

Knowledge of Maternal HIV/AIDS and Child Adjustment: The Moderating Role of Children's Relationships with their Mothers

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Abstract The current study examined whether child-reported maternal warmth and support moderated the association between knowledge of maternal illness and child psychosocial adjustment among 86 low-income, African American mothers with HIV/AIDS and their non-infected children. Mother–child relationship quality moderated the association between children's knowledge of maternal HIV/AIDS and children's externalizing, but not internalizing, difficulties. Consistent with the stress-buffering hypothesis, a warm and supportive mother–child relationship afforded a more robust buffer against externalizing difficulties for children who knew of their mother's illness than for children who did not. Clinical implications and future directions are discussed.

Keywords African American · HIV/AIDS · Mother–child relationship quality · Child adjustment

Introduction

Although African Americans make up approximately 12% of the United States population, they account for nearly 40% of the HIV/AIDS cases diagnosed since

the epidemic began [Centers for Disease Control and Prevention (CDC), 2004a]. HIV/AIDS has disproportionately affected African American women in particular, with disease rates among African American women exceeding those of women and men in all other racial/ethnic groups (CDC, 2004b). In fact, HIV/AIDS is among the top four causes of death for all African American women aged 20–54 years and is the leading cause of death for African American women of childbearing age (25–34 years) (Anderson & Smith, 2003). Accordingly, a growing number of African American women with HIV/AIDS are also mothers and must contemplate how their children will cope with the knowledge that their mother is infected with a stigmatized and life-threatening disease (e.g., Armistead, Tannenbaum, Forehand, Morse, & Morse, 2001).

A mother's disclosure of any chronic or life-threatening illness to her child is often accompanied by some level of hesitation or worry regarding the child's reaction (Semple et al., 1993; Tompkins, Henker, Whalen, Axelrod, & Comer, 1999). Mothers with HIV/AIDS may be particularly worried about their children learning of their illness given the stigma associated with the disease, as well as the methods of transmission (Herek, 1999; Armistead et al., 2001; Kirshenbaum & Nevid, 2002). Perhaps for these reasons, maternal disclosure of HIV/AIDS has not been associated with the same sense of relief experienced by mothers who disclose other life-threatening, but less stigmatized diseases, such as cancer (Armistead, Morse, Forehand, Morse, & Clark, 1999; Levy et al., 1999). It is not surprising then that only about one-third of mothers with HIV/AIDS disclose their disease to their children, even as the disease progresses

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and death becomes more imminent (Murphy, Koranyi, Crim, & Whited, 1999; Armistead et al., 2001; Murphy, Steers, & Stritto, 2001).

If mental health professionals are to better counsel mothers regarding the impact that the knowledge of their HIV/AIDS will have on their children, more research attention needs to be devoted to this question. The small but growing body of qualitative (e.g., Rotheram-Borus, Draimin, Reid, & Murphy, 1997; Tompkins et al., 1999; Kirshenbaum & Nevid, 2002) and quantitative (e.g., Forsyth, Damour, Nagler, & Adnopo, 1996; Murphy et al., 2001; Shaffer, Jones, Kotchick, Forehand, & The Family Health Project Research Group, 2001) work suggests that child adjustment in response to the knowledge of maternal infection varies widely across families. Although some findings suggest that children's knowledge of maternal HIV/AIDS is associated with more compromised outcomes for children, such as behavior problems and depressive symptoms (e.g., Forsyth et al., 1996), other authors have reported an increase in positive child adjustment, including enhanced self-esteem, among children who know of their mothers' infection (e.g., Murphy et al., 2001).

In part, the mixed findings regarding the adjustment of children who learn of their mothers' HIV/AIDS may be accounted for by varying methods across studies (e.g., Forsyth et al., 1996; Murphy et al., 2001; Shaffer et al., 2001). For example, child outcomes across the aforementioned studies depends, at least in part, on the reporter of child psychosocial adjustment (e.g., mother versus child), as well as the outcome of interest (e.g., internalizing versus externalizing). In addition to methodology, however, the inconsistent results of previous studies suggest that a third variable may qualify the association between knowledge of maternal HIV/AIDS and child psychosocial adjustment. The current study examines one potential moderator: children's reports of the quality of their relationship with their mother.

A robust literature documents the association between mother-child relationship quality and child adjustment (e.g., Lamborn, Dornbusch, & Steinberg, 1996; Pittman & Chase-Lansdale, 2001; Brennan, Le Brocque, & Hammen, 2003). Mothers who engage in more warm and supportive parenting behaviors have children who evidence fewer adjustment difficulties, including fewer internalizing, and externalizing difficulties (e.g., Dodge, Pettit, & Bates, 1994; Armistead, Forehand, Brody, & Maguen, 2002; Vandewater & Lansford, 2005). Moreover, a warm and supportive mother-child relationship has been shown to buffer children from a range of psychosocial stressors, includ-

ing many maternal physical illnesses (see Armistead, Klein, & Forehand, 1995; Korneluk & Lee, 1998 for reviews). Children who learn of their mothers' illness in the context of a warm and supportive relationship appear to evidence fewer adjustment difficulties than those whose relationships with their mothers are less positive.

The purpose of the current study was to examine children's perceptions of the quality of their relationships with their mothers as a moderator of the association between knowledge of maternal HIV/AIDS and child adjustment among a low-income, urban African American sample. The stress-buffering hypothesis posits that the protective effects of social relationships depend on the level of stress to which individuals are exposed, with positive relationships serving an increasingly protective function as individuals in the relationship are exposed to increasing levels of stress (Cohen & Wills, 1985). Given the relatively high degree of stress to which low-income African American families residing in urban neighborhoods are exposed and the impact of such stressors on child and family functioning (e.g., Forehand & Jones, 2003; Jones, Foster, Forehand, & O'Connell, 2005; Jones, Forehand, O'Connell, Brody, & Armistead, 2005), it is predicted that children in the study who perceive their relationships with their mothers to be more warm and supportive will evidence fewer adjustment difficulties regardless of their knowledge of maternal illness; however, it is predicted that among children who know of their mothers' HIV/AIDS diagnosis, an additional stressor which not only poses the threat of stigma, but also the threat of maternal sickness and loss, the buffering role of a warm, and supportive mother-child relationship will be more robust.

Methods

The current study represents secondary analyses of data collected as part of the Family Health Project, a longitudinal investigation of the psychological and sociological correlates of maternal HIV infection among low-income, inner-city African American women and their families (Forehand et al., 2002). Prior studies examining the main effects of maternal HIV/AIDS (Forehand et al., 1998; Forehand et al., 2002) and maternal disclosure (Armistead et al., 2001; Shaffer et al., 2001) have been conducted with this dataset; however, these prior studies have not considered children's perceptions of the quality of their relationships with their mothers as a moderator of the association between knowledge of maternal HIV/AIDS

Table 1 Descriptive statistics for and correlations among demographic, maternal medical, and major study variables

	<i>M</i> (SD)	<i>N</i> (%)	Internalizing problems		Externalizing problems	
			Child (<i>n</i> = 85)	Mother (<i>n</i> = 84)	Child (<i>n</i> = 86)	Mother (<i>n</i> = 83)
Maternal variable						
Age	31.8 (8.14)		– 0.18	0.03	– 0.02	– 0.09
Marital status (% never-married)		76 (88.3)	0.03	– 0.14	0.04	– 0.04
Education (% <high school)		30 (35.0)	0.01	– 0.03	– 0.06	– 0.06
Child variables						
Gender (% girls)		39 (45.0)	0.01	0.01	– 0.01	– 0.15
Age (years)	8.45 (1.84)		– 0.18	– 0.01	– 0.03	– 0.12
Family variables						
Income (monthly)	613 (397)		– 0.15	0.04	– 0.04	– 0.06
Maternal medical variables						
CD4 count	316 (211)		0.14	– 0.03	0.03	– 0.05
Time since diagnosis (years)	3.36 (2.23)		– 0.04	0.17	0.08	0.15
Antiretroviral medication (% yes)		50 (57.9)	– 0.06	– 0.11	– 0.04	0.03

and child adjustment. Although the Family Health Project was a longitudinal study, 48 mother–child dyads were lost over time for the following reasons: mother refused ($n = 9$), moved out of city ($n = 2$), could not locate ($n = 3$), mother incarcerated ($n = 2$), mother lost custody of child ($n = 3$), or mother deceased ($n = 29$) (Forehand et al., 2002). Accordingly, the current analyses focus on the first assessment which afforded an adequate sample size and power to conduct moderation analyses.

Participants

The focus of the current study was a sample of 99 African American mothers with HIV/AIDS and one of their non-infected children (range 6–11 years old) who participated in the first assessment of the Family Health Project. The age range of children was selected given the importance of family relationships during this developmental period. It also represents a period during which children are old enough to independently complete measures of psychosocial adjustment. Mother–child dyads were recruited from the inner-city area of New Orleans, Louisiana. The majority of the families lived in government housing projects, which were characterized by overcrowding, poverty, and crime. On average, mothers were diagnosed with HIV 2.9 years prior to Assessment 1.

Eligibility criteria for the Family Health Project were as follows: mothers had to range in age from 18 to 45 years in order to include young adult and adult mothers with children in the age range of interest; mothers had to deny intravenous drug use for at least 6 months prior to recruitment; and mothers had to have CD4 counts less than 600, in order to recruit mothers at a relatively advanced stage of illness. As

previously noted, each mother had to have at least one biological child in the 6–11-year-old age range; the child had to be identified as non-infected; and the mother and child had to reside together.

Of the 99 mother–child dyads who participated in the first assessment, 86 had complete data on all variables of interest for the current study. Demographic characteristics for this subsample are presented in Table 1.

Procedures

Mother–child dyads were recruited over a period of 2 years from the primary public HIV/AIDS clinic in the city of New Orleans (93%), as well as the practices of physicians treating women with HIV/AIDS (7%). At a regularly scheduled check-up, mothers who met the inclusion requirements were approached by a project staff member who explained the study, confirmed eligibility, and scheduled an interview for interested women. Ninety-five percent of the mothers with HIV/AIDS approached for the study agreed to and did participate in Assessment 1.

Written consent was obtained from mothers for their own and their child's participation and children provided assent. Assessment 1 consisted of two interviews, one sociodemographic and one psychological, each separated by approximately 1–2 weeks. The sociodemographic interview assessed demographic information regarding the mother (e.g., age, education), child (e.g., age), and family (e.g., income). This interview lasted approximately 1 h and mother–child dyads received \$50 for participation. The psychological interview assessed mother and child psychosocial functioning, including the independent, moderator, and dependent variables examined in the current

study. This interview lasted approximately 2 h, and mother–child dyads again received \$50 for participation.

For each interview, mother–child dyads were assessed in a medical setting. When necessary, a taxicab was provided for transportation. Upon arrival, mothers read and signed consent forms, children signed assent forms, and both were reassured of confidentiality. Within each session, all measures were administered verbally to mothers and children to control for illiteracy. In addition, cue cards were used that contained descriptors (e.g., “not true,” “sometimes true,” “often true”), their corresponding numeric values (e.g., 0, 1, or 2), and pictorial representations of the descriptors (e.g., thermometers with appropriate proportions shaded in). All interviews were conducted separately for mothers and children to maximize sensitivity and confidentiality.

A medical chart review was also completed for mothers at approximately the same time as the interviews.

Measures

Measures were selected and modified to optimize their cultural sensitivity via both focus groups and extensive pilot testing (see Family Health Project Research Group, 1997, for more details). Measures that had not been previously used with a sample similar to the one studied in this report were subjected to factor analyses, which was conducted on the Assessment 1 data and an alpha coefficient for the retained items on each scale was computed. For instruments with standardized data that included samples similar to the current one, only an alpha coefficient was calculated.

Demographic and Medical Variables

All demographic information for each mother–child dyad was collected at the initial sociodemographic interview. Demographic information collected included child gender, mother and child age, family income, and maternal education level. In addition, medical variables were abstracted from the mothers' medical charts, including the time since HIV diagnosis, CD4 count, and whether the mother had been prescribed an antiretroviral treatment regimen.

Child Knowledge of Maternal HIV/AIDS

Due to ethical considerations regarding disclosure of maternal infection, mothers, rather than children, were asked whether children knew of their illness.

Responses were coded as a dichotomous variable (0 = no, 1 = yes).

Child-reported Mother–Child Relationship Quality

Children completed the short form of the Interaction Behavior Questionnaire (IBQ; Prinz, Foster, Kent, & O'Leary, 1979), which was used to assess warmth and support in the mother–child relationship. This form consists of the 20 items that have the highest phi coefficients and the highest item-to-total correlations among the 75 items in the original IBQ. The short form correlates 0.96 with the longer version. Examples of items on the child version of the IBQ, which are endorsed as *True* or *False*, include “You enjoy spending time with your mother,” and “You think you and your mother get along well with each other.”

Adequate internal consistency and discriminant validity have been reported elsewhere for the IBQ (Prinz et al., 1979; Robin & Weiss, 1980); however, given that the IBQ was not standardized with samples similar to the one in the current study, polychoric correlations among the dichotomous items were estimated using MPLUS Version 3.12 (Muthen & Muthen, 1998). In order to address the problems, which are encountered when using full weighted least squares procedures with small to moderate sample sizes, a robust weighted least squares procedure with corrected chi-square, degrees of freedom, and standard errors was used (Muthen & Muthen, 1998). Examination of the matrix revealed that a model, which included 18 of 20 items best fit the data (CFI & TFI > 0.90 and RMSEA < 0.08). Accordingly, these 18 items were summed to yield a measure of child-report of the quality of the relationships with their mothers (range 0–18), with higher scores indicating that children perceived more warmth and support in the mother–child relationship ($\alpha = 0.84$).

Child Psychosocial Adjustment

Child psychosocial adjustment was assessed by both mother and child reports. Consistent with the recommendations of Achenbach (1991a) for research with non-clinical samples, mother-report of child's psychosocial adjustment was assessed using the raw scores on the internalizing and externalizing subscales from the Child Behavior Checklist (CBCL). Notably, the CBCL T scores have been shown to be less sensitive to variability in behaviors among non-clinical and/or high-risk children who are the focus of the current study (also see Drotar, Stein, & Perrin, 1995). Using a

3-point scale, mothers indicated the extent to which each behavior was true of the target child: 0 (*not true*), 1 (*sometimes or somewhat true*), and 2 (*very or often true*). Achenbach (1991a) has reported adequate reliability data, as well as evidence of content and criterion validity, with samples including children similar to those in the current study. Accordingly, alpha coefficients were calculated on the standardized subscales, yielding an alpha of 0.90 for the externalizing subscale (32 items; range 0–64) and an alpha of 0.84 for the internalizing subscale (28 items; range 0–56), respectively. Higher scores on each subscale indicated greater levels of mother-reported externalizing and internalizing problems for children.

Given that this was a community rather than clinical sample, child-report of their externalizing problems was also examined using raw scores, rather than T scores, on the Aggression Subscale of the Youth Self-Report (YSR; Achenbach, 1991b). This subscale was selected because it assesses the types of externalizing problems typically displayed by children in the age range included in this study and has acceptable reliability and validity data with ethnically representative samples (Achenbach, 1991b). Using a 3-point Likert-type scale ranging from 0 (*not true*) to 2 (*very or often true*), children indicate how true each behavior was of them. Given that the YSR has not been standardized with children as young as some of those included in this investigation, a factor analysis was initially conducted. All 19 items of the Aggression subscale loaded at 0.40 or greater and were retained. The alpha coefficient for this subscale with the current sample was 0.86. Higher scores indicated greater levels of child-reported aggression, with possible scores ranging from 0 to 38.

Child-report of internalizing problems was examined using the Child Depression Inventory (CDI; Kovacs, 1981). The CDI consists of 27 items rated on a 3-point scale, ranging from 0 to 2. In addition to being the most widely used measure of child depression, adequate reliability, and validity data with samples similar to the one participating in this study have been reported (e.g., Fitzpatrick, 1993), and standardization data are available for children and adolescents ranging from 7 to 17 years old. For the purposes of the current study, items were reworded from first person to second person, instructions were rephrased to reflect that the child was to answer verbally or by pointing to the card, and one question about suicidal ideation was omitted, resulting in a modified 26-item version of the scale. The alpha coefficient for the current sample was 0.79. Scores can range from 0 to 52, with higher scores indicating greater child-reported depressive symptoms.

Results

Preliminary Analyses

As previously noted, mother–child dyads were excluded from the analyses if they had missing data for any of the primary study variables ($n = 13$), yielding 86 mother–child dyads. In addition, analysis of scatter plots for the remaining sample of children revealed that 4 of 19 children who knew of their mother’s HIV/AIDS diagnosis had an extreme score on at least one of the outcomes of interest (note: two children had extreme scores on two outcomes): mother-reported internalizing difficulties (two children); mother-reported externalizing difficulties (three children); child-reported internalizing difficulties (one child); and child-reported externalizing difficulties (no outliers). Due to the relatively small sample size, we were reluctant to exclude all four of these children from all primary analyses; therefore, we instead excluded only those children with outliers on the outcome being examined in order to preserve the sample size and power to detect proposed interactions. Accordingly, analyses were based on the following sample sizes: mother-reported internalizing difficulties ($n = 84$); mother-reported externalizing difficulties ($n = 83$); child-reported internalizing difficulties ($n = 85$); and child-reported externalizing difficulties ($n = 86$).

Descriptive statistics for and correlations among demographic, maternal medical, and child psychosocial adjustment variables are presented in Table 1. Neither socio-demographic (e.g., gender or age of child) nor maternal medical variables (e.g., immune functioning, antiretroviral regimen) were associated with either domain of child psychosocial adjustment; therefore, these variables were not statistically controlled in the primary analyses.

Descriptive statistics for the major study variables, as well as bivariate associations for the proposed independent (child’s knowledge of maternal HIV/AIDS) and moderator (child-report of mother–child relationship quality) variables with the outcomes of interest are reported in Table 2. Child knowledge of maternal HIV/AIDS was associated with child-report of internalizing difficulties ($r = -0.23$, $p < 0.05$), but was not associated with the other outcomes of interest. Children who reported that they knew of their HIV/AIDS infection reported lower levels of internalizing difficulties.

Child-reported mother–child relationship quality was associated with child-reports of internalizing ($r = -0.22$, $p < 0.05$) and externalizing ($r = -0.59$, $p < 0.01$) difficulties, but not mother-reports on either outcome variable. Children who perceived lower levels

Table 2 Descriptive statistics for and correlations among child-knowledge of maternal HIV/AIDS, mother–child relationship quality, and each child outcome

	Range	M (SD)	N (%)	Internalizing problems		Externalizing problems	
				Child (n = 85)	Mother (n = 84)	Child (n = 86)	Mother (n = 83)
Knowledge maternal HIV (% yes)			19 (22.1)	– 0.23*	0.20	– 0.05	0.19
Mother–child relationship quality	0–18	15.23 (3.02)		– 0.22*	0.04	– 0.59**	– 0.05
Child-report internalizing difficulties	0–52	10.67 (7.59)					
Mother-report internalizing difficulties	0–56	10.62 (6.95)					
Child-report externalizing difficulties	0–38	7.51 (6.44)					
Mother-report externalizing difficulties	0–64	16.27 (9.33)					

* $p < 0.05$ ** $p < 0.01$

of maternal warmth and support reported greater internalizing and externalizing difficulties.

Primary Analyses

Hierarchical regression analyses were conducted to examine the interaction of child knowledge of maternal HIV/AIDS and children's perceptions of the quality of the mother–child relationship, the primary focus of the current study. Child knowledge of maternal HIV/AIDS, the proposed independent variable, was entered on Block 1; child-report of the quality of the mother–child relationship, the proposed moderator, was entered on Block 2; and the 2-way interaction of child knowledge of maternal HIV/AIDS \times child report of mother–child relationship quality was entered on Block 3. Consistent with the recommendations of Baron and Kenny (1986) for continuous variables, child-report of the quality of the mother–child relationship was centered prior to multiplying it with child knowledge of maternal HIV/AIDS in order to reduce multicollinearity. Analyses were repeated for both mother- and child-report of both internalizing and externalizing difficulties.

Findings from the regression analyses are presented in Table 3. The obtained main effects of child knowledge of maternal HIV/AIDS and mother–child relationship quality were consistent with the bivariate analyses; however, 2-way interactions were also obtained between knowledge of maternal HIV/AIDS \times mother–child relationship for both mother-report, standardized $\beta = -0.98$, $p < 0.05$, and child-report, $\beta = -0.59$, $p < 0.05$, report, of externalizing difficulties. In contrast, the proposed interactions were not signif-

icant in analyses examining either mother- or child-report of internalizing difficulties. As per Aiken and West (1991), this pattern of findings suggests that the dependence of child externalizing difficulties, but not internalizing difficulties, on child knowledge of maternal HIV/AIDS depends on how children rate the quality of their relationships with their mothers (i.e., the simple slopes for each of the regression lines are significantly different from each other).

In order to determine whether the slopes of the respective regression lines in each of the two interactions were significantly different from zero, explication was conducted according to the procedures of Aiken and West (1991) using Preacher, Curran, and Bauer's (in press) interactive calculator for 2-way interactions obtained in multiple linear regression. Accordingly, for each significant interaction, the sample values of \hat{b}_0 (the constant), \hat{b}_1 (child knowledge of maternal HIV/AIDS), \hat{b}_2 (child-report of mother–child relationship quality), and \hat{b}_3 (child knowledge of maternal HIV/AIDS \times child-report of mother–child relationship quality) were entered into the calculator, as well as the asymptotic variances of \hat{b}_0 , \hat{b}_1 , \hat{b}_2 , and \hat{b}_3 (i.e., the squared standard errors) and the asymptotic covariances of \hat{b}_2 with \hat{b}_0 and of \hat{b}_3 with \hat{b}_1 . In order to calculate the simple slopes of each regression line, the degrees of freedom for each equation were also entered, as well as conditional values for the continuous moderator variable, child-reported mother–child relationship quality (i.e., $M - 1$ SD = low-mother–child relationship quality and $M + 1$ SD = high-mother–child relationship quality). In order to plot the interactions, lower and upper values of the independent variable, child knowledge of maternal HIV/AIDS, were also entered (i.e., coded 0 or 1).

Table 3 Hierarchical regression analyses examining child report of mother–child relationship quality as a moderator of the association between child’s knowledge of maternal HIV/AIDS and child adjustment

	Standardized			
	<i>F</i>	ΔR^2	β	<i>T</i>
Internalizing difficulties (mother-report; <i>n</i> = 84)				
Block 1: Child’s knowledge of maternal HIV/AIDS	3.37	0.05	0.20	1.84
Block 2: Mother–child relationship quality	1.67	0.00	0.01	0.05
Block 3: Child’s knowledge × mother–child relationship	1.76	0.02	– 0.67	– 1.38
Externalizing difficulties (mother-report; <i>n</i> = 83)				
Block 1: Child’s knowledge of maternal HIV/AIDS	3.14	0.04	0.19	1.77
Block 2: Mother–child relationship quality	1.83	0.01	– 0.08	– 0.73
Block 3: Child’s knowledge × mother–child relationship	2.68*	0.05	– 0.98	– 2.06*
Internalizing difficulties (child-report; <i>n</i> = 85)				
Block 1: Child’s knowledge of maternal HIV/AIDS	4.52*	0.05	– 0.23	– 2.13*
Block 2: Mother–child relationship quality	4.17*	0.04	– 0.20	– 1.91*
Block 3: Child’s knowledge × mother–child relationship	3.43*	0.02	– 0.49	– 1.37
Externalizing difficulties (child-report; <i>n</i> = 86)				
Block 1: Child’s knowledge of maternal HIV/AIDS	0.30	0.003	– 0.06	– 0.54
Block 2: Mother–child relationship quality	23.68**	0.36	– 0.60	– 6.85**
Block 3: Child’s knowledge × mother–child relationship	17.79**	0.03	0.59	– 2.05*

* *p* ≤ 0.05
 ** *p* ≤ 0.01

As demonstrated in Figs. 1 and 2, the pattern of findings for externalizing difficulties was the same regardless of reporter. Notably, a warm and supportive mother–child relationship afforded a more robust buffer against externalizing difficulties for children who knew of their mother’s diagnosis than children who did not.

Discussion

The current study examined children’s ratings of mother–child relationship quality as a moderator of the association between knowledge of maternal HIV/

AIDS and child adjustment among low-income, urban African American mother–child dyads. Findings suggest that the children’s reports of the quality of their relationship with their mother served as an important context within which to understand the association between children’s knowledge of maternal HIV/AIDS and externalizing, but not internalizing, difficulties. Consistent with the stress-buffering hypothesis (Cohen & Wills, 1985), children’s perceptions of the warmth and support that they receive from their mother afforded the greatest degree of protection against externalizing difficulties to those children who had the additional stress of reportedly knowing that their mother was infected with HIV/AIDS.

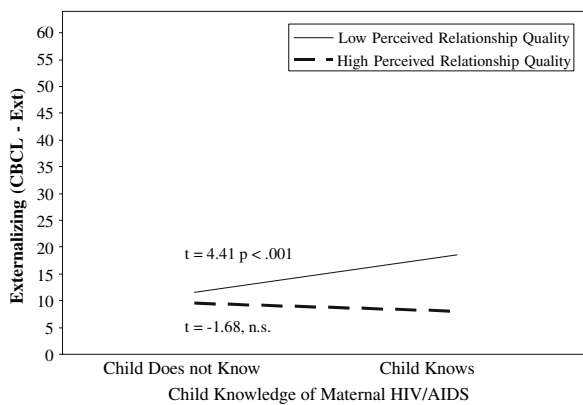


Fig. 1 Child knowledge of maternal HIV/AIDS (no versus yes) × mother–child relationship quality (*M* – 1 SD = low, *M* + 1 SD = high) and mother-report of child externalizing difficulties (range 0–64)

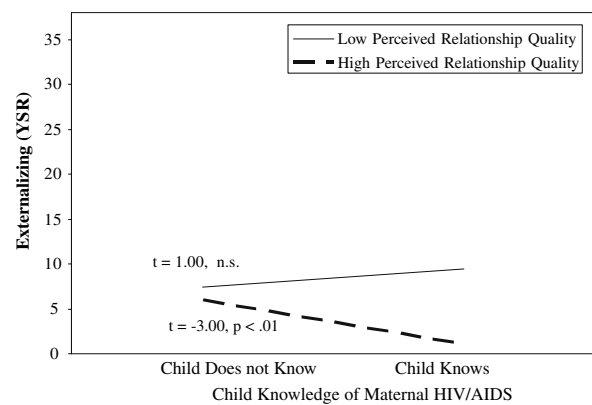


Fig. 2 Child knowledge of maternal HIV/AIDS (no versus yes) × mother–child relationship quality (*M* – 1 SD = low, *M* + 1 SD = high) and child-report of child externalizing difficulties (range 0–38)

Consistent with prior studies (Murphy et al., 1999; Armistead et al., 2001; Murphy et al., 2001), a relatively small number of children in the current analyses knew of their mother's HIV/AIDS. A mother's disclosure of any chronic or life-threatening illness to her child is often accompanied by some level of hesitation or worry regarding the child's reaction (Semple et al., 1993; Tompkins et al., 1999); however, the current findings contribute to a growing literature which suggests that mothers with HIV/AIDS may be particularly worried about their children learning of their illness likely due to the stigma associated with the disease, as well as the methods of transmission (e.g., Herek, 1999; Armistead et al., 2001; Kirshenbaum & Nevid, 2002). Consistent with the literature to date (e.g., Forsyth et al., 1996; Murphy et al., 2001; Shaffer et al., 2001), child knowledge of maternal HIV/AIDS was not consistently associated with better or worse outcomes for children in the current study. While child knowledge of maternal HIV/AIDS was associated child-reported internalizing difficulties, it was not associated with mother-reported internalizing difficulties or either reporter of externalizing difficulties. With regard to child-reported internalizing difficulties, children who knew of their mother's HIV/AIDS diagnosis reported lower, rather than higher, levels of internalizing symptoms. Notably, this finding is consistent with the notion that children of infected mothers may be aware of behavioral changes and feel some sense of relief when an explanation for these changes is provided (e.g., Murphy et al., 2001).

Mother-child relationship quality was associated with child-reports, but not mother-reports, of both internalizing and externalizing difficulties. Children who reported that their mothers were more warm and supportive endorsed fewer internalizing and externalizing difficulties than children who reported lower levels of maternal warmth and support. The low-income and urban nature of the sample suggests that all of the children in the study were likely exposed to a relatively high degree of psychosocial stress, including poverty and neighborhood crime and violence (e.g., Forehand & Jones, 2003; Jones et al., 2005; Jones et al., 2005). Although this study did not specifically examine the impact of these stressors on child adjustment, the findings suggest that the mother-child relationship may offer some degree of protection for children residing in these high-risk circumstances (e.g., Lamborn et al., 1996; Pittman & Chase-Lansdale, 2001; Brennan et al., 2003). As previously noted, however, the results were not replicated using mother-reports on the same outcome variables. One possibility for this discrepancy is that the findings for child-reported outcomes are

inflated due to the use a common-reporter in these analyses (i.e., the child). Alternatively, the significant findings for child-report only are consistent with prior research which suggests that the most robust correlate of psychosocial outcomes may be individuals' own reports of the quality of their relationships (e.g., Wethington & Kessler, 1986; Cohen, 1988).

Importantly, the aforementioned main effects for externalizing, but not internalizing, difficulties are qualified by the obtained 2-way interactions of child-knowledge of maternal HIV/AIDS \times mother-child relationship quality. Of note, explication of the interaction revealed that understanding the link between knowledge of maternal HIV/AIDS and externalizing difficulties depended on an examination of children's reports of their family context as well. Children who did and did not know of their mother's HIV/AIDS diagnosis evidenced relatively fewer externalizing difficulties in the context of greater levels of maternal warmth and support than in the context of lower levels of warmth and support. Consistent with the stress-buffering hypothesis, however, the magnitude of the buffering effect for mother-child relationship quality was stronger for children who had the additional stress of knowing that their mother was infected. These findings suggest that there is variability among children who know of their mother's diagnosis and while some are faring relatively well (i.e., lower levels of externalizing difficulties), others may be acting out in response to the knowledge of their mother's infection or the context in which this knowledge was gained. Although beyond the scope of this study, it is possible that some children are more likely to learn of their mother's illness as a function of problems in the mother-child relationship, such as inappropriate boundaries and/or high levels of conflict. Accordingly, these children may be given relatively low levels of support or comfort as they attempt to cope with the stressful news of their mother's diagnosis. In turn, they may act out in an effort to garner some level of maternal attention, even if it is negative. In contrast, other children who are afforded a warm and supportive environment to cope with the news of their mother's illness are more likely to have their needs met and their questions regarding the illness and its impact answered, decreasing the likelihood that they will act out in the context of receiving the news of their mother's illness.

Why did mother-child relationship quality moderate the association between child knowledge of maternal HIV/AIDS and externalizing, but not internalizing, difficulties? First, the current findings are consistent with previous results, which suggest that warm and supportive parenting may decrease children's overall

risk for internalizing symptoms, but it may not buffer children from internalizing symptoms in the context of other family stressors (e.g., Dallaire, Pineda, & Cole, 2006). In the current study, children who reported that they had a warm and supportive relationship with their mother were less likely to endorse internalizing symptoms generally, but a warm and supportive relationship did not buffer the association between child knowledge of maternal HIV/AIDS and internalizing symptoms. In addition, other findings suggest that paternal parenting may be a more robust correlate of child internalizing symptoms than maternal parenting (e.g., Kaczynski, Lindahl, & Malik, 2006). Although the focus of the current study was African American single mother families, many of these children likely have at least some level of contact with a biological father, father-figure, or another adult or family member who assists with parenting (e.g., Jarrett & Burton, 1999; Jones, Schaeffer, Forehand, Brody, & Armistead, 2003; Johnson & Staples, 2005). Perhaps a child's positive relationship with these other adults and family members may buffer the impact of a variety of stressors on internalizing symptoms, including the impact of maternal HIV/AIDS. Finally, other contextual variables may moderate the association between children's knowledge of maternal HIV/AIDS and internalizing difficulties. For example, African American mothers with HIV/AIDS themselves have been shown to be at increased risk for depressive symptoms relative to demographically-matched non-infected mothers (Jones, Beach, Forehand, & the Family Health Project Research Group, 2001a, b). Accordingly, maternal depression may moderate the association between children's knowledge of maternal HIV/AIDS and child internalizing symptoms generally or depressive symptoms in particular.

Of course, the findings of this study must be interpreted in light of its limitations. First, our analyses focused on a relatively small sample of children. Given that individual scores can be influential on regression results in relatively small samples, replication of the current pattern of findings with larger samples will strengthen our confidence in the obtained interactions. The relatively small sample size and associated limitations in statistical power also restricted our analyses to the first assessment of the longitudinal project, as well as the number of variables that we could examine in our multivariate model. Prior longitudinal analyses using the Family Health Project data suggest that mothers, but not children, report an increase in child behavior problems pre- to post-disclosure (Schaeffer et al., 2001). However, those analyses were limited to univariate tests given that only 15 children learned of their mothers' illness during

the course of the study (i.e., affording the opportunity to examine behavior pre- and post-disclosure). Although learning that one's mother is infected with HIV/AIDS may interact with the child's perception of mother-child relationship quality to predict child adjustment, as previously mentioned, it may also be the case that the extent of children's behavior problems and/or the quality of the mother-child relationship or other family variables may determine which children are told about their mothers' illness. Accordingly, future longitudinal studies with larger samples will provide the opportunity to examine the directionality of the associations among knowledge of maternal HIV/AIDS, changes in child adjustment as a function of learning this information, and the moderating role of mother-child relationship quality. Other potential moderators merit future research attention as well, including maternal psychological adjustment, the quality of the child's relationship with other family members, as well as age and gender of the child (e.g., Bettoli-Vaughn, Brown, Brown, & Baldwin, 1998). Of importance, child age and gender were not associated with the outcomes in the current study and were, therefore, not statistically controlled.

In addition, this study relied solely on child-report of the quality of the mother-child relationship. Although perceived relationship quality may be a more robust correlate of adjustment than some more objective measures (e.g., Wethington & Kessler, 1986; Cohen, 1988), future studies should also include other reporters of the family context variables that are examined (e.g., mother), as well as observation and coding of mother-child interactions. Due to ethical considerations, the current study also relied on only a single reporter, mothers, of the child's knowledge of her illness. Accordingly, more children may have been aware that their mother was infected with HIV/AIDS, but had not yet disclosed this knowledge.

Finally, generalizations from our study sample to others should be done cautiously. We examined maternal HIV/AIDS specifically; thus, the findings may not be generalizable to families dealing with HIV/AIDS more broadly. Our study also focused on a community sample, rather than a clinical sample. As suggested by Achenbach for research (1991a, b), we utilized raw scores on the CBCL, rather than T scores (also see Drotar et al., 1995). Although this strategy has been recommended for research purposes, it makes cross-sample comparisons more difficult.

Despite the aforementioned limitations, this study contributes to the literature in several important ways. First, this study contributes to a relatively sparse literature examining the context and correlates of children learning that their mothers are infected

with a life-threatening illness (Armistead et al., 2001; Shaffer et al., 2001). Additionally, the current study focused on child knowledge of an illness that is disproportionately affecting African American families, particularly those who are low-income, HIV/AIDS. Although African American mothers have been relatively understudied in both the HIV/AIDS and family literatures, prevention, and intervention efforts depend on a better understanding of the psychosocial impact of this illness on women and their families. Again, although future longitudinal studies are necessary in order to examine directionality, the findings of these analyses begin to offer preliminary information regarding the specific circumstances under which children's knowledge of maternal HIV/AIDS may be associated with better or worse outcomes. Several well-established treatments aimed at improving parent-child relationship quality already exist (e.g., Robin & Foster, 1989; Hembree-Kigin & McNeil, 1995; McMahon & Forehand, 2003) and may lend themselves nicely to future work in this area. Finally, our confidence in the obtained findings (and null findings) is strengthened by the consistency across two reporters of children's adjustment difficulties (mother and child) and two markers of adjustment outcomes (internalizing and externalizing difficulties).

In summary, the findings of the current study suggest that child knowledge of maternal HIV/AIDS is not consistently associated with better or worse outcomes. Rather, consistent with the stress-buffering hypothesis (Cohen & Wills, 1985), the impact of children's knowledge of maternal HIV/AIDS on their externalizing behavior may depend on their perception of the degree of warmth and support that they receive from their mothers. Although future longitudinal research is necessary before definitive clinical recommendations can be made, these findings provide preliminary information to health care professionals regarding the circumstances under which children may best cope with the knowledge of their mothers' illness. Perhaps, clinicians could encourage mothers whose children characterize their relationships as lacking in warmth and support to participate in parent training programs and/or family therapy, depending on the age of the child. Family therapy techniques, such as parent-child communication training, may not only increase a mothers' confidence in how to share the news of her illness with her child or how to process this information if the child learns it from another source.

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