al., 2004; Mandara, 2006). Prior research suggests that protective family processes may affect academic engagement by supporting youths' confidence in meeting academic challenges (Taylor & Lopez, 2005), and fostering high levels of self-regulation (Brody et al., 2002). In the present study, although protective family processes was linked to academic engagement in both males and females, these processes demonstrated stronger associations for emerging adult women than men. Past research on gender differences in the effects of family protective processes on aspects of academic functioning and engagement are mixed, with some studies finding stronger effects for girls, others for boys, and others finding no differences (Annunziata, Hogue, Faw, & Liddle, 2006; Chen, Dornbusch, & Liu, 2007. In the present research, although the strength of the link varied, protective family processes were significant predictors for both girls and boys, suggesting the importance of protective family processes for both.

In our analyses, youth who evinced academic engagement at age 15 were less likely to engage in HIV-related risk behavior at age 19. This effect was both direct and mediated by peer affiliation. Greater attachment to school and to peers who do not promote risky behavior may render individuals less likely to contemplate risk behavior because they are both less likely to be involved with unconventional friends and more likely to avoid activities that would jeopardize their academic standings or future plans (Stacy & Newcomb, 1999). Studies also suggest that academically engaged youth evince high self-regulation (Rudolph, Lambert, Clark, & Kurlakowsky, 2001), which further protects them from HIV-related risk behaviors. The present study thus supports the need to address African Americans' academic engagement during middle school and high school. The loss of such engagement might be linked to a problematic trajectory for many African American adolescents that includes substance use, school dropout, and HIV-related risk behavior (Gutman, Sameroff, & Eccles, 2002; Roderick, 2003; Taylor, Casten, Flickinger, Roberts, & Fulmore, 1994).

Although not originally hypothesized in our heuristic model, we found that negative prototypes of risk-taking peers mediate the prospective associations between academic engagement and peer affiliations. Schools actively socialize students against risk behavior, particularly unsafe sexual activity and substance use. School sanctions and educational programs highlight the negative consequences of these behaviors. Youth who are invested in school may be more receptive to these messages or find their conventional leanings reinforced at school. Their evaluations of peers who engage in risk behavior might thus become negative, leading them to avoid friendships and activities with risk-taking youth. During a developmental stage when youth are particularly concerned with personal identity and "fitting in," identifying other academically oriented youth who avoid risk behaviors that may compromise their functioning at school plays a key cognitive role in the formation of peer subgroups (Gibbons et al., 2003).

Conclusion

The research design used in the current study enhances the findings' reliability and generalizability. Protective family processes were assessed from both parent and youth perspectives. Multiple indicators of latent constructs were used to assess exogenous variables and the 3 waves of panel data were gathered across 6 years. Several limitations of the study, however, must be noted. First, this study focused on African Americans living

outside of densely populated inner cities in Georgia and Iowa. The generalizability of these findings to other families is unknown. Second, the present study was not designed to specify the distinct domains of family behavior on youth mediators. Future studies are needed to determine whether specific parenting domains are associated with unique mediating factors. Although the prospective design of the study allows some evidence of temporal sequencing of variables, experimental designs are required to validate directions of effects. Finally, because data were not collected on youths' schools, it is not known if characteristics of the school context may have explained variability in individuals' mediating processes. These cautions notwithstanding, the present results describe ways in which parenting processes might promote school engagement and encourage negative prototypes of risk-taking peers while discouraging affiliation with such peers and deterring HIV-related risk behavior among African American youth across adolescence. Although interventions addressing these constructs have not yet been tested, designers of such programs might consider incorporating this information into their curricula to determine whether it enhances their programs' effectiveness.

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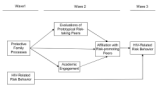

Figure 1.
Heuristic model.

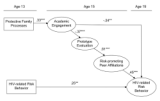

Figure 2.
Final model (#8). ** $p < .01$. *** $p < .001$.

Table 1

Correlation Matrix

Variables	1	2	3	4	5	6	7	8	9	10	11	12	13	14	15	16	17	18	19	20	21	22	23	24
Wave 1																								
1. Protective family processes	--																							
2. Sexual behavior	−-.24	--																						
ACADEMIC ENGAGEMENT																								
3. Grades	.19	−.21	--																					
4. Motivation	.20	−.24	.46	--																				
5. Relationships with teachers	.16	−.20	.30	.52	--																			
PROTOTYPE EVALUATION																								
6. Pregnant	−.24	.23	−.17	−.14	−.12	--																		
7. Sexually active	−.17	.23	−.05	−.18	−.13	.56	--																	
8. Substance using	−.20	.32	−.19	−.29	−.11	.55	.57	--																
R-P PEER AFFILIATIONS																								
9. Sexual norms	−.23	.55	−.29	−.33	−.17	.25	.33	.39	--															
10. Substance use	−.12	.40	−.27	−.20	−.11	.31	.33	.38	.68	--														
11. Unprotected sex norms	−.06	.42	−.16	−.25	−.15	.12	.04	.25	.65	.39	--													
Wave 2																								
ACADEMIC ENGAGEMENT																								
12. Grades	.21	−.13	.48	.37	.25	−.10	−.12	−.10	−.14	−.11	−.12	--												
13. Motivation	.31	−.18	.43	.49	.37	−.18	−.15	−.25	−.18	−.13	−.12	.61	--											
14. Relationships with teachers	.15	−.10	.31	.35	.42	−.10	−.04	−.17	−.13	−.05	−.11	.45	.66	--										
PROTOTYPE EVALUATION																								
15. Pregnant	−.17	.17	−.15	−.22	−.19	.35	.31	.27	.18	.27	.09	−.24	−.18	−.23	--									
16. Sexually active	−.19	.17	−.19	−.30	−.19	.21	.31	.18	.28	.24	.10	−.22	−.23	−.18	.57	--								
17. Substance using	−.19	.26	−.23	−.29	−.24	.26	.35	.46	.26	.28	.13	−.25	−.29	−.28	.54	.56	--							
R-P PEER AFFILIATIONS																								
18. Sexual norms	−.15	.120	−.29	−.23	−.13	.14	.26	.23	.46	.30	.24	−.19	−.22	−.20	. 36	.46	.38	--						
19. Substance use	−.13	.19	−.09	−.11	.05	.18	.25	.29	.35	.40	.16	−.13	−.12	−.04	.24	.25	.41	.53	--					
20. Unprotected sex norms	.039	.08	−.11	−.02	.06	.11	.12	.16	.22	.23	.16	−.08	−.06	−.03	.28	.19	.184	.62	.36	--				
Wave 3																								

Variables	1	2	3	4	5	6	7	8	9	10	11	12	13	14	15	16	17	18	19	20	21	22	23	24
HIV-RISK BEHAVIOR																								
21. Number of partners[a]	−.18	.22	−.22	−.27	−.24	.02	.17	.13	.41	.24	.30	−.19	−.30	−.24	.09	.16	.18	.39	.20	.11	--			
22. Sex with strangers	−.15	.31	−.21	−.24	−.27	.07	.19	.16	.35	.30	.23	−.13	−.22	−.19	.09	.22	.21	.34	.13	.03	.53	--		
23. Sex without condom	−.16	.19	−.13	−.14	−.12	.14	.14	.17	.24	.27	.08	−.16	−.19	−.02	.07	.18	.20	.16	.21	.09	..29	.17	--	
24. Substance use before sex	−.25	.36	−.16	−.14	−.23	.15	.17	.29	.42	.30	.26	−.11	−.23	−.20	.14	.13	.23	.13	.30	.16	.32	.33	.23	--
M	2.29	1.37	.04	23.63	11.06	15.12	17.25	14.10	2.15	−.00	1.56	.16	23.13	11.19	16.06	18.45	15.84	2.60	−.01	1.7	7.31	1.11	1.59	1.53
SD	1.12	.81	2.32	4.28	2.63	4.82	4.95	4.32	.10	1.00	.10	2.49	4.24	2.66	4.39	4.54	4.05	.95	1.03	.93	17.30	.89	.71	.72

Note. R-P: Risk-Promoting

Correlations with an absolute value ≥ .14 are significant at $p < .05$.

[a]Log of partners used for correlations. Mean and standard deviation are from raw data. Median number of partners = 3.

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Table 2

Measurement Models

Model		χ^2	*df*	*p*	χ^2/df	CFI	RMSEA
				Baseline and Mediator Models			
1	Baseline	.00	0	NA	NA	1.00	NA
2	Academic engagement	9.92	12	.62	.83	1.00	.00 (.00, .05)
3	Prototype evaluation	8.19	12	.77	.68	1.00	.00 (.00, .04)
4	Peer affiliations	15.00	12	.24	1.25	.99	.03 (.00, .07)
				Reciprocal Models			
5	Academic ↔ Prototype	58.26	43	.06	1.36	.98	.04 (.00, .07)
6	Academic ↔ Peers	46.71	44	.36	1.06	1.00	.02 (.00, .05)
7	Prototype ↔ Peers	70.08	45	.01	1.56	.97	.05 (.03, .08)
				Final Model			
8	Final	70.57	58	.12	1.22	.98	.03 (.00, .05)

Note. NA: not applicable

Table 3

Baseline and Mediational Models Predicting the Influence of Protective Family Processes on HIV-Related Risk Behavior

Model	Mediator	Family ↔ Mediator	Mediator ↔ HIV-Behavior	Family ↔ HIV-Behavior	Indirect Effect	Mediational Model Fit					
						χ^2	*df*	*p*	χ^2/df	CFI	RMSEA
1	None	--	--	−.18*	NA	2.05	3	.56	.68	1.00	.00 (.00, .11)
2	Academic engagement	.33***	−.34**	−.12	−.11*	17.69	17	.41	1.04	.98	.01 (.00-.07)
3	Prototype evaluation	−.23**	.18†	−.16	−.04	24.09	17	.12	1.42	.98	.05 (.00-.09)
4	Peer affiliations	−.18*	.51***	−.10	−.09*	34.57	17	.01	2.03	.93	.07 (.04-.11)

Note: NA: not applicable

* $p < .05$.

** $p < .01$.

*** $p < .001$.

Table 4

Lagged Reciprocal Analyses of the Associations Between Mediating Constructs

Model	Mediator Constructs	Wave 2 Paths Tested	β	Model Fit					
				χ^2	*df*	*p*	χ^2/df	CFI	RMSEA
5	Academic engagement ↔ Prototype evaluation	Academic → Prototype	−.38***	61.53	44	.04	1.40	.98	.05 (.01, .07)
		Prototype → Academic	.15						
6	Academic engagement ↔ Peer affiliation	Academic → Peer	−.26*	47.81	45	.36	1.06	1.00	.02 (.00, .05)
		Peer → Academic	.11						
7	Prototype evaluation ↔ Peer affiliation	Prototype → Peer	.33*	70.47	46	.01	1.53	.97	.05 (.03, .08)
		Peer → Prototype	.25						

* $p < .05$.

*** $p < .001$.