Family-Based Processes Associated with Adolescent Distress, Substance Use and Risky Sexual Behavior in Families Affected by Maternal HIV

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Abstract

The present study investigated how maternal HIV and mediating family processes are associated with adolescent distress, substance use, and risky sexual behavior. Mother–adolescent (ages 12–21) dyads (N=264) were recruited from neighborhoods where the HIV-affected families resided (161 had mothers with HIV). Mediating family processes were youth aggressive conflict style, maternal bonding, maternal role reversal expectations, and overall family functioning. Results of structural equation modeling indicated that youth aggressive conflict resolution style was strongly associated with adolescent distress, substance use, and risky sexual behavior. In HIV-affected families, youth less frequently reported using an aggressive conflict resolution style and more

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frequently reported positive maternal bonds; their mothers reported less positive family functioning than control families. Finally, maternal distress indirectly affected adolescent distress and risk behavior via youth aggressive conflict resolution style.

INTRODUCTION

In the United States, 28% of adults infected with HIV are parents (Schuster et al., 2000). Among families affected by parental HIV, research consistently has shown the significant effects of maternal HIV status and distress on adolescent outcomes (Bauman, Silver, Draimin, & Hudis, 2007; Biggar et al., 2000; Forehand et al., 1998; Lester, Stein, & Bursch, 2003; Rotheram-Borus, Lee, Lin, & Lester, 2004; Rotheram-Borus, Stein, & Lester, 2006). The negative impact of maternal HIV may radiate throughout the family system via the mother's lessened ability to care for her family and for herself, creating strains in family dynamics (e.g., conflict). These stressors may negatively influence her children, leading to risk behaviors and emotional distress in her children (Rotheram-Borus, Flannery, Rice, & Lester, 2005).

Mothers who are HIV-positive tend to come from disadvantaged and impoverished neighborhoods and may have suffered a variety of difficulties along with their HIV status (Rotheram-Borus et al., 2002). The social and contextual stressors faced by minority women living in poverty may be more causative of, or associated with, problems among their children than their HIV-positive diagnoses (Bauman, Silver, & Stein, 2006). To understand the effect of parental HIV on adolescent mental health and behavioral outcomes fully, research must delineate the mediating family processes through which maternal HIV impacts children. There are several mediating family processes identified in previous research that could account for the impact of maternal distress on adolescent behavioral and emotional outcomes. The four most often posited mediating family process mechanisms are (a) increased family conflict, (b) problematic maternal bonding, (c) parent–child role reversal (i.e., "parentification"), and (d) decreased family functioning due to prior dysfunctional behaviors or due to maternal illness. In each case, the breakdown of these family processes can increase adolescent emotional distress and acting-out behaviors (e.g., increased sexual risk taking and substance use). Research on HIV-affected families to date has largely proceeded under the assumption that parental HIV infection exacerbates these family-based processes, which in turn leads to problems seen in children living in these families.

Central to adolescent psychosocial and behavioral outcomes is the role of family conflict. Family conflict can result from several factors including maternal emotional distress, which disrupts the relationship between mother and child, causing internalized (emotional distress) and externalized (substance use or sex risk behaviors) outcomes for the adolescent (Burt, McGue, Krueger, & Iacono, 2005; Forehand et al., 1998). Parent–adolescent conflict broadly impacts adolescent health behaviors (Black, Ricardo, & Stanton, 1997; Dashiff, Hardeman, & McLain, 2008; Shek, 1998; Stauffer, Emerson, & Donenberg, 2006). The stresses related to stigma, compromised health, and financial burden of parental HIV could all exacerbate conflict within family relationships (Alonzo & Reynolds, 1995; Andrews,

Williams, & Neil, 1993; Brown, Lourie, & Pao, 2000; Letteney & LaPorte, 2004; Reyland, Higgins-D'Alessandro, & McMahon, 2002; Rotheram-Borus, Robin, Reid, & Draimin, 1998). One might specifically hypothesize that those adolescents with adaptive coping skills, such as effective conflict resolution styles, will better manage stressful situations, such as family conflict, and therefore be less likely to engage in problem behaviors. Supporting this hypothesis, past research found a "contentious" adolescent conflict resolution style (defined as making threats or unreasonable demands or using forceful strategies to get one's way, with little regard for others) has been associated with a range of problem adolescent behaviors including low academic achievement, fighting, cigarette smoking, drinking, and marijuana use (Colsman & Wulfert, 2002). Likewise, an "aggressive" conflict resolution style has been associated with substance use among adolescents (Unger, Sussman, & Dent, 2003). Rubenstein and Feldman (1993), in their longitudinal study of 81 tenth-grade boys, found that those at greatest risk for both externalizing and internalizing problems used an aggressive style in response to interpersonal conflict.

Positive maternal bonding, which underscores a sense of emotional security within the mother and adolescent relationship, is exemplified by maternal caring and support, which influences adolescent psychosocial and behavioral outcomes. Positive parental bonding may act as a buffer to psychosocial stressors both within and outside of the family. Studies show that supportive, affirmative parent–child relationships positively impact adolescent adjustment over time (Sroufe, 2005). Lack of positive parent–child bonding has been linked to mental health problems in adolescents, such as depression and borderline personality disorder (Ingram & Ritter, 2000; Nickell, Waudby, & Trull, 2002).

For families affected by parental HIV illness, expectations of emotional role reversal or "parentification" in a child have been identified as a potentially problematic impact on the parent–child relationship (Stein, Riedel, & Rotheram-Borus, 1999). When an adolescent assumes increased caretaking roles within the family, there is a risk for missed developmental opportunity for that child. The potential for role reversal resulting from serious parental illness or incapacitation has been demonstrated to have variable consequences for adolescents. Whereas some studies show that parentified adolescents exhibit greater autonomy and better adaptive coping skills during later years (Murphy, Greenwell, Resell, Brecht, & Schuster, 2008; Stein, Rotheram-Borus, & Lester, 2007), parentification also has been shown in the short run to predict increased internalized emotional distress and externalized problem behaviors such as substance use and sexual risk taking (Stein et al., 1999).

"Family functioning" describes family interactions more broadly than those specific to parent–child relationships. Family functioning can refer to cohesion, expressiveness, organization, control, family values, conflict, and social orientation across the family system. The measurement of family functioning itself is the amalgamation of many earlier attempts at studying family dynamics (Bloom, 1985). Research has shown that less positive family functioning can lead to poorer health and adverse mental health outcomes among children, especially in the context of children living with parental illness (Gazendam-Donofrio et al., 2007; Ohannessian, Kerner, Lerner, & von Eye, 2000; Shek, 1998; Trask et al., 2003). Within research on families affected by HIV, Rosenblum and colleagues (2005)

found that positive family functioning was associated with greater resilience and negative family functioning was associated with affiliation with deviant peers and substance use among adolescents. However, Rosenblum and colleagues did not utilize a comparison group of non-HIV-affected families, so the specific impact of HIV in these processes was not examined.

Our overarching goal in this article is to examine adolescent emotional distress, substance use, and risky sex behaviors among families affected by HIV relative to similar neighborhood control families who are non-HIV-affected. There are two major aims of this article: (a) to delineate the specific family processes associated with adolescent distress and problem behaviors and (b) to understand what role the presence of HIV in the family plays in these processes by including and comparing a sample of HIV-affected and non-HIVaffected families. Recognizing that the association of these family processes with adolescent distress and problem behaviors may vary across developmental stages of adolescents, we explored potential differences for younger and older adolescents in the study.

We expected maternal distress and impaired family processes to be associated with adolescent distress and problem behaviors, especially among HIV-affected families. We expected adolescent age to be related to increased substance use and increased risky sexual behavior (Kotchick, Shaffer, Forehand, & Miller, 2001), but unrelated to youth emotional distress or to the underlying family processes. Adolescent gender and maternal ethnicity were not hypothesized to be correlated with family processes or adolescent distress or behaviors. Demographic variables were not expected to be related to each other. Structural equation modeling (SEM) was utilized as the analytic strategy because it allows for modeling of direct effects of HIV and demographic characteristics on youth behaviors and emotional distress while examining indirect effects of HIV status on mediating family process variables, which previous work has consistently demonstrated impact adolescent risk behaviors and emotional distress.

METHODS

Participants

Participants were recruited as part of a larger intervention study designed to reduce risky behavior among adolescents of mothers living with HIV. HIV-positive participants were recruited in Los Angeles County, California (refusal rate=6.4%) from January 2005 to October 2006. As part of the larger study, our inclusion criteria required that they were the mothers or primary female caregivers of at least one child between the ages of 6 and 20 living with them. The current study used only those youth between the ages of 12 and 21, along with their female caretaker. Mothers living with HIV (MLH) were recruited from HIV/AIDS clinics, general medical clinics, HIV/AIDS community based organizations, peer referrals, and the rosters of previous studies. MLH were approached in waiting rooms of clinics, referred by providers to study staff, or approached by members of the study staff after presentations to support groups or after reading promotional posters/flyers posted at participating agencies.

Neighborhood control mothers (NCM) were recruited through street outreach. After 25% of the MLH sample was recruited, the addresses of all participants were mapped. Five modal neighborhoods were identified based on clustering of MLH addresses. Screening and recruitment were conducted at grocery stores in these modal neighborhoods. Women of childbearing age were approached as they entered or left the participating market. Again, women were eligible to participate in the larger study if they were the mother or primary female caregiver of at least one child between the ages of 6 and 20 living with them. All eligible women were invited to participate in the study (refusal rate=53.0%). There were no specific quotas for racial/ethnic groups, and as a result, there are more African American women in the NCM group than there are in the MLH group. For both MLH and NCM, a $30 incentive was provided to complete the interview assessment. University of California Los Angeles Institutional Review Board approval was obtained for all study procedures, and all children and parents provided informed written consent/assent prior to enrollment. HIV-negative status among the NCM was determined by self-report.

In some cases, more than one child from a family participated in the study. To avoid dependencies in the data, only one child per family was allowed in the current analysis. We used information obtained from the mothers and their oldest child. The mean age of the youth in this study is 15.6 years (range=12–21 years, SD=2.4). Eighty-one percent were between 13 and 19 years of age. Because of the relatively wide range of ages of the youth and possible developmental differences, a supplementary analysis described in more detail next also tested whether there were substantive differences between younger and older youth on the variables used in this study.

Of the 264 mother–child pairs, 61% were MLH. The overall sample was 62% Latina, 32% African American, 6% others (White, Asian, or other). Among the Latina mothers, 70% were MLH; among the African American mothers, 45% were MLH. Among the mothers who were White, Asian, or other, 63% were MLH. Most of the MLH had disclosed their status to their children (84%). Nine of the children of the MLH were also HIV-positive. Because results may have differed without inclusion of the 9 youths who were HIV-positive, supplementary analyses were conducted in which those 9 youths were excluded. Results of these analyses are also reported next.

The average age of the mothers was 40.6 years. There was no difference between the ages of the NCM and the MLH (40.6 years among each group). Fifty-six percent of the entire sample of mothers had less than a high school education and 17% had a high school or general equivalency diploma (GED). Among the MLH, nearly 65% had less than a high school education and 13% had a high school diploma or GED. Among the NCM, 43% had less than a high school education and 25% had a high school diploma or GED. This difference was statistically significant (p<.01). Both groups were equally likely to have a romantic partner such as a husband or boyfriend, and there was no significant difference in the number of adults living in their households. The NCM had more children in their households (3.2 children vs. 2.3 in the MLH households; p<.01). The NCM had a higher average monthly income than the MLH (p<.01).

Latinas were primarily Spanish speaking (88%). All participants had the option to complete assessments in English or Spanish. Language preference was assessed based on the language used to conduct the interview. Literacy was low for many mothers, as approximately half of Latinas had not completed the eighth grade. All assessments were conducted by trained interviewers using laptop computers, with some sections pertaining to sex and drug risk conducted using audio-assisted computer self-interviewing software. For monolingual Spanish speakers, a validated Spanish language version of the Brief Symptom Inventory (BSI) was used (Asner-Self, Schreiber, & Marotta, 2006). When a validated Spanish language version was not available for standardized measures, and for demographic questions, the assessments were sent to a professional translation service where they were translated and then back translated for accuracy.

Measures

Background Variables

Mother's emotional distress: Mother's emotional distress was assessed by the BSI (Derogatis, 1975, 1992). Reliability and validity of the BSI has been well established in this extensively used measure (e.g., Derogatis & Savitz, 2000; Piersma, 1994), including with African American and Latino individuals (Hoe & Brekke, 2008, 2009). Mean scores from two subscales (Depression, coefficient a=.80; Anxiety, a=.79) were used as indicators of a latent variable of Emotional Distress; ratings ranged from 0 to 4. Items on the scale assessed whether the problem had bothered them during the past week. We included all items on the two subscales, including physical symptoms (which could be due to HIV or treatment), because symptoms due to either emotional or physical causes can be distressing.

Demographic characteristics: Demographic characteristics included age and gender of the child and HIV status of the mother. Age of the mother was not significantly associated with any of the model variables and was not included. Educational level of the mother, marital status, and monthly income were also originally considered for inclusion, but none of these variables were associated significantly with adolescent distress, substance use, or risky sexual behavior. In the interest of parsimony, they were not included either. To help account for the pre-existing ethnic differences between the two samples of MLH and NCM, both Latina and African American ethnicity were included in the analyses (each variable scored 0–1).

Mediating Family Dynamics Variables

Aggressive conflict style: Aggressive conflict style during maternal–child conflict was assessed with three subscales from the Conflict-Resolution Behavior Questionnaire (Rubenstein & Feldman, 1993). This scale assessed the conflict-resolution styles employed by the adolescents. It has been validated previously for adolescents (Rubenstein & Feldman, 1993). The scale assesses the adolescent's perception of style of conflict resolution employed by the participant as well as the frequency that style was employed. Subscales assessed verbal aggression by the child (i.e., the child yelled, screamed or insulted; coefficient a=.70), child violence (i.e., the child hit or threw things; coefficient a=.72), and

violence rate. How frequently the child hit and threw things during conflict (violence rate) was calculated based on responses to the violence items.

Positive maternal bonds: Positive maternal bonds was assessed by items that reflected maternal warmth and caring from the Parker Bonding Instrument, which was administered to the youth (Parker, 1990; Parker, Tupling, & Brown, 1979). Self-reported items were rated on a 1 (very unlikely) to 4 (very likely) scale. Higher scores indicated better bonds. The Parker Bonding Instrument has been tested repeatedly for test and re-test reliability and has satisfactory construct and convergent validity (Parker, 1983). Stronger bonds were characterized by child reports of parenting behavior that was highly caring (Rotheram-Borus et al., 2006). Example items included, "Your mother spoke to you with a warm and friendly voice" and "She appeared to understand my problems and worries." Coefficient alpha for the warmth and caring items was .79.

Expectations of emotional role reversal: Expectations of emotional role reversal was assessed by the Role Reversal subscale from the Adult-Adolescent Parenting Inventory completed by the mothers. Scores originally ranged from 1 (strongly agree) to 5 (strongly disagree). Items were reversed so that higher numbers would indicate more expectation of role reversal. All subscales in the Adult-Adolescent Parenting Inventory have been shown to be valid and reliable, and appropriate for adult parents (Bavolek & Keene, 2001). It has been used in studies among parents with HIV/AIDS in previous research (Rotheram-Borus, Stein, & Lin, 2001). The Role Reversal subscale has seven items (example: Children should be their parent's best friend). Coefficient alpha was 0.78. To avoid too many indicators in the model, we combined the items randomly to create three parcels of mean values as indicators of a latent variable of Role Reversal Expectations. Parceling is acceptable in structural modeling especially when alpha coefficients are high (Yuan, Bentler, & Kano, 1997).

Family functioning: Family functioning items were reported by the mothers, using items from the Family Functioning scale, which has been tested for reliability and validity in adult populations (Bloom, 1985). The three subscales that were used were Cohesion, Conflict (reversed), and External Locus of Control. Example items include, "Family members really help and support one another" (cohesion, coefficient a=.87), "Family members hardly ever lose their tempers" (conflict, a=.56), and "My family felt that they had very little influence over the things that happen to them" (external locus of control; a=.71). This Conflict subscale is different from "aggressive style used by adolescents during mother-child conflict" scale in two important respects: (a) This family functioning measure was completed by the parent, and (b) these items refer to conflict in the family globally, whereas the scale used with the child assesses specific conflict resolution strategies in a particular target relationship, in this case the mother.

Targeted Youth Variables—The youth variables were selected because they were all target outcomes of the intervention program in which the youth were enrolled. The program was designed to impact youth emotional distress, substance use, and sexual risk taking. For this analysis, our focus was on assessing how family processes are related to the "outcomes" or target behaviors at baseline, prior to being exposed to the intervention. This analysis also

allows for an understanding of how mediating family process variables may differently impact youth living with an HIV-infected mother or a healthy mother.

Youth emotional distress: Youth emotional distress was indicated with the depression (a=. 81) and anxiety (a=.81) subscales of the BSI as previously described.

Youth substance use: Youth substance use was a latent variable reflected by three indicators showing use of alcohol, hard drugs, and marijuana within the past 90 days. Frequency of alcohol use ranged from 0 (never) to 8 (every day or almost every day). Marijuana use was assessed in the same manner as alcohol use. Hard drug use frequency was a sum of frequency measures similar to those described for alcohol use. Hard drugs included inhalants, party drugs, LSD, stimulants, cocaine, opiates, barbiturates, sedatives, heroin, and drug injection.

Youth sexual risk behavior: Youth sexual risk behavior was assessed by one item indicating the number of times they had sex without a condom in the past 6 months. The item was extremely skewed and kurtoses so it was transformed to its square root for the analysis. The original range was 0 to 200 with a mean of 2.2 and a standard deviation of 15.0.

Data Analysis

The analytic method used in this study was SEM with latent variables using the EQS structural equations program (Bentler, 2006). Latent variable analysis allows one to evaluate directional hypotheses with correlational, nonexperimental data. Goodness-of-fit of the models was assessed with the maximum-likelihood chisquare statistic (M-L X^2), the comparative fit index (CFI), the Satorra-Bentler chi-square (S-B X^2), the robust comparative fit index (RCFI), and the root mean square error of approximation (RMSEA; Bentler, 2006). The Robust S-B X^2 was used in addition to the maximum likelihood X^2 because it is more appropriate when the data depart from multivariate normality. The multivariate kurtosis estimate was high (z statistic=55.69) rejecting multivariate normality. The CFI and RCFI range from 0 to 1 and reflect the improvement in fit of a hypothesized model over a model of complete independence among the measured variables. CFI and RCFI values at .95 or greater are desirable, indicating that the hypothesized model reproduces 95% or more of the covariation in the data. The RMSEA is a measure of lack of fit per degrees of freedom, controlling for sample size, and values less than .06 indicate a relatively good fit between the hypothesized model and the observed data.

An initial confirmatory factor analysis (CFA) assessed the adequacy of the hypothesized measurement model and the associations among the latent variables and the single item variables. Then a latent variable path model positioned background variables of mother emotional distress, HIV status, child age and gender, and ethnicity as statistical predictors of the intermediate family measures of adolescent aggressive conflict style, positive maternal bonds, positive family functioning, and maternal expectations of role reversal, which in turn predicted the variables youth emotional distress, youth substance use, and youth sex risk behavior. Initially the model was tested with no direct paths from the background variables

to the targeted youth variables. However, based on results of the LaGrange Multiplier Test (Bentler, 2006), which suggests significant paths that can improve the fit of the model and that should be included in the model, additional associations were allowed between some of the background demographic variables and the targeted youth variables. For instance, we expected that older adolescents would be more likely to engage in substance use and sexual behavior and that direct pathways would be necessary. We also report the significant indirect effects of all of the background variables on the targeted youth variables that were mediated through the family dynamics variables.

RESULTS

Confirmatory Factor Analysis

Table 1 reports summary statistics of the measured variables and the factor loadings of the hypothesized factor structure. In addition, separate means and standard deviations are reported for the MLH and NCM samples. All factor loadings were significant ($p<.001$). Fit indexes for the CFA model were excellent: M-L $X^2(202)=322.08$, CFI=.95, RMSEA=.048, 90% confidence interval (CI) for RMSEA=.038 .057; S-B $X^2(202)=276.40$, RCFI=.95, RMSEA=.037, CI= .026 .048. Only one supplementary correlated error residual was added to this model based on a suggestion from the LaGrange Multiplier Test. This association was between the two violence indicators in the Youth Aggressive Conflict Style scale.

Table 2 reports the bivariate correlations among the variables in the model before the directional hypothesized path model was tested. Age and female gender were significantly correlated in the sample of youth. As previously reported, Latina mothers in the sample were more likely to be HIV-positive, and the African American mothers were less likely to be HIV-positive. Latina mothers were more likely to report poorer family functioning and expectations of emotional role reversal. African American mothers were more likely to report positive family functioning and less expectation of role reversal.

Positive family function was negatively associated with maternal expectations of role reversal and youth emotional distress. Positive maternal bonds was negatively associated with youth aggression during maternal–child conflicts. Emotional distress in the mother was highly associated with being HIV-positive and was negatively associated with better family functioning. Poorer family functioning was associated with being HIV-positive.

As expected, older youth were more likely to report sex risk behavior and substance use. Girls were more likely to report exhibiting aggression during conflicts with their mothers, and also reported more emotional distress. Youth aggression during conflicts was also positively associated with all targeted youth variables including emotional distress, substance use, and sex risk behavior, whereas positive maternal bonds were negatively associated with these targeted youth variables.

Final Path Model

The final structural equation model after model trimming is presented in Figure 1. Paths were trimmed gradually following the procedure of MacCallum (1986) in which the most minimal nonsignificant paths and correlations are dropped sequentially until none remain in

the model. As expected, older adolescents were more likely to report substance use and sexual behavior. Thus, direct paths from the background demographics and targeted youth variables were allowed between age and these constructs. Except for a path between African American ethnicity and less substance use, no nonhypothesized paths or correlations were added to this model. Fit indexes were very good: M-L $X^2(256)=382.57$, CFI=.95, RMSEA= .043, CI=.034 .052; S-B $X^2(256)=335.61$, RCFI=.95; RMSEA=.034, CI=.023 . 044. Not all significant bivariate relationships noted in the CFA remained in the path model.

Only one background variable other than age was associated with a targeted youth variable. Children of African American mothers reported significantly less substance use. However, there were several important relationships between background variables and the mediating family measures. An aggressive style used by the youth during conflict with the mother, a pivotal construct in the model, was associated with greater maternal emotional distress, being a girl, and being the child of a mother who was HIV-negative. MLH reported less positive family functioning but were described by their children as warm and accepting. Latina ethnicity in the mother was correlated with role reversal expectations and less positive family functioning. Significant correlations among the variables indicate that the African American mothers reported less emotional distress and that the HIV-positive mothers reported more emotional distress. Variations in ethnic differences associated with HIV status were at least partially accounted for through inclusion of both Latinas and African American ethnicity in the model but cannot be ruled out entirely.

The family measures were significantly related to youth emotional distress and risk behaviors. More youth aggression during conflicts was associated with all three maladaptive youth behaviors and distress. Positive maternal bonds was associated with less youth substance use and positive family functioning was associated with less youth emotional distress. More expectation of role reversal by the mothers was associated with fewer reports by youth of substance use.

Supplementary Analyses

Exclusion of HIV-Positive Youth—The CFA model and the final path model were tested using a smaller data set without the 9 HIV-positive youth. Results were essentially the same. For the CFA model, because chi-square is based on sample size multiplied by a minimized function, the loss of 9 participants caused a very small decrease in chi-square for the maximum likelihood solution and practically no change at all to the robust solution. The fit without the 9 youths was M-L $X^2(202)=318.80$, CFI=.95; S-B $X^2(202)= 276.19$, RCFI=. 95. Correlations and factor loadings were the same or nearly the same (e.g., no more than single unit differences such as a correlation of .14 vs. one that is .15). We also used this new set of youth in the final path model and again the results were almost exactly the same: M-L $X^2(256)=380.59$, CFI=.95; S-B $X^2(256)= 336.93$, RCFI=.95. The only difference was that the significant path between positive family functioning and less youth emotional distress was no longer significant in this model. The regression coefficient went from .12 (p .05) to .10 which was nonsignificant. The difference between the two coefficients is not significant itself, but this is an interesting finding. It would need to be explored in a much larger sample of HIV-positive youth to see if it has important ramifications.

Multisample Model Comparing Younger (12–16) and Older (17–21)
Adolescents—The sample was divided in two groups: For the 17 to 21 group, N=109, and for the 12 to 16 group, N=155. First a baseline model was tested that did not impose any constraints between the groups. Fit indexes were acceptable: ML X^2(402)=512.83, CFI=.95; S-B X^2(402)=490.85, RCFI=.94. Constraints on the measurement model were added by setting each factor loading equal in the two data sets. This step produced no decrement in fit: X^2(19)=25.02. This meant that both groups related to the questionnaire items in the same fashion and that their factor structures were equivalent. The next step involved constraining the covariances between the groups to equality. This model also produced no significant decrement in fit: X^2(67)=75.70. Only one of the 55 constraints between the covariances was reported as untenable, the correlation between positive family functioning and conflict (.19 in the younger group and .07 in the older group). The final path model was then contrasted in the two groups. The chi-square difference when setting the paths to equality was 17.99 (df=16). No constraint in the path model was untenable. Thus, the groups were almost identical in terms of relations among the variables in the model.

Indirect Effects—One strength of the SEM approach is the capacity to examine both direct and indirect effects in the multivariate model. There was a significant indirect effect of child female gender on greater youth emotional distress (p .001), substance use (p .01) and sex risk behavior (p .01) mediated through the positive association between female gender and conflict.. Youth substance use was indirectly and negatively associated with Latina ethnicity of the mother (p .01) and less likelihood of the mother being HIV-positive (p .05). The indirect effect for Latina mothers was mediated by expectations of role reversal and for HIV-positive mothers by less youth conflict and better maternal bonds.

DISCUSSION

The primary contributions of this article are that it delineates several family-based processes that are related to emotional distress, substance use, and HIV risk behaviors among adolescents and identifies which of these processes are related to maternal HIV. Regardless of parental HIV status, the family process measures were related to adolescent emotional distress, substance use, and sexual risk taking in anticipated ways. A higher level of youth aggression during family conflict was strongly associated with all three targeted youth variables: emotional distress, substance use, and risky sex behaviors among the adolescents. This finding is consistent with past research (Colsman & Wulfert, 2002; Rubenstein & Feldman, 1993; Unger et al., 2003) and our hypothesis that adolescents with effective conflict resolution styles will better manage stressful situations and be less likely to engage in problem behaviors.

Greater maternal bonding was associated with less youth substance use, which is consistent with previous findings demonstrating the protective impact of parental bonding on adolescent adjustment and mental health outcomes (Ingram & Ritter, 2000; Nickell et al., 2002; Sroufe, 2005). Role reversal expectations or "parentification" by mothers was also associated with youth reports of less substance use, which is in keeping with several studies reporting beneficial outcomes associated with role reversal for adolescents (e.g., Murphy et al., 2008; Stein et al., 2007; Tompkins, 2007b). Witte and de Ridder (1999) reported that for

youth, taking on roles previously filled by their HIV-positive mother was a way they felt they could "give back" to their mother. Tompkins (2007b) suggested that this construct taps into emotional closeness. Caffery and Erdman (2000) posited that attending to the needs of other family members allows these adolescents to successfully avoid focusing on their own anxiety related to the lack of parental support. Of interest, neither positive maternal bonds nor role reversal expectations were related to adolescent emotional distress or risky sex behavior.

Consistent with prior work, better family functioning was associated with less youth distress (Gazendam-Donofrio et al., 2007; Ohannessian et al., 2000; Rosenblum et al., 2005; Shek, 1998; Trask et al., 2003). However, this relationship was not significant when the 9 youths with HIV were dropped from the analysis. Further, better family functioning was not associated with less substance use or risky sexual behavior. Results strongly suggest that youth aggression during family conflict, the only mediating variable that was strongly associated with all three targeted youth variables, is an important point of intervention.

Race and ethnicity were associated with several results in the final model. In particular, Latina mothers reported lower positive family functioning and more expectations of role reversal. Adolescents with African American mothers reported less substance use. Interpreting these racial and ethnic findings is difficult without comprehensive data examining culture, which do not exist in the present data set. It is unclear if and/or how local cultural influences differentially impact either youth risk behavior or youth reports of such behavior. For example, in our sample, Latina mothers had strong expectations of role reversal or parentification. One might hypothesize this is due to maternal reliance on their children for interacting with others who do not speak Spanish (Weisskirch, 2005).

The unique contribution of maternal HIV was assessed by including a reasonably comparable sample of families that are not impacted by maternal HIV. The presence of HIV-affected family processes in complex and unexpected ways. Adolescents in families affected by HIV reported less aggressive communication styles during mother–child conflict and more positive mother–child bonds than did youth in the control group made up of noninfected families. Mothers affected by HIV, however, reported lower levels of family functioning (cohesion, external locus of control, family conflict) relative to the nonaffected families. Most of the existing literature on parental HIV has argued that HIV adds stresses to the family, which can negatively affect family dynamics and lead to poorer outcomes among adolescent children (Bauman et al., 2007; Rotheram-Borus et al., 2003; Rotheram-Borus et al., 2006; Stein et al., 1999; Tompkins, 2007a; Witte & de Ridder, 1999). Here, the data suggest that mothers would agree with this assessment but their children would not. It may be that the increased stresses brought on by the disease provide families not only with challenges but also with opportunities for coming together and manifesting their resilience with positive and warm parent–child relationships. This opportunity may be more apparent in our sample as, contrary to previous research (Armistead, Tannenbaum, Forehand, Morse, & Morse, 2001), most of the mothers disclosed their HIV status to their children. On the other hand, youth of HIV-positive mothers might be more protective of their parent and therefore less self-disclosing of problems in general than those adolescents from noninfected families.

Previous research consistently has shown linkages between maternal mental health symptoms and adolescent distress in HIV-affected families (Rotheram-Borus et al., 2003; Rotheram-Borus et al., 2006; Stein et al., 1999; Stein et al., 2007; Tompkins, 2007a; Witte & de Ridder, 1999). This analysis revealed that family process variables mediated this relationship. These results also demonstrated that mothers living with HIV reported higher levels of emotional distress and that their higher levels of emotional distress were associated with more youth aggression during mother–child conflict. Maternal mental health/distress, however, was not directly correlated with targeted youth variables.

There are two primary limitations to the present study. First, this is a cross-sectional analysis, which means that attributions of causality or a temporal or directional influence among the hypothesized mediators and outcomes cannot be made (MacCallum, Wegener, Uchino, & Fabrigar, 1993). Some establishment of directionality in the model is reasonable such as the positioning of HIV status and the demographic variables. Other causal directions, however, are open to interpretation. For example, the final model has a directional path which suggests that less positive family functioning may "cause" or influence adolescent emotional distress, yet logically it is plausible that the emotional distress or problem behaviors of a child can decrease positive family functioning. In addition, mediation that we observed in this study may not be valid given that other models that place the data in other positions are possible. Our study focused on the impact of family process variables on dysfunctional problem behaviors among adolescents. Consequently the hypothesized structure of the model reflected this focus.

Second, both samples are convenience samples. The HIV-affected families were recruited from clinical care settings and the control families were recruited at public venues in the modal neighborhoods. The generalizability of any data set is dependent upon how it is collected. In this case we feel confident that our control group families are sufficiently comparable to the HIV-affected families because they are drawn from the same neighborhoods and have generally similar backgrounds. However, there may be unforeseen biases introduced by the recruitment process. For example, the control families who agreed to participate in the study may be different from the more than 50% who refused. They may have been more prosocial or had greater financial need for the assessment incentive than those who refused. It is also possible that some control group mothers were positive for HIV/AIDS but did not know it or did not wish to disclose it to us. Likewise, we relied on self-report related to the HIV status of the youth, resulting in similar potential biases. Inconsistent with previous studies, most of the mothers living with HIV in our sample had disclosed their HIV status to their children. It is not known if this high level of self-disclosure reflects decreased stigmatization related to HIV infection that has occurred over time, or if our sample is biased in this regard. Finally, Latinas were the largest group among both the MLH and neighborhood controls (70% and 49%, respectively); however, the neighborhood group had a larger proportion of African American mothers (45%) than did the MLH group (23%). These ethnic differences in group composition were mitigated to some extent through inclusion of both Latina and African American ethnicity in the model as separate variables.

Implications for Research, Policy, and Practice

These data reinforce the need for designing effective family-based interventions for HIV-affected families to decrease emotional distress of the mother living with HIV, improve family functioning, and, perhaps most important, teach parents and youth effective communication and conflict resolution skills. Interventions can build upon the positive relationships that exist among the mothers and their children that are associated with better youth outcomes. This article confirms that family-based processes can impact youth mental health, substance use, and risky sex behaviors, regardless of family HIV status. Ethnic differences such as those found in our model should also be considered in designing family-based programs. For example, there were marked differences between African American and Latina mothers in their expectations of parent–child role reversal, which was associated with differing youth reports of substance use. Youth of African American mothers were less likely to report substance use; however, it is unclear if they use less or are more likely to conceal their use. This finding requires further examination and suggests that interventions to support families need to be customized according to cultural understanding of family roles and relationships.

Future research would benefit from looking at family-based process variables over time. A longitudinal analysis would allow for a greater understanding of the directionality of influence of the model. It would be instructive to know how maternal HIV impacts adolescent development over time, especially in a sample such as this one where maternal HIV status disclosure was the norm. Likewise, it would be helpful to know if family-based processes differ in families that include children living with HIV. Past research suggests efficacy for parent and youth training programs (Forehand et al., 2007; Rotheram-Borus et al., 2004). The data for this study come from baseline measures in just such an intervention trial, and future analyses will look both at changes in behavioral outcomes and at how positive changes in family-based processes over time mediate these outcomes in families affected by HIV.

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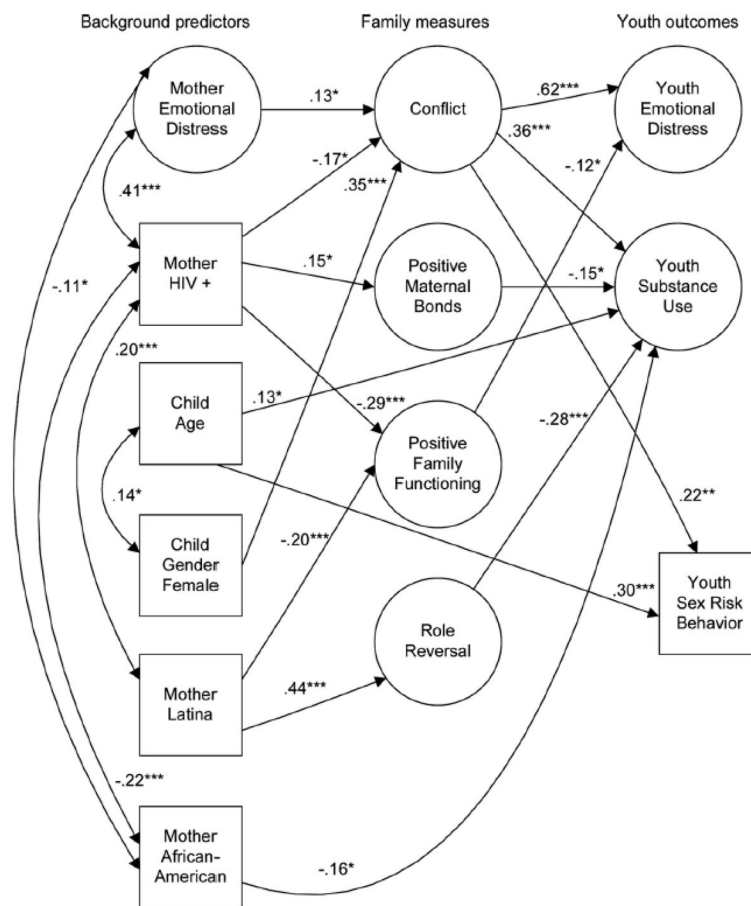
FIGURE 1.
Significant regression paths among latent and measured variables in the structural equation model assessing demographic, maternal, and family function influences on youth outcomes (*N* = 264). *Note:* Conflict and positive maternal bonds were assessed among the youth, positive family functioning and role reversal was assessed among the mothers. Regression coefficients (represented as one-way arrows) and correlations among the predictors (represented by double-headed arrows) are standardized. *p< .05. **p < .01. ***p< .001.

TABLE 1

Summary Statistics and Factor Loadings of Measured Variables in the Confirmatory Factor Analysis

Variables	Total Sample M (SD)	MLH M (SD)	NCM M (SD)	Factor Loading[a]
Background Predictors				
Mother Emotional Distress				
Depression	1.61 (0.67)	1.82 (0.69)	1.29 (0.46)	.89
Anxiety	1.60 (0.67)	1.77 (0.72)	1.33 (0.47)	.81
Mother HIV+ (0 = no, 1 = yes)	0.61 (0.49)	1.00	0.00	1.00
Youth Age (range = 12–20 years)	15.6 (2.43)	15.5 (2.44)	15.8 (2.42)	1.00
Youth Gender (1 = male, 2 = female)	1.58 (0.50)	1.60 (0.49)	1.54 (0.50)	1.00
Mother Latina (0 = no, 1 = yes)	0.62 (0.49)	0.70 (0.46)	0.49 (0.50)	1.00
Mother African American (0 = no, 1 = yes)	0.32 (0.47)	0.23 (0.43)	0.45 (0.50)	1.00
Family Measures				
Youth Aggressive Conflict Style				
Verbal Aggression	6.51 (6.34)	6.14 (5.92)	7.11 (6.94)	.79
Presence of Violence	0.71 (1.82)	0.57 (1.34)	0.95 (2.38)	.64
Violence Rate	0.23 (0.42)	0.23 (0.42)	0.25 (0.42)	.53
Positive Maternal Bonds (1–4)				
Warm and Friendly Voice	3.39 (0.76)	3.45 (0.72)	3.29 (0.80)	.73
Understand Problems	3.20 (0.86)	3.29 (0.85)	3.05 (0.87)	.74
Affectionate	3.39 (0.74)	3.43 (0.73)	3.32 (0.75)	.76
Positive Family Functioning				
Cohesion	8.12 (1.50)	7.88 (1.75)	8.50 (0.89)	.79
Conflict (Reversed)	7.99 (1.21)	7.73 (1.33)	8.41 (0.83)	.77
External Locus of Control	7.95 (1.32)	7.63 (1.49)	8.46 (0.76)	.83
Maternal Role Reversal Expectations				
Role Reversal 1	2.70 (0.79)	2.80 (0.80)	2.54 (0.75)	.63
Role Reversal 2	1.98 (0.92)	2.02 (0.95)	1.92 (0.87)	.71
Role Reversal 3	2.12 (0.83)	2.20 (0.88)	1.99 (0.74)	.87
Youth Outcomes				
Youth Emotional Distress				
Depression	1.36 (0.54)	1.39 (0.57)	1.32 (0.48)	.73
Anxiety	1.33 (0.51)	1.33 (0.52)	1.33 (0.50)	.78
Youth Substance Use (past 90 days; 0–8)				
Alcohol Use	0.60 (1.32)	0.60 (1.38)	0.59 (1.24)	.63
Hard Drug Use	0.32 (1.55)	0.35 (1.53)	0.29 (1.60)	.45
Marijuana	0.29 (0.83)	0.22 (0.75)	0.41 (0.94)	.88
Youth Sex Risk Behavior[b] (0–200)	2.19 (15.01)	2.60 (18.5)	1.55 (6.19)	1.00

Note. Total *N* = 264; mothers living with HIV (MLH) = 161; neighborhood control mothers (NCM) = 103.

[a] All factor loadings significant, *p* < .001. Factor loadings reported for combined sample.

[b] Square root used in the analysis due to skewness and kurtosis. Actual means and standard deviations reported above.

TABLE 2

Correlations Among Latent and Measured Variables

Variables	1	2	3	4	5	6	7	8	9	10	11	12
1. Mother Emotional Distress	—											
2. Mother HIV+	.42***	—										
3. Child Age	-.02	-.07	—									
4. Child Gender^a	.02	.06	.14*	—								
5. Mother Latina	.04	.21***	-.07	.01	—							
6. Mother African American	-.15*	-.23***	.09	-.06	-.88***	—						
7. Conflict	.06	-.11	-.03	.36***	-.05	.02	—					
8. Positive Maternal Bonds	-.01	.14*	-.03	-.05	-.04	.00	-.38***	—				
9. Positive Family Functioning	-.22***	-.33***	-.04	-.12*	-.27***	.27***	-.18*	.03	—			
10. Role Reversal	.12	.14*	.02	-.04	.45***	-.36***	.10	-.17*	-.21**	—		
11. Youth Emotional Distress	-.01	.03	-.01	.26***	.02	-.04	.69***	-.22**	-.20**	.11	—	
12. Youth Substance Use	.03	-.10	.12*	.07	.03	-.05	.45***	-.24**	-.08	-.17*	.12	—
13. Youth Sex Risk Behavior	.12	-.04	.30***	.09	-.03	.06	.22**	-.14*	-.10	.06	.10	.13*

Note. $N = 264$.

^a Child gender: 1 = male, 2 = female.

*
$p < .05$.

**
$p < .01$.

***
$p < .001$.