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THE IMPACT OF PSYCHOLOGICAL ACCEPTANCE AND SIBLING RELATIONSHIP  
QUALITY ON DEPRESSION AND PERCEIVED STIGMA FOR YOUTH LIVING WITH

HIV

by

KARA E. SNEAD

Under the Direction of Frank Floyd

ABSTRACT

Compared to their uninfected peers, youth living with HIV experience greater distress related to a multitude of stressors they face. In order to enhance the lives of youth who are living with HIV, it is important to identify the personal and social resources that these individuals might bring to coping with their disease. Using the compensatory hypothesis and resiliency theory as conceptual frameworks, the present study examined the function of both psychological acceptance and sibling relationships for youths in managing depression and HIV-related stigma. In addition, the current study investigated the interactive effects of psychological acceptance and sibling relationship quality on these outcomes for youths living with HIV. The participants for the current study included 68 youth who were recruited as part of another study examining adolescents infected with HIV and their caregivers. The racial composition of the final sample consisted of 94% African Americans and 6 % who identified as another racial minority. The current sample consisted of 28 males, 38 females, and 2 transgendered youth between the ages of

12 and 23 ( $M= 17.9$ ,  $SD= 2.8$ ). In the sample, 56% of youth were perinatally infected and 44% were behaviorally infected. Regression analyses indicated no support for the complex associations among resources posited in the resiliency model and the compensatory hypothesis. Greater psychological acceptance was associated with both less depression and less stigma. Both the positive and negative aspects of sibling relationships demonstrated importance for youth's psychological well-being, such that supportive sibling relationships were associated with lower depression and negative sibling relationships were associated with greater perceived stigma. Exploratory analyses demonstrated interactions with gender, age, and route of transmission not explained by the proposed models, which suggests that further research is needed to understand their impact. Future research endeavors should examine the efficacy of intervention programs in individual and group settings to determine if the predicted benefit of both personal and social resources are compounding factors in the psychosocial well-being for youth living with HIV.

**INDEX WORDS:** Sibling relationships, HIV, Acceptance, Depression, Stigma, Youth

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QUALITY ON DEPRESSION AND PERCEIVED STIGMA FOR YOUTH LIVING WITH

HIV

by

KARA E. SNEAD

A Dissertation Submitted in Partial Fulfillment of the Requirements for the Degree of

Doctor of Philosophy

in the College of Arts and Sciences

Georgia State University

2011

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Kara E. Snead  
2011

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QUALITY ON DEPRESSION AND PERCEIVED STIGMA FOR YOUTH LIVING WITH

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May 2011

## DEDICATION

I would like to dedicate this document to my family and friends for all of their support. Each and every one of you has impacted my life in numerous ways. Without your influences, love, and enthusiasm, I certainly would not be in the position I am in today. I am deeply grateful for each of you.

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## Introduction

Over the last decade, prevalence rates of HIV infection in African American youths between the ages of 13-25 have risen (Kang et. al, 2008, Hosek, 2000). Recent reports from the Centers for Disease Control (2008) indicated that at the end of 2007, 6,559 adolescents 13 to 19 years of age were living with HIV/AIDS in the 34 states with confidential name-based HIV infection reporting, representing about 14% of the persons diagnosed that year. Although only 15% of the adolescent population at that time was African American, 68% of reported AIDS cases among 13 to 19 year olds were African American. Paired with this increase in infection rates are advances in medical treatments for HIV infection which have improved survival rates for infected individuals. Thus, an interest in the psychosocial issues and quality of life of young people who are living with the disease has also grown.

Compared to their uninfected peers, youths infected with HIV experience greater distress related to a multitude of stressors they face. Stressors include concern over disclosure of HIV status because of the stigma associated with the disease. As result, these youths are often socially isolated, depressed, and lack normative peer supports. Furthermore, these problems occur in the context of many other stressors, including concerns about sexual health, feelings of hopelessness, fears of death, and family conflict (Fielden et al., 2006). Because HIV infection is more common among youths from low SES groups (Brown et. al, 2000) numerous youths with HIV endure exposure to substance abuse, and community violence. Moreover, youths not only face the possibility of the losing their own life, many are also dealing with the repeated loss of family members (Battles & Wiener, 2002).

Despite the numerous risks factors they face, many youths with HIV seem to be thriving under arduous circumstances. Rutter (1987) argues that such resilience is achieved through

personal resources in conjunction with a complex social process. Specifically, he posits that resiliency results from an interactive process of protective factors, a combination of internal characteristics and environmental influences. Further, Rutter (2000) maintains that an individual's ability to take active steps to deal with the environmental challenges combined with the availability of an external support system contribute to long-term well-being. Notably, his research has consistently shown that a positive self image together with the presence of a healthy parent-child relationship and/or other close, confiding relationships help to reduce the impact of adverse risks experienced by adolescents during stressful periods, such as divorce and marital conflict. Thus, successful coping with HIV infection likely requires a combination of personal resources and social supports from close family members or friends.

In terms of personal sources, Rutter (2000; 2006) posits that it is protective for people to accept the reality of their negative experiences rather than deny or ignore it. He further explains that acknowledging the reality of any experience includes recognizing the positive aspects while not denying the negative. The ability to cognitively process an adverse event in such a way that promotes adjustment is a personal resource. In his review of resiliency literature, Rutter (2000) cited a study (Main et al., 1985) which indicated that adults who recalled their negative childhood experiences with a sense of acceptance evidenced healthier relationships compared to adults who distorted those early experiences. Other investigators identified personal resources such as emotional control (Stattin et al., 1997), a sense of control over one's life (Connell et al., 1994; Luthar, 1991) and a determination to influence one's own fate (Werner, 1996) as key components of resiliency. In Steinhauer's (2001) review of interventions designed to diminish the effects of poverty and promote resiliency, he highlighted the overarching qualities of resilient

individuals. Specifically, resilient individuals were those who evidenced a sense of meaning in their lives, a will to overcome difficulties, and hope.

In conjunction with personal resources, social resources contribute to well-being in the face of adversity. Steinhaur (2001) demonstrated that individuals who had strong, supportive relationships with family members evidenced resiliency during interventions designed to address the effects of poverty. Similarly, the results from a prospective longitudinal study that followed children from birth to age thirty-two indicated that of the “high risk” individuals, those who had a close bond within a supportive relationship with a caregiver, such as a parent, grandparent, or sibling evidenced healthy relationships and stable employment over time (Werner, 1996). Another study involving children who were raised in residential care indicated that the children who received a high level of support from their social network engaged in fewer deviant behaviors compared to children who did not have a strong support network (Losel & Bliesener, 1994).

To date, research has not adequately examined factors, like support, that might affect the adjustment of HIV infected youths. Instead, many of the studies involving children and adolescents and HIV have examined the impact of maternal HIV infection disclosure on their children, usually who are not infected themselves. Research has also looked at the mental health and behavioral outcomes of youths with infected parents (Havens et al., 1996). The research that has examined youths who are themselves infected has mostly focused on medication adherence (Murphy et al., 2001), psychological distress related to youths’ disclosure, and prevention of risk behaviors in youths (Donenberg and Pao, 2005; Rotheram-Borus et al., 2001), with little attention to other aspects of adjustment. In addition, the literature that has explored the impacts of social support on adjustment has mainly focused on broad assessments of support. The few

studies that do examine social support from specific sources mostly explore the support provided by peers or adults, such as parents and teachers, and ignore siblings.

To gain a better understanding of the sources of strength for these youths in facing both stigma and social isolation, the current study will examine their personal and social resources. In particular, the focus will be on psychological flexibility in the form of psychological acceptance as a personal resource and siblings as a potentially important social resource. These two resources might act in combination with one another and/or independently from each other to protect youths from dysfunction. Thus, the present study will aim first, to understand the nature of psychological acceptance as a personal resource for adapting to the stigma of HIV infection and will explore the role of psychological acceptance on youths' psychological distress. In addition, the study will seek to describe the nature and quality of sibling relationships in the context of other interpersonal resources available to these adolescents, then to demonstrate how the quality of sibling relationships may impact depression and perceived stigma around HIV.

### *Stigma*

Stigma is a significant stressor for individuals infected with HIV. Seminal work by Goffman (1963) defined stigma as an undesirable or discrediting attribute that an individual possesses which subsequently reduces that individual's status in society. In an effort to further understand health-related stigma, Berger and colleagues (2001) generated a conceptual model of feelings and experiences around stigma related to HIV. Perceived stigma is conceptualized as the person's awareness of actual or potential rejection and change in social identity related to HIV status. Much of what makes some interactions distressful for the individual with HIV is the inability to predict reliably how he/she will be treated by others (Kinsler, et al., 2007; Brown et al., 2003). Perceived stigma can have a significant impact on coping efforts, self-care, and the



psychological well-being of an individual who experiences it (Vanable et al., 2006; Swendeman et al., 2006). For example, individuals who have HIV often internalize the negative stereotypes others have about HIV, which in turn may lead them to feel stigmatized and ashamed. Subsequently, they might engage in behaviors that negatively influence their well-being, such as avoiding disclosure of their infection to medical professionals, failure to follow medication regimens consistently, or failure to seek social support. Ultimately, perceived stigma leads people to alter their behaviors to avoid additional experiences of stigma and in doing so may also limit opportunities for support and treatment.

Because HIV infection has historically been associated with those who have been marginalized in society, including gay men, minorities, and injection drug users, it involves prejudice and poor treatment that often contributes to perceived stigma. As such, youths infected with HIV are vulnerable to negative experiences and often perceive stigma as a result. In a study by Flicker and colleagues (2004), youths with HIV reported that they felt lonely and stigmatized, and that their feelings of sadness and depression negatively impacted their ability to connect to others. For individuals whose status is not known outside the family, often the “burden of secrecy” may further exacerbate feelings of isolation (Brown et al., 2000). In another study of youths living with HIV, participants reported that many of their peers made derogatory comments about HIV-positive individuals (Rao et al., 2007). Subsequently, youths described feeling as though they had to hide their own status from peers and in some cases, parents/guardians. Similarly, in a sample of 17-21 year-old youths living with HIV, self-isolation and distancing from friends and peers tended to occur following diagnosis (Hosek et al., 2000). The youths also reported that distancing from others was done in an effort to avoid rejection.

Given the social isolation that perceived stigma perpetuates, it might be especially important for youth living with HIV to rely on close relationships for support.

### *Psychological Acceptance as a Personal Resource*

The effects of stigma on psychological distress and dysfunction can be conceptualized from the framework of psychological acceptance theory. A premise of the acceptance and commitment therapy (ACT) formulation is that a problem with trying to directly control internal experiences such as negative emotions, thoughts, and physical sensations is that these attempts sometimes make a problem more pronounced and aversive, or cause additional problems. The inflexible tendency to negatively evaluate internal events, like thoughts about stigma, and to make persistent attempts to alter and avoid those experiences, lessens contact with present moments (Kashdan et al., 2006). In contrast, psychological acceptance, or flexibility, refers to a willingness to experience thoughts, feelings, and physiological sensations without avoiding them or letting them determine one's actions in life (Hayes, 1987; Hayes, Strosahl & Wilson, 1999). By not controlling internal behavior, one can better control actions and thus, promote mental health and lessen the impact of negative events (Hayes et al., 1996). Subsequently, people make choices based on their own values, not based on the emotions or thoughts they may be experiencing and, thus, become better able to define and accomplish meaningful goals in the future.

From the perspective of ACT, the negative impact of stigmatizing beliefs and attitudes comes not from the existence of such thoughts, but from the function of the thoughts (Luoma, 2008). Stigmatizing thoughts can be rigid (Kurzban & Leary, 2001) and therefore difficult to eliminate or alter. As such, when acted on, feelings and thoughts related to stigma often lead individuals to avoid subsequent experiences and interactions perceived as potentially

stigmatizing. For example, it seems likely that if a person infected with HIV holds beliefs about him/herself that are stigmatizing such as “others think a person with HIV is disgusting”, those beliefs would lead the person to avoid thinking about being someone who is disgusting to others and feelings related to the sense that other people find him/her disgusting. However, doing so would include avoiding situations and activities where the possibility of thinking these thoughts and experiencing these feelings would exist such as avoiding contact with other people, or at least avoiding disclosure of HIV status. Therefore, the very situations that would facilitate supportive interaction and connection with family and friends are likely to perpetuate this thought and related fears. This situation might also lead one to deny the seriousness of the condition in order to reduce the internalized sense of stigma, which might then lead to poor medication adherence. In contrast, psychological acceptance enables individuals to feel their emotions and notice their thoughts related to stigma, rather than try to act on, change, or avoid them. Current research indicates a strong relationship between perceived stigma and limited psychological acceptance. Masuda and colleagues (2007) examined stigma that college students felt towards individuals with psychological disorders, and self-stigma they experienced in regards to their own psychological struggles. Results showed that psychologically inflexible individuals also tended to have more stigmatizing and shame-based thoughts and beliefs about themselves and others compared to participants who were more psychologically flexible. A study by Luoma and colleagues (2008) examined the impact of psychological acceptance on self-stigma in a group of adult substance users. Findings demonstrated that after some individuals learned how to use acceptance among other ACT-based techniques, internalized stigma and shame decreased and were negatively correlated with post-treatment levels of psychological acceptance.

Research on psychological acceptance has consistently demonstrated its relationship with psychological functioning (Hayes, Stosahl et al., 2004; Karekla et al., 2004). In particular, the impact of psychological acceptance on reducing depression has been well established. In a prospective study with undergraduates, Plumb and colleagues (2004) demonstrated that using avoidance as a coping mechanism, which presumably implies low levels of flexibility or acceptance, following a stressful event was associated with depression. Several other studies have indicated that low acceptance, thus high avoidance, was also associated with depression (Tull et al., 2004; Forsyth et al., 2003; Roemer et al., 2005). Similarly, a meta-analysis indicated that higher levels of psychological flexibility, were associated with lower levels of depression, and better mental health overall as captured by measures of psychopathology (Hayes et. al, 2006).

Although there is little research to date that associates psychological acceptance with interpersonal functioning, there are some findings that have begun to establish a link. A set of studies involving undergraduates examined the relationship between psychological acceptance and psychological outcomes and behaviors. Results indicated that high levels of psychological acceptance were associated with relatively frequent positive social interactions on a daily basis, and inversely related to feelings of social anxiety (Kashdan et al., 2006). In other studies, high levels of acceptance were associated with high levels of support from friends (Luoma et al., 2008) and a positive quality of life including relationship satisfaction (Hayes, et. al, 2006). Although these studies indicate some relationship between psychological acceptance and interpersonal engagement, the exact nature of the relationship remains unclear. Though not yet examined in the literature, it might be that psychological acceptance enhances the effects of supportive relationships on well-being, such that it enables individuals to focus less on their own

negative thoughts and feelings, and instead participate more fully and actively in relationships, such as the sibling relationship. Increased cognitive flexibility not only makes individuals less susceptible to the influences of their own negative thoughts and feelings, but also makes individuals less susceptible to the negativity from others (Hayes, et al., 2006). Thus, in the context of high levels of psychological acceptance, the negative effects of a hostile or antagonistic relationship on well-being likely dampen.

Other research has examined the role of psychological acceptance as a strengthening effect on behaviors that reduce stress. Several particularly relevant studies evaluated this process in the workplace. Previous research by Bond & Bunce (2000) established links amongst acceptance, employees' general mental health, and their ability make productive changes in the workplace. Subsequently, Bond & Bunce (2003) conducted a study that examined whether the benefits of job control were greater when acceptance was higher than when it was lower. Job control is an individual's perceived ability to assert control over the work environment so that it is more rewarding. Low job control has been shown to diminish job satisfaction, performance, and mental health. Specifically, it was predicted that at low acceptance levels, individuals would engage in avoidance of negative thoughts and feelings related to their job. In comparison, individuals who had high levels of acceptance would be able to use their attentional resources to notice the control they had in a given situation and subsequently, obtain goals such as positive work performance, mental health, and job satisfaction. The findings supported the expectations that psychological acceptance interacted with job control such that the benefits of job control on productivity and mental health were greater when acceptance was higher. Additionally, as expected, results indicated that there was a main effect of acceptance and a main effect of job control on improvements in mental health and job performance one year later.

Another relevant line of research has examined psychological acceptance with individuals who suffer from chronic pain (Donaldson-Feilder & Bond, 2004; Vowles & McCracken, 2008). Findings from one study by McCracken (1998) indicated that acceptance of chronic pain was associated with less depression and pain-related anxiety. In the study, acceptance did not mean resigning oneself to all experiences of suffering, but rather acceptance involved facing suffering so that a healthy course of action could be followed. Further, acceptance of pain involved acknowledging the pain, relinquishing useless attempts to control it, and committing to live a satisfying life in spite of the pain. In doing so, patients reported better psychological and behavioral adjustment outcomes. These studies establish a link between acceptance and disease adjustment that will likely be salient for individuals who are infected with HIV and who might face similar struggles related to their illness.

To date, psychological acceptance has not been studied in individuals infected with HIV, but may be particularly useful considering the challenging nature of the disease. Given the positive effects that psychological acceptance has evidenced on reducing depression and stigma in samples of individuals who struggle with substance abuse and chronic pain, it seems likely that individuals with HIV might also use psychological acceptance as a personal resource to cope with distress.

### *Social Support*

Research has firmly established that social support has a significant impact on adjustment to disease for individuals who suffer from chronic illnesses (LaGreca et al., 1995; Varni & Setoguchi, 1993; Pennix et al., 1996). Support from family, friends, and medical professionals often helps to reduce the risks from emotional and behavior difficulties for children with chronic illnesses, and instead promotes coping with the disease and better medication compliance

(Wallander & Varni, 1998; Kyngas et al., 2004). Social support also impacts psychological well-being by lessening feelings of loneliness, depression, and anxiety that are commonly associated with chronic illness (Graetz, 2000).

Like individuals with other chronic illnesses, individuals with HIV likely benefit from social support to help manage psychological distress. Research literature on adults with HIV is fairly extensive and serves as a foundation for understanding how social support might operate for youths living with HIV, given that these youths can experience similar struggles to adults with the same condition. Several studies have demonstrated that among HIV-infected adults, greater social support was associated with lower levels of HIV symptomatology, depression, and loneliness (Hays et al., 1992; McDowell & Serovich, 2007). For youths living with HIV, there is a strong link between an effective support network and positive psychological functioning (Murphy et al., 2000). Compared to non-infected peers and youth with other chronic illnesses, HIV-positive youth are vulnerable because they experience higher levels of anxiety, depression, and loneliness (Bachanas et.al, 2001; Brown et al, 2000), and thus need support to cope with these problems. Furthermore, adolescents living with HIV may also require significant levels of support to maintain complicated adherence regimens, manage disclosure of HIV status, and to develop intimate relationships (Brown et al., 2000). Social support has also been shown to correlate with feeling confident in one's abilities to provide self-care such as adherence to medication in HIV-positive youths (Naar-King, et al., 2006). Another study of youths infected with HIV indicated that high levels of social support were associated with relatively few experiences of personalized stigma (Wright et al., 2007).

The literature on adults with HIV has also shown that social support tends to come from close family members and/or partners. In a qualitative study on African American women living

with HIV/AIDS, the women reported that their families were the central providers of affective, concrete, and informational support (Owens, 2003). Kalichman and colleagues (2003) demonstrated that HIV-positive adults who disclosed their HIV status to family members perceived the greatest amounts of support from those relationships compared to relationships with non-family members. Findings from another study involving women living with HIV indicated that the quality of support from family members was more predictive of lower levels of depression, loneliness, and anxiety than was support from friends (Serovich et al., 2001).

Similar to adults, family support might be particularly important for youths with HIV as well. Although research is limited, some findings suggest that this is the case. In a study of HIV positive youths (ages 16-25), Lam and colleagues (2007) demonstrated that higher social support from family was related to less anxiety and depression. Further, the study indicated that youths were more likely to disclose their status to family members rather than friends. It may be that siblings are a particularly important component of family support for youth.

#### *Sibling Relationships in the Context of a Systemic Framework*

Individuals exist within a context of a family system that involves interacting parts that help to shape the development of the individual. Systems theory holds that changes in each of the subsystems in a family (parent-child, child-child) mutually influence one another. Similarly, changes in the behaviors of individuals exert an influence on and are influenced by the subsystems (Bronfenbrenner, 1992; Pike, Coldwell & Dunn, 2005). Sibling dyads represent independent subsystems within the family that uniquely affect the psychosocial functioning of the developing individual (Howe & Ross, 1990; Hanson et al., 1992). Although much of the extant research on families focuses on the parent-child dyad and its influence on individual outcomes, recent research has begun to recognize the significance of the sibling subsystem for



individual development (Dunn, 1992; Brody, 1992; Stocker, Burwell & Briggs, 2002, Dunn, 2002).

Sibling relationships are distinctive due to their life-long duration, shared genetic components, and common cultural and family experiences for the two individuals. Sibling relationships can be characterized by friendship and trust as well as hostility and disengagement (Stoneman & Brody, 1992). Although sibling relationships share components similar to those of a close peer relationship (e.g., companionship, support), the sibling dyad remains unique. Specifically, sibling relationships are not chosen or fostered in the same intentional manner as peer relationships (East & Rook, 1992). Further, sibling relationships provide easy access to companionship, intimacy, and support, and they have potential for high conflict. Thus, sibling dyads are characterized by emotional salience and a combination of closeness and conflict that is unlike any other interpersonal relationship (Furman & Buhrmester, 1985).

In normative circumstances, family roles and relationships shift during adolescence. Throughout the course of childhood and adolescence, individuals spend more time with siblings than with their parents (McHale & Crouter, 1996; Stocker, Burwell & Briggs, 2002). Adolescence is a developmental time when autonomy and personal independence from parents and family typically become foci. During this period, youths begin to spend even less time with their parents and place more importance on peer relationships. Although adolescent siblings may spend less time together as well, the relationships do endure and remain important over time (Furman & Buhrmester, 1992).

For youths who have experienced disruptions in typical development due to stressful life events such as chronic illness, the sibling relationship may serve an important interpersonal function above and beyond that of peers or parents (Sharpe & Rossiter, 2002). The trajectory of

personal independence for youths with HIV may deviate from typical patterns. In particular, they may remain more strongly reliant on family members, with fewer strong connections to peers. For example, the complex and/or unpleasant medical regimens often lead to non-adherence issues for the youth. In turn, parents or other parent-like caregivers become heavily involved in managing the youth's anti-retroviral medications (Battles & Weiner, 2002). Given that youths living with HIV tend to face interpersonal difficulties and are socially isolated due to the stigmatizing perceptions of HIV and social isolation, sibling relationships might be an important source of social support during this developmental stage when individuation is vital. Like the literature on typically-developing youths, research on the interpersonal relationships of youths with HIV has mainly focused on how parents/caregivers or peer networks impact both psychological adjustment and risk factors associated with HIV infection. To date, however, research has failed to attend to the function of sibling relationship quality, especially as it relates to youths' psychological well-being and disease adjustment.

Given that siblings have not been a large focus of the research conducted on youths with HIV, the theories and empirical findings related to typical siblings will be used as a foundation for the current study. Much of the literature on typical siblings has used samples of majority culture siblings from two-parent families (McHale et al., 2007). The few studies that have examined African American families are restricted to two-parent, middle-class families (McHale et al., 2007). Therefore, the current study will likely fill some of the gaps regarding sibling relationships for minority youth, many whose families are low-income and led by a single-parent. Sibling literature has also tended to emphasize the impact of structural characteristics such as gender, age gap, and birth order on outcomes. However, in a seminal article, Brody (1998) demonstrated the importance of focusing on the quality of sibling relationships rather

than on the structural components in order to understand the impact of the relationship on adjustment and psychosocial functioning. Thus, the present study will focus on the quality of sibling relationships and its impact on adjustment for youths living with HIV.

*Compensatory Theory: Siblings as a Social Resource*

Siblings might be especially important when other sources of support are not available. In their review of the effects of multiple types of interpersonal relationships on individual well being, Furman and Burhmester (1985) argued that it would be adaptive for an individual who lacks a specific relationship type to be able to compensate for the missing support by turning to a functionally similar type of relationship. For youth who struggle with significant family-related stress, such as a disruption in the parent-child relationship due to loss or illness, the impact of a supportive, close sibling relationship may be even greater. Previous research shows that overtly distressed or emotionally or physically absent parents have children who take care of each other to compensate for the lack of parental involvement (Hetherington, 1988, 1989; Brody, 1998). In a study by Bryant (1992), children whose parents were more rejecting and/or invalidating during a discussion about stressful events, reported that they usually prefer to talk to a close sibling about those experiences. Alternatively, children whose parents demonstrated emotional support during the discussion reported that they typically looked to their parents for support. Similarly, Jenkins and colleagues (1990; 1989) demonstrated that sibling dyads growing up in disharmonious homes characterized by high marital distress benefited from offering comfort to, and from receiving comfort from each other such that they evidenced fewer emotional and behavioral problems compared to sibling dyads without a supportive sibling relationship. Close sibling relationships might also compensate for a lack of peer relationships. A study by East & Rook (1992) indicated that adolescents who were socially isolated reported high levels of

support from their sibling relationships. Additionally, isolated adolescents who had high sibling support also endorsed fewer adjustment problems such as anxiety compared to isolated adolescents who had low sibling support.

Although some research supports a compensatory process between siblings, these results have only been found in sibling dyads who were under adverse conditions, such as social isolation from peers, maternal illness, or when one sibling suffered from chronic illness (Dunn et al., 1994). Thus, it might be that sibling relationships serve a compensatory function only when the families experience significantly stressful conditions (East & Khoo, 2005). Other studies conducted with families who were relatively low in parental distress such as marital conflict indicated a different pattern from the compensatory relationship. Under these low adverse conditions, healthy parent-child relationships were associated with prosocial behaviors between siblings and relatively negative or hostile parent-child relationships were associated with quarrelsome and antagonistic sibling relationships (Boer et. al, 1992; Seginer, 1998). Thus, for some families, positive versus negative sibling relationships emerge from positive versus negative relationships among other family members. For other families, the stress of adversity influences sibling relationship quality such that siblings actually become closer.

Given that HIV is associated with significant stress within the family like maternal loss, and stress from outside the family like social isolation, siblings might overcome and compensate for the stress. In particular, siblings might compensate for distressful or absent relationships for these youths. Thus, it will be especially useful to explore the role of siblings within the context of all support sources to further understand how youths adjust to HIV infection and related stressors.

*Sibling Relationship Characteristics that may Contribute to or Inhibit Resilience*

There are both positive and negative aspects of sibling relationship quality that potentially promote or weaken resilience. Positive support qualities include nurturance, warmth, intimacy, and companionship. Negative qualities include conflict and antagonism. One relevant support component is nurturance or emotional support. Although most children and adolescents receive the bulk of their emotional support from parents (Bryant, 1992), siblings can also provide emotional support in such a way that impacts psychosocial adjustment. Branje and colleagues (2004) found that for a sample of adolescents, high levels of emotional support from a sibling were uniquely related to lower levels of externalizing and internalizing behavior problems over time after controlling for the effects of support from father, mother, and friends. Warmth between siblings is another important support component and has been positively associated with self-esteem (Stocker, 1994). Intimacy and companionship within a sibling relationship are also important components of support that might contribute to resilience. Both have been associated with less loneliness and fewer internalizing issues for developing children and adolescents (Brody, 1998; Dunn, 2005).

In contrast to being a source of support, highly conflictual sibling relationships can create or exacerbate distress for individuals. Further, the negative effects of sibling conflict on youths' psychological functioning can be extensive and damaging. For example, in a 6-year longitudinal study of sibling dyads, Kim and colleagues (2007) showed that increases in sibling conflict were associated with increases over time in depressive symptoms, and this association remained after controlling for parent-child relationship quality and the psychological adjustment of other family members. Additionally, findings from a longitudinal study conducted by Stocker, Burwell & Briggs (2002) demonstrated that high sibling conflict was predictive of adolescents' anxiety,

depressed mood, and delinquent behavior two years later, beyond the effects of parental hostility and marital conflict.

The positive and negative aspects of sibling relationship quality may have a particularly strong impact for children and adolescents who suffer from chronic illness. In a sample of youths with insulin dependent diabetes, Hanson and colleagues (1992) showed that high sibling conflict was significantly related to low self-esteem, low acceptance of the illness, and high levels of externalizing behaviors for the youths with illness. Also, these effects occurred above and beyond the effects of marital distress and family cohesion. Conversely, high sibling warmth/closeness was positively associated with self-esteem above and beyond the effects of the family factors. Although there is a significant amount of research on sibling relationships with children who have chronic illnesses, the majority of studies are descriptive and comparative with normative samples, without focusing on the impact of the relationship for the individual with illness (Williams, 1997; Faux, 1991). Thus, the impact of sibling relationship quality on disease adjustment and psychosocial functioning of the child with the illness remains unclear. It may be that sibling relationship quality varies based on the severity of the illness, such that for youths who have significantly severe illnesses (e.g., require extensive care-taking, complex medication regimens, hospitalizations), effects of sibling relationship quality are even more intense compared to sibling relationships of youth whose illnesses are easier to manage and less stigmatizing (Weiss, 2001).

Given the significant role siblings play in other populations of individuals with chronic illness, and youths infected with HIV experience a multitude of interpersonal struggles, siblings may be an important support for these youths. However, to date, studies have not adequately addressed this question. For example, in one study involving youths infected with HIV, support

from parents and teachers was associated with relatively lower levels of psychological distress compared to support from peers over a five year period (Battles & Wiener, 2002). Although the study examined the support provided by important individuals for the youths, it failed to include siblings as potential support agents.

### *Purpose*

In order to enhance the lives of youths who are living with HIV it is important to identify the personal and social resources that individuals might bring to coping with their disease. The present study will examine the function of both psychological acceptance and sibling relationships for youths who have HIV. Specifically, first, the study will explore the effects of psychological acceptance on depression and perceived stigma for these youths. Second, the study will examine the impact of sibling relationship quality on these same adjustment and well-being outcomes. Third, in order to understand the uniqueness of sibling relationships and what they add to existing relationships, the study will compare the nature and impact of sibling relationships with other close relationships such as parent/caregiver, close peers, and partners for youths living with HIV. Finally, the study will examine the interactive effects of psychological acceptance and sibling relationship quality on depression and perceived stigma of these youths.

### *Hypothesis 1: Personal Resources: Psychological Acceptance*

Given the impact of personal or psychological resources on the adjustment of individuals who suffer from significant distress, it is hypothesized that personal resources will have a significant impact on youths' adjustment. There will be a main effect of acceptance on well-being such that higher levels of acceptance will be associated with lower levels of depression. It is also hypothesized that psychological acceptance will have a main effect on perceived stigma, such that higher levels of acceptance will be associated with lower levels of perceived stigma.

*Hypothesis 2: Social Resources:Siblings*

Due to the nature of HIV and associated risks such as loss of a parent and social ostracism, the quality of sibling relationships will have a significant impact on the well being of HIV positive youths. It is hypothesized that youths who have a sibling relationship characterized by high levels of support in the form of warmth, companionship, instrumental support, intimacy, nurturance, affection, and admiration will endorse lower levels of depression. Negative, hostile or distant sibling relationships will be predictive of higher levels of depression for the youths. Sibling relationship quality will also impact how youths with HIV perceive HIV-related stigma. Specifically, it is hypothesized that youths who have a close, supportive relationship with a sibling will endorse less perceived stigma. Hostile or distant sibling relationships will be predictive of higher levels of perceived stigma.

*Hypothesis 3: Compensatory Mechanism*

Given the importance of other supportive social relationships such as parents, relatives, peers, and partners, it will be necessary to consider their influence on youths' depression and perceived stigma. Based on the notion that siblings might play a compensatory role when other forms of support are lacking, it is hypothesized that the impact of sibling relationship quality on depression will be moderated by support from others, such that at low levels of other supportive relationships, sibling relationship quality will have a larger impact on depression than at high levels of other support. At higher levels of other support, the impact of sibling relationship quality on depression will still be significant, but weaker. In addition, it is hypothesized that the impact if sibling relationship quality on perceived stigma will be moderated by support from others, such that at low levels of other supportive relationships, sibling relationship quality will have a larger impact on perceived stigma than at high levels of other support.



#### *Hypothesis 4: Interactive Effects of Personal and Social Resources*

In light of the interactive effects of personal and social resources on adjustment to adversity that Rutter (1987) discussed, it is hypothesized that youths with HIV will also utilize a combination of personal and social resources to overcome depression and disease related stigma. It is hypothesized that the impact of sibling relationship quality on depression and perceived stigma will be moderated by the psychological acceptance level of individual. At high levels of psychological acceptance, sibling support will have a stronger impact on depression and perceived stigma than at lower levels of psychological acceptance. At high levels of acceptance, the impact of a sibling relationship that is negative, hostile or distant will be weaker than at low levels of acceptance.

#### Methods

##### *Participants*

The participants for the current study included 68 youth who were recruited as part of a larger study examining adolescents infected with HIV and their caregivers. There were 75 youth who participated in the larger research study; however, given that the focus of the present study was on sibling relationships of minority youth, a total of 7 participants were excluded from the data analysis because they did not have a sibling and of the 7, 2 participants were excluded because they were Caucasian. The larger study served two purposes. First, it examined caregiver reports of their own attachments, experiences of trauma, psychological functioning, social support, and involvement in their child's medication adherence. Second, it investigated the same variables in youths and examined additional issues for youth, including body image, perceived stigma, self-esteem, and coping strategies. The racial composition of the final sample consisted of 94% African Americans and 6 % who identified as another racial minority. The final sample

consisted of 28 males, 38 females, and 2 transgendered youth between the ages of 12 and 23 ( $M=17.9$ ,  $SD=2.8$ ). In the sample, 56% of youth were perinatally infected and 44% were behaviorally infected. The youth in the current study reported having experienced significantly stressful life circumstances, including multiple deaths of close relatives ( $M=3$ ,  $SD=3.4$ ) and a substantial frequency of having moved ( $M=5.5$ ,  $SD=5.5$ ). In addition, 53% of the participants reported living with at least one other family and 29% of the youth reported that they were currently in or had been in the custody of the Department of Family and Children Services during their lifetime. For exploratory analyses involving gender, the 2 transgendered participants were excluded. The age group was selected in order to understand the issues that face HIV-positive adolescents as they mature to adulthood. Youths were eligible for the study if they were aware of their HIV diagnosis and spoke and understood English fluently. In some cases, the legal guardians of youth in state custody (i.e., DFCS caseworkers) were contacted to provide consent for the youth.

### *Procedures*

Recruitment occurred at the Infectious Disease Clinic at the Ponce Center in Atlanta, GA, a specialty medical center associated with Grady Health System which serves a predominantly low-income, minority population. Data collection was conducted by advanced graduate students. Adolescents and their caregivers who presented for appointments and who were eligible for participation were approached by a staff person who provided information about the study. Approximately 15 people who were approached for the study chose not to participate based on reasons such as not having the time to complete the protocol or feeling ill. No further information is available on the individuals who did not participate. Families interested in the study were taken to a private room, read the consent and assent forms, and were able to ask

questions together. Upon understanding of and agreement to participate, the families were then asked to sign the consent and assent forms and given their own copies to keep. After signing the forms, the researcher met with the youth individually, read all questionnaires to the participant and recorded the responses. The measures were read to the participants to better ensure comprehension regardless of their reading level. The participants were given response cards which indicated the rating scales for each measure. The youth assessment was conducted separate from caregiver assessments to ensure privacy for the youths and increase the probability that their responses would be candid. The youth assessment took approximately 2 hours to complete, which included a ten-minute break. All participants completed the full protocol. After completion of study protocol, the adolescents were compensated \$40 for their time.

#### Measures

*Demographic.* Information was collected during the initial portion of the interview with the parents/caregivers and the youths on the participant's gender, age, ethnicity, race, yearly household income, and route of HIV transmission (e.g., perinatal or behavioral). If youths were living independently from their family, the yearly household income was based on their personal income. In addition, a medical chart review was conducted to verify date of diagnosis and route of transmission. There were no discrepancies in reports pertaining to diagnosis except in cases where someone did not have the information.

*Sibling relationship quality.* The Network of Relationships Inventory (NRI; Furman & Buhrmester, 1985a) was used to assess the quality of the youth's relationship with a close sibling in the context of other close relationships. If subjects had more than one sibling, they were asked to identify their favorite sibling or the sibling with whom they felt closest. The participants were also asked to identify and answer questions about a mother figure, father figure, close relative,

partner, and best friends of the same and opposite sex. The NRI is comprised of 30 items, three items for each of 10 subscales, and all 30 items are repeated for each relationship examined. Participants were asked to rate each of the 10 relationship qualities for each relationship. For example, participants were asked “How much free time do you spend with this person?” Participants then answered based on a 5-point Likert scale ranging from, “1”, indicating *little or none*, to “5”, indicating *the most*. The NRI produces scores for two broad scales, Social Support and Negative Interaction, which were derived through a factor analysis of the 10 subscales (Furman, 1996). The social support score consists of the average of scores from seven subscales, including companionship, e.g., “How much do you have fun with this person”, instrumental aid, e.g., “How much does this person help you figure out or fix things”, intimacy, e.g., “How much do you share your secrets and private feelings with this person”, nurturance e.g., “How much do you protect and look out for this person”, affection, e.g., “How much does this person really care about you”, admiration, e.g., “How much does this person treat you like you are good at many things”, and reliable alliance, e.g., “How sure are you that this relationship will last no matter what”. The negative interaction factor is the average of two scales, conflict, e.g., “How much do you and this person disagree and quarrel”, and antagonism, e.g., “How much do you and this person get annoyed with each other’s behavior”. One additional subscale, relative power, forms a separate factor. This factor is not a focus of the current study because it is unrelated to support or non-support behaviors of individuals within the interpersonal network. Thus, the score range for the social support and the negative interaction factors is 1-5 and with higher scores reflecting more support or more negativity. Furman and Buhrmester (1985a, 1992) reported internal consistency of the larger factors with a mean Cronbach alpha of .81. Further, findings indicated that in samples of school-age children, high school and college students, the factors were

independent of one another. For the current study, internal consistency of the sibling support and sibling negative interaction factors was strong with Cronbach alphas of .88 and .91 respectively. The NRI has been used in samples of youths across cultures (van Horn & Cunegatto Marques, 2000; DeRosier & Kupersmidt, J., 1991). In other studies involving youth participants, ratings on the NRI demonstrated stability across time (Connolly et al., 2000), and were correlated in expected directions with depressed mood (Williams, et al., 2001), family cohesion and family conflict (Creasey & Jarvis, 2001).

*Stigma.* The Stigma Regarding HIV scale (Wright, Naar-King, Lam, Templin, & Frey, 2007) was chosen to assess perceived stigma. The Stigma Regarding HIV is a modified, shorter version of the HIV Stigma scale (Berger, 2001). It is a 10-item self-report measure and was developed as a brief, psychometrically sound measure of HIV-related stigma, validated on a sample of predominantly African American, HIV-positive youth. To create this version, the authors chose the items that loaded the highest in each of 4 factor scales of Berger's original factor analysis, using two to three items per subscale. Each item is rated on a five-point scale from "Strongly Disagree" to "Strongly Agree," resulting in a Total Stigma score that ranges from 0-40, with higher scores reflecting greater perceived stigma. Additionally, there are four subscale scores examining (1) Personalized Stigma (3 items), which addresses personal experiences or fears of rejection for having HIV, e.g., "I have been hurt by how people reacted to learning I have HIV", (2) Disclosure Concerns (2 items), which relates to keeping one's HIV status secret, e.g., "I worry that people who know I have HIV will tell others", (3) Negative Self-Image (3 items), which concerns feeling not as good as others, shame, and guilt, e.g., "Having HIV makes me feel unclean", and (4) Concern with Public Attitudes (2 items), which are what people think about HIV, e.g., "Most people think that a person with HIV is disgusting." Subscales and total

stigma score have been correlated with the Brief Symptom Inventory (BSI, Derogatis, 1982), measures of social support, and substance use (Wright, Naar-King, Lam, Templin, & Frey, 2007). The subscales and total stigma scale demonstrated adequate reliability with Cronbach alphas ranging from .72-.84 (Wright, Naar-King, Lam, Templin, & Frey, 2007). In the current study, the internal consistency of the total stigma scale indicated a Cronbach alpha of .83.

*Depression.* The Center for Epidemiological Studies-Depression Scale (CES-D; Radloff, 1977) was administered to assess youths' current depressive symptoms. The reliability and validity of the scale with adults has been assessed in both community and clinic populations. Fewer studies of adolescents have been conducted; however, the data available suggest that characteristics of the scale are similar for both adult and adolescent samples (Murphy et al., 2000). Overall, the CES-D has evidenced strong psychometric properties with internal consistency ranging from .80-.90 in recent studies (Murphy et al., 2000; Rotheram-Borus et al., 2001). Consistent with existing studies, the reliability of the CES-D in the current study was strong with a Cronbach alpha of .91. In this study, participants responded on a 4 point scale ranging from 0-3, "0", indicating *rarely or none of the time or less than 1 day of the last week*, to "3", indicating *most or all of the time or 5-7 days of the last week*, yielding total scores of between 0 and 60. Higher scores indicate greater depression. The CES-D has been used for self-ratings of depression in clinical populations, including youth with HIV and AIDS (Berger et al., 2001). Specific findings demonstrated that higher scores on the CES-D were associated with higher scores on the life event distress scale and poorer overall psychosocial functioning for minority youth infected with HIV (Murphy et al., 2000).

*Psychological Acceptance.* Psychological acceptance was assessed using the Acceptance and Action Questionnaire-Revised (AAQ-R; Bond & Bunce, 2003; Hayes et al., 2004). The

AAQ-R uses a 7-point Likert scale, with “1” indicating *never true* to “7” indicating *always true*. The current version of the measure was created based on a factor analysis conducted by Hayes and colleagues (2004). The questions inquire about avoidance of emotions and inability to act while experiencing difficult or negative thoughts and feelings. The 16-item version is a self-report measure and yields dual factors, which are action, e.g., “I’m able to take action on a problem even if I am uncertain what is the right thing to do” and willingness, e.g., “It’s okay to feel depressed or anxious”. Higher scores correspond with high acceptance and psychological flexibility. The AAQ-R shows expected correlations with depression (Hayes et al., 2004), general mental health (Bond & Bunce, 2000), and the Quality of Life Inventory (Frisch et al., 1992). The AAQ-R has demonstrated adequate reliability, with Cronbach alphas of .72-.79 (Bond & Bunce, 2003). In the current study, the AAQ-R evidenced low reliability with a Cronbach alpha of .4. The AAQ-R has been largely used in samples of Caucasian adults, ages 18 and older. Although the measure has not been widely used in samples of ethnic minority youth, this study presents an initial step towards understanding these constructs in minority youth populations. Using a child version of the AAQ-R, Greco and colleagues (2008) recently measured psychological acceptance in a fairly ethnically diverse sample of children ages 8-14 years old. The findings demonstrated that psychological flexibility was correlated with measures of behavioral health, anxiety and overall quality of life, which supports the notion that psychological acceptance is salient and measurable in youth.

## Results

Descriptive statistics are presented in Table 1. Examination of the skewness and kurtosis statistics and histograms revealed that the distributions for all variables were relatively normal. Each variable was assessed for outliers, which were defined as scores 2 SD's above or below the

mean. The data for the disclosure variable revealed an outlier that was 3 SD's below the mean, which was reassigned to the next lowest value of 3. After this transformation, all variables met the assumptions of normality according to the guidelines provided by Tabachnick and Fidell (2001).

*Psychological acceptance as a predictor of depression and perceived stigma*

The bivariate correlations largely supported the hypothesis that psychological acceptance would be significantly associated with levels of depression, total perceived stigma, and the four stigma subscales (Table 1). Of the six hypothesized relationships, three of the correlations were significant in the expected direction. Specifically, higher levels of psychological acceptance were significantly associated with lower levels of depression, total stigma, and negative self-image. There was also a nonsignificant trend for the association between higher levels of acceptance and lower levels of personalized stigma. Psychological acceptance was not significantly associated with disclosure or public attitudes.



Table 1  
*Descriptives and correlations*

	1	2	3	4	5	6	7	8	9	10	11	12	13
1 Acceptance	-	.31*	-.23 <sup>^</sup>	.26*	-.39**	-.26*	-.22 <sup>^</sup>	-.09	-.25*	-.16	-.11	.26*	.21 <sup>^</sup>
2 Sibling Support		-	-.09	.63**	-.42**	-.17	-.06	-.10	-.21	-.15	.16	-.15	-.19
3 Sibling Negative			-	-.22 <sup>^</sup>	.13	.32**	.10	.10	.34**	.39**	.14	-.10	-.12
4 Total Other Support				-	-.41**	-.33**	-.20	-.19	-.37**	-.20	.21	-.10	-.09
5 Depression					-	.51**	.45**	.23*	.48**	.24	-.17	.20	.37**
6 Total Stigma						-	.81**	.53**	.83**	.66**	.05	.16	.18
7 Personalized Stigma							-	.31**	.48**	.36**	.12	.24*	.11
8 Disclosure								-	.33**	.16	.10	.02	.11
9 Negative Self-Image									-	.47**	-.08	.12	.20
10 Public Attitudes										-	.07	.03	.12
11 Gender											-	-.22	-.31*
12 Age												-	.65**
13 Route of Transmission													-
Mean	70.3	3.7	2.3	3.6	14.1	18.4	3.7	5.9	3.3	5.5	.55	.53	.43
SD	9.4	0.64	1.0	0.64	11.6	8.3	3.7	1.7	3.4	2.3	.50	.50	.50
Std. Skew	0.30	-0.31	0.78	-0.08	1.5	0.39	0.75	-0.05	0.77	-0.82	-.31	-.12	.28
Std. Kurtosis	0.16	-0.16	-0.05	-0.98	1.4	-0.48	-0.49	-1.5	-0.33	0.04	-2.0	-2.0	-2.0

Note. n = 68. \* = significant at  $p < .05$ . \*\* = significant at  $p < .01$

*Sibling relationship quality as a predictor of depression and perceived stigma*

Multiple regression analyses tested the hypothesized relationship between sibling relationship quality and depression and stigma. It was expected that sibling support would be negatively associated with depression, total stigma, and with each the four stigma subscales. In addition, sibling negative was hypothesized to be positively associated with depression, total stigma, and with each of the stigma subscales.

First, the dependent variable, depression, was regressed onto both of the variables measuring sibling relationship quality. This model was significant,  $F(2, 65) = 7.4, p < .001, R^2 = 0.18$ . Beta weights for the individual predictors indicated that greater sibling support predicted lower levels of depression, as expected, but sibling negativity was not a significant predictor (see Table 2).

Table 2  
*Multiple Regression Predicting Depression from Sibling Relationship Quality (N=68)*

	Depression		
	<i>B</i>	<i>SE</i>	<i>B</i>
Step 1			
Sib Support	-7.5	2.0	-.42**
Sib Negative	1.0	1.2	.09
Step 2			
Sib Support	-7.4	2.0	-.41**
Sib Negative	1.2	1.3	.11
Sib S X Sib N	-.82	1.7	-.06

*Note.* Sib Supp= Sibling Support. Sib Negative = Sibling Negative. Sib S X Sib N= Sibling Support X Sibling Negative.

\*\*=  $p < .01$ .

To examine the association between sibling relationship quality and perceived stigma, the total stigma score and each of the four subscale scores for stigma were regressed on the sibling

support and sibling negative scale scores in five separate regressions. The model for predicting total stigma was significant,  $F(2, 65) = 4.3, p < .01, R^2 = 0.12$ . Beta weights indicated that sibling support did not significantly predict total stigma. However, greater sibling negativity predicted higher total perceived stigma, as expected (see Table 3).

For predicting personalized stigma, the overall model was not significant,  $F(2, 65) = .43, p > .05, R^2 = 0.01$ . The beta weights in Table 3 indicated that there were no significant effects of sibling relationship quality on this outcome.

Predicting disclosure, the overall model was not significant,  $F(2, 65) = .59, p > .05, R^2 = 0.02$ . The beta weights in Table 3 indicated that there were no significant effects of sibling relationship quality on this outcome.

For predicting negative self-image, the overall model was significant,  $F(2, 65) = 5.6, p < .01, R^2 = 0.15$ . Similar to total stigma, the beta weights in Table 3 indicated that there was a significant main effect of sibling negative, such that more negative sibling relationships predicted higher negative self-image for the youth, and there was no significant effect of sibling support.

Predicting public attitudes, the overall model was significant,  $F(2, 65) = 6.5, p < .01, R^2 = 0.17$ . Similar to total stigma and negative self-image, the beta weights in Table 3 indicated that there was a significant main effect of sibling negative, such that more negative sibling relationships predicted higher concerns about public attitudes, and there was no significant effect of sibling support.

Table 3:  
*Multiple Regression Predicting Stigma from Sibling Relationship Quality*

	Total Stigma			Personalized Stigma			Disclosure			Negative Self-Image			Public Attitudes		
	<i>b</i>	<i>SE</i>	$\beta$	<i>b</i>	<i>SE</i>	$\beta$	<i>b</i>	<i>SE</i>	$\beta$	<i>b</i>	<i>SE</i>	$\beta$	<i>b</i>	<i>SE</i>	$\beta$
Step 1															
Sib S	-1.8	1.5	-.14	-.26	.71	-.05	-.23	.33	-.09	-.99	.62	-.18	-.40	.40	-.11
Sib N	2.4	.93	.30**	.35	.44	.10	.15	.20	.09	1.05	.38	.32**	.84	.25	.38**
Step 2															
Sib S	-1.8	1.5	-.14	-.25	.72	-.04	-.21	.33	-.08	-1.1	.62	-.19	-.41	.40	-.11
Sib N	2.4	.97	.30**	.37	.46	.11	.20	.21	.12	.98	.39	.30*	.82	.26	.38**
SS X SN	.17	1.3	.02	-.09	.59	-.02	-.23	.27	-.11	.40	.51	.09	.08	.33	.03

(*N*=68) Note. Sib S= Sibling Support. Sib N = Sibling Negative. SS X SN= Sibling Support X Sibling Negative. \*\*=*p*<.01.

In sum, overall, sibling support was predictive of youths' depression and sibling negative was predictive of youths' perceived stigma. It was further hypothesized that the value of sibling support and sibling negative might be important within the context of each other. Specifically, it was hypothesized that sibling conflict would be less detrimental in the context of a supportive sibling relationship, and that sibling support would be less effective in the context of a highly negative (i.e., conflictual) relationship. To test this hypothesis, the Sibling Support X Sibling Negative interaction terms were entered in the second step of all regressions. The results indicated that there was not a significant interaction predicting depression  $F(1, 64) = .24, p > .05$ ,  $R^2_{change} = .00$  or total stigma,  $F(1, 64) = .02, p > .05$ ,  $R^2_{change} = .00$  or any of the stigma subscales (see Tables 2 and 3).

*The Compensatory Hypothesis: Total other support as a moderator of sibling relationship quality and youth outcomes*

The next analyses tested the hypothesis that the impact of sibling relationship quality on depression and perceived stigma would vary depending on support from others, such that in the context of low other support, the relationship between sibling relationship quality and outcomes would be especially strong. Two indices of the amount and quality of other support were calculated. Total other support was calculated by taking the total sum of each support score (mother, father, relative, etc.) excluding sibling support and then dividing that total by the number of people who were supports, which resulted in an averaged total support score. Highest other support was calculated by taking the highest support score out of all the support scores, excluding sibling support. However, the latter variable was subsequently discarded because it was not correlated with any outcomes and, thus, did not appear to be capturing an aspect of social support that was relevant to the functioning of these youths. A cut off rating of 3 or above

which indicated “very much” on the NRI, was used to delineate high levels of both sibling and total other support. Results demonstrated that 76.5% of the sample had high sibling support and high other support; 4.4 % had low sibling support and high other support; 11.8% had high sibling support and low other support, and 7.3% had low sibling support and low other support.

The hypothesis was tested using hierarchical regression analyses. In step one of the hierarchical regression, depression was regressed on the predictor variables, sibling support, sibling negative, and total other support. The first block was significant  $F(3, 64) = 5.9, p < .001, R^2 = .22$ . Although the univariate correlations indicated that depression was significantly associated with both sibling support and total other support (see Table 1), only the beta weight for sibling support reached significance in the regression analysis (see Table 4). The addition of the interaction terms in the second block did not significantly improve the prediction of depression,  $\Delta F(2, 62) = .70, p > .05, R^2 = .02$  and neither of the beta weights for these effects was significant (see Table 4). Thus, there was no support for the compensatory hypothesis in predicting depression.

Table 4

*Moderation effect of Total Other Support on the relationship between Sibling Relationship Quality and Depression*

	Depression		
	<i>b</i>	<i>SE</i>	$\beta$
Step 1			
Sib Support	-4.9	2.6	-.28*
Sib Negative	.62	1.3	.06
TOS	-4.1	2.6	-.23
Step 2			
Sib Support	-5.0	2.9	-.28^
Sib Negative	.49	1.3	.05
TOS	-4.0	2.8	-.22
SS X TOS	2.3	3.4	.08
SN X TOS	-1.7	1.9	-.11

*Note.* Sib Support= Sibling Support. Sib Negative = Sibling Negative. TOS= Total Other Support. SS X TOS= Sibling Support X Total Other Support. SN X TOS= Sibling Negative X Total Other Support. \*=  $p < .05$ , ^=  $p = \text{approaching significance}$ .

For predicting stigma, the total stigma score and each of the four subscale scores for stigma were regressed on the sibling support, sibling negative, total other support scores and interaction terms in five separate regressions. For the prediction of total stigma, the first block with only main effects was significant,  $F(3, 64) = 4.5, p < .01, R^2 = .17$ . The beta weights in Table 5 indicated that there were significant main effects of both sibling negative and total other support in predicting total stigma. Specifically, higher sibling negative and lower total other support predicted higher total stigma. The addition of the interaction terms in the second step did not significantly improve the model,  $\Delta F(2, 62) = .45, p > .05, R^2 = .01$ . Thus, although total other support made a unique contribution to predicting stigma, there was no support for the compensatory hypothesis in predicting total stigma.

For predicting personalized stigma, the first block was not significant  $F(3, 64) = 1.1$ ,  $p = ns$ ,  $R^2 = .05$ . The beta weights in Table 5 indicated that there were no main effects of sibling relationship quality or total other support. The addition of the interaction terms in the second block did not significantly improve the model  $\Delta F(2, 62) = .33$ ,  $p > .05$ ,  $R^2 = .01$ . Thus, there was no support for the compensatory hypothesis in predicting personalized stigma.

For predicting disclosure, the first block was not significant,  $F(3, 64) = .87$ ,  $p > .05$ ,  $R^2 = .04$ . The beta weights in Table 5 indicated that there were no main effects of sibling relationship quality or total other support. However, at step 2 of the regression, the Sibling Support X Total Other Support interaction was significant. Figure 1 shows that, consistent with the hypothesis, under conditions of low total other support, sibling support had the expected effect on disclosure stigma. Contrary to the hypothesis, high total other support did not reduce the effect of sibling support. Instead, low levels of sibling support were associated with relatively low levels of disclosure stigma.

*Figure 1. The moderating effect of total other support on the relationship between sibling support and disclosure concerns.*

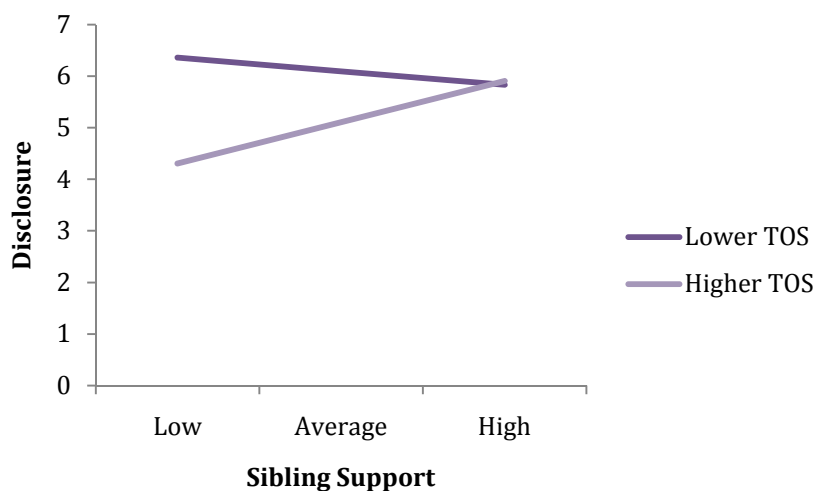




Table 5

*Moderation effect of Total Other Support on the relationship between Sibling Relationship Quality and Stigma*

	Total Stigma			Personalized Stigma			Disclosure			Negative Self-Image			Public Attitudes		
	<i>b</i>	<i>SE</i>	$\beta$	<i>b</i>	<i>SE</i>	$\beta$	<i>b</i>	<i>SE</i>	$\beta$	<i>b</i>	<i>SE</i>	$\beta$	<i>b</i>	<i>SE</i>	$\beta$
Step 1															
Sib Support	.63	1.8	.05	.61	.89	.10	.08	.42	.03	.07	.77	.01	-.23	.52	-.06
Sib Negative	2.0	.93	.25*	.21	.44	.06	.10	.20	.06	.88	.38	.27*	.81	.26	.37**
Tot Other S	-4.0	1.9	-.31*	-1.4	.92	-.25	-.51	.43	-.19	-1.7	.78	-.32*	-.28	.53	-.08
Step 2															
Sib Support	.65	2.1	.05	.37	1.01	.06	.42	.45	.16	.12	.86	.02	-.38	.59	-.11
Sib Negative	1.9	.99	.24*	.11	.47	.03	.19	.21	.11	.88	.40	.27*	.76	.27	.35**
Tot Other S	-4.0	2.0	-.31*	-1.3	.97	-.22	-.71	.43	-.27	-1.8	.83	-.33*	-.19	.56	-.05
SS X TOS	1.4	2.5	.07	-.12	1.2	-.01	1.2	.54	.30*	.60	1.0	.07	-.38	.69	-.07
SN X TOS	-.97	1.4	-.08	-.55	.68	-.11	.01	.30	.00	-.31	.58	-.06	-.13	.40	-.04

*Note.* Sib Support= Sibling Support. Sib Negative = Sibling Negative. Tot Other S= Total Other Support. SS X TOS= Sibling Support X Total Other Support. SN X TOS= Sibling Negative X Total Other Support. \* $p < .05$ . \*\* $p < .01$ . ^=approaching significance

For predicting negative self-image, the first block of main effects was significant  $F(3, 64) = 5.62, p < .01, R^2 = .21$ . Similar to the effects for total stigma, the beta weights indicated that higher sibling negative and lower total other support predicted higher negative self-image. The addition of the interaction terms at step 2 did not significantly improve the model,  $\Delta F(2, 62) = .36, p > .05, R^2 = .01$ , and neither of the beta weights was significant. Thus, once again, there was no support for the compensatory hypothesis.

For predicting public attitudes, the first block of main effects was significant  $F(3, 64) = 4.4, p < .01, R^2 = .17$ . Similar to the effects for total stigma, the beta weights indicated there was a significant main effect of sibling negative, such that higher sibling negative predicted higher concerns about public attitudes. There were no significant main effects of sibling support or total other support on public attitudes. The addition of the interaction terms in the second block did not significantly improve the model  $\Delta F(2, 62) = .18, p > .05, R^2 = .01$  and therefore there was no support for the compensatory hypothesis.

In general, these findings provide no support for the hypothesis that the impact of sibling relationship quality on depression and HIV-related stigma would be moderated by the level of support youths received from others.

*The relationship between youth outcomes and sibling relationship quality as moderated by psychological acceptance*

The next analyses tested the hypothesis that the effect of sibling relationship quality on depression and perceived stigma would be influenced by the levels of psychological acceptance such that acceptance would strengthen positive effects and weaken negative effects of sibling relationship quality on depression and stigma. In step one of the hierarchical regression, the

predictor variables, sibling support and sibling negative, were entered together with the moderator variable, acceptance. The first block was significant,  $F(3, 64) = 7.3, p < .001, R^2 = .25$ , and the individual beta weights demonstrated that sibling support and acceptance contributed significantly to the prediction of depression. The addition of the Sibling support X Acceptance interaction and Sibling Negative X Acceptance interaction terms in the second block did not significantly improve the model  $\Delta F(2, 62) = .83, p > .05, R^2 = .27$ , and neither of the beta weights for these effects was significant (see Table 6).

Table 6

*Moderation effect of Psychological Acceptance on the relationship between Sibling Relationship Quality and Youth Outcomes*

	Depression		
	<i>b</i>	<i>SE</i>	$\beta$
Step 1			
Sib Support	-6.0	2.1	-.33**
Sib Negative	.41	1.2	.04
Acceptance	-.34	.14	-.28*
Step 2			
Sib Support	-5.8	2.1	-.32**
Sib Negative	.19	1.3	.02
Acceptance	-.34	.15	-.28*
SS X A	.28	.22	.16
SN X A	.08	.15	.07

*Note.* Sib Support = Sibling Support. Sib Negative = Sibling Negative. SS X A = Sibling Support X Acceptance. SN X A = Sibling Negative X Acceptance.  
 \*\* =  $p < .01$ , \* =  $p < .05$ . ^ = approaching significance.

The same regression analysis was conducted with total stigma and each of the four stigma subscales as criteria. The first block was significant,  $F(3, 64) = 3.6, p < .05, R^2 = .14$ , and the individual beta weights demonstrated that sibling negative contributed significantly to the prediction of total stigma (see Table 7). At step 2, the addition of the Sibling Support X Acceptance interaction and Sibling Negative X Acceptance interaction terms in the second block

did not significantly improve the model  $\Delta F(2, 62) = .34, p > .05, R^2 = .01$ , and neither of the beta weights for the interactions was significant (see Table 7).

For predicting personalized stigma, the first block was not significant  $F(3, 64) = 1.2, p > .05, R^2 = .05$ . The beta weights in Table 7 indicated that there were no main effects of sibling relationship quality or acceptance. The addition of the Sibling Support X Acceptance and Sibling Negative X Acceptance interaction terms in the second block did not improve the model, and neither of the beta weights for the interactions was significant  $\Delta F(2, 62) = .20, p > .05, R^2 = .01$  (see Table 7).

For predicting disclosure, the first block was not significant  $F(3, 64) = .43, p = ns, R^2 = .02$ . Beta weights in Table 7 indicated there were no significant main effects of sibling relationship quality or acceptance. The addition of the Sibling Support X Acceptance and Sibling Negative X Acceptance interaction terms in the second block did not improve the model, and neither of the beta weights for the interactions were significant  $\Delta F(2, 62) = .34, p > .05, R^2 = .03$  (see Table 7).

For predicting negative self-image, the first block was significant,  $F(3, 64) = 4.2, p < .05, R^2 = .17$ . Similar to the effects for total stigma, individual beta weights demonstrated that sibling negative contributed significantly to the prediction of negative self-image (see Table 7). The addition of the Sibling Support X Acceptance and Sibling Negative X Acceptance interaction terms in the second block did not improve the model, and neither beta weights for the interactions was significant  $\Delta F(2, 62) = 1.1, p > .05, R^2 = .20$  (see Table 7).

Table 7

*Moderation effect of Psychological Acceptance on the relationship between Sibling Relationship Quality and Stigma*

	Total Stigma			Personalized Stigma			Disclosure			Negative Self-Image			Public Attitudes		
	<i>b</i>	<i>SE</i>	$\beta$	<i>b</i>	<i>SE</i>	$\beta$	<i>b</i>	<i>SE</i>	$\beta$	<i>b</i>	<i>SE</i>	$\beta$	<i>b</i>	<i>SE</i>	$\beta$
Step 1															
Sib S	-1.2	1.6	-.09	.10	.73	.02	-.20	.34	-.07	-.77	.64	-.14	-.35	.43	-.10
Sib N	2.1	.95	.26*	.20	.44	.06	.14	.21	.08	.97	.39	.29*	.82	.26	.38*
Acc	-.16	.11	-.18	-.08	.05	-.22	-.01	.02	-.05	-.05	.05	-.14	-.01	.03	-.04
Step 2															
Sib S	-1.2	1.6	-.09	.04	.75	.01	-.16	.35	-.06	-.80	.65	-.15	-.40	.43	-.11
Sib N	2.3	.98	.28*	.21	.46	.06	.11	.21	.07	1.1	.39	.33*	.84	.26	.39*
Acc	-.15	.11	-.17	-.09	.05	-.22	-.01	.02	-.05	-.05	.05	-.13	-.01	.03	-.05
SS X Acc	-.13	.17	-.11	-.04	.08	-.08	.03	.04	.12	-.08	.07	-.16	-.04	.05	-.13
SN X Acc	-.06	.11	-.08	.00	.05	.01	.01	.02	.05	-.07	.05	-.19	-.01	.03	-.03

*Note.* Sib S= Sibling Support. Sib N = Sibling Negative. Acc= Psychological Acceptance. SS X Acc= Sibling Support X Psychological Acceptance. SN X Acc= Sibling Negative X Psychological Acceptance. \*= $p < .05$ , ^= $p =$ approaching significance. \* $p < .05$ . \*\* $p < .01$ . ^=approaching significance.

For predicting public attitudes, the first block was significant,  $F(3, 64) = 4.3, p < .01, R^2 = .17$ . Similar to the effects for total stigma, individual beta weights demonstrated that sibling negative contributed significantly to the prediction of negative self-image (see Table 7). The addition of the Sibling Support X Acceptance and Sibling Negative X Acceptance interaction terms in the second block did not improve the model, and neither of the beta weights for the interactions was significant  $\Delta F(2, 62) = .49, p > .05, R^2 = .18$  (see Table 7). Overall, these findings do not support expectations that the impact of sibling relationship quality on depression and HIV-related stigma would be influenced by psychological acceptance.

#### *Follow-up Analyses*

Follow-up analyses were conducted to examine whether gender, age, or route of transmission altered any of the results for predicting depression and stigma.

#### *Gender*

To examine the potential influence of gender on the compensatory hypothesis predicting depression, the gender, sibling support, sibling negative, and total other support predictor variables were entered simultaneously. The first block was significant,  $F(4, 61) = 4.6, p < .01, R^2 = .23$ . There was a marginally significant main effect for sibling support  $\beta = -.25, t = -1.8, p = .08$ , and no significant main effect of gender  $\beta = -.08, t = -.70, p = .49$ , sibling negative  $\beta = .06, t = .50, p > .05$ , or total other support  $\beta = -.24, t = -1.6, p > .05$ . At step 2 of the regression, neither the Gender X Sibling Support interaction term  $\beta = .23, t = 1.2, p > .05$  nor the Gender X Total Other Support interaction term  $\beta = .01, t = .04, p > .05$  were significant. However, the Gender X Sibling Negative interaction was significant,  $\beta = -.47, t = -2.6, p = .01$ . The direction of the effects illustrated in Figure 2 indicates that, for boys, sibling negative is more predictive of depression than for girls. At step 3, there was a significant 3-way interaction of Gender X Sibling Negative

X Total Other Support,  $\beta = .25$ ,  $t = 2.2$ ,  $p = .03$ ; however the Gender X Sibling Support X Total Other Support,  $\beta = -.05$ ,  $t = -.41$ ,  $p > .05$  was not. Figure 3 shows that, for girls, sibling negative has no effect on depression. On the other hand, when other support is low, sibling negatives do have an effect, but the effect seems to be opposite expectations, with high levels of sibling negative associated with less depression. For boys, the pattern seems to fit expectations better: no effect of sibling negative when other support is high, but an adverse effect of sibling negative when other support is low (see Figure 4).

*Figure 2. The moderating effect of gender on the relationship between sibling negative and depression.*

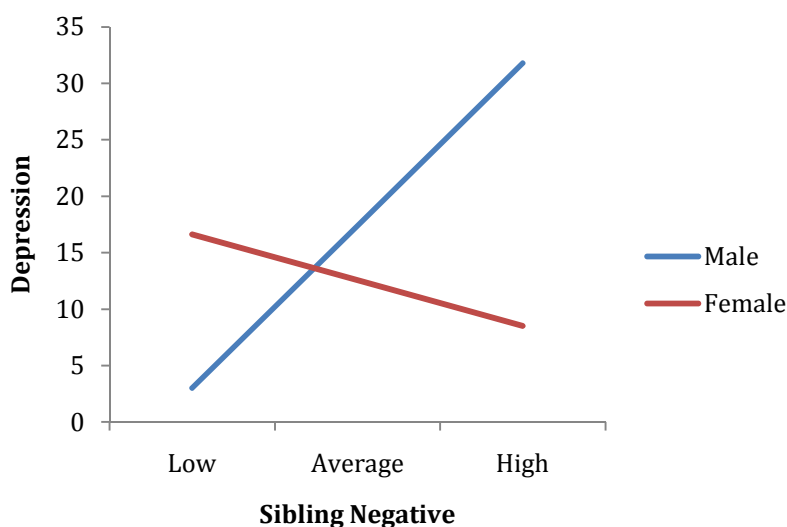


Figure 3: The moderating effect of total other support on the relationship between sibling negative and depression for girls.

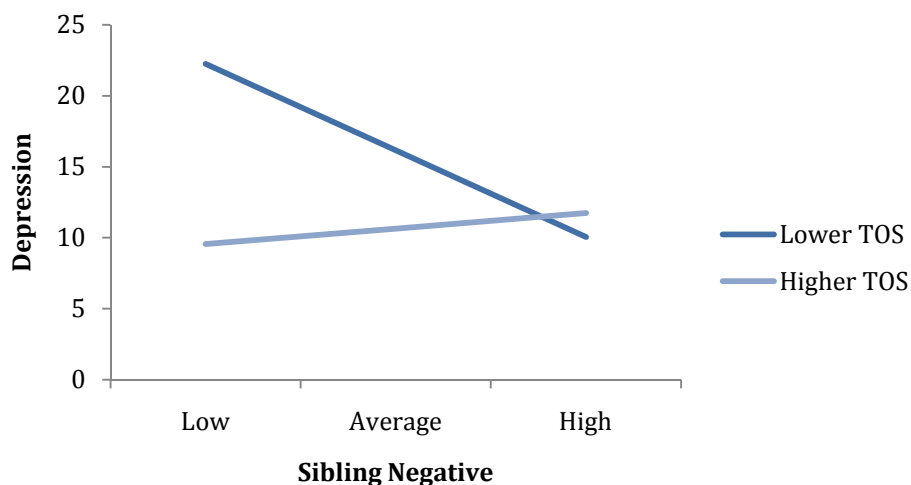
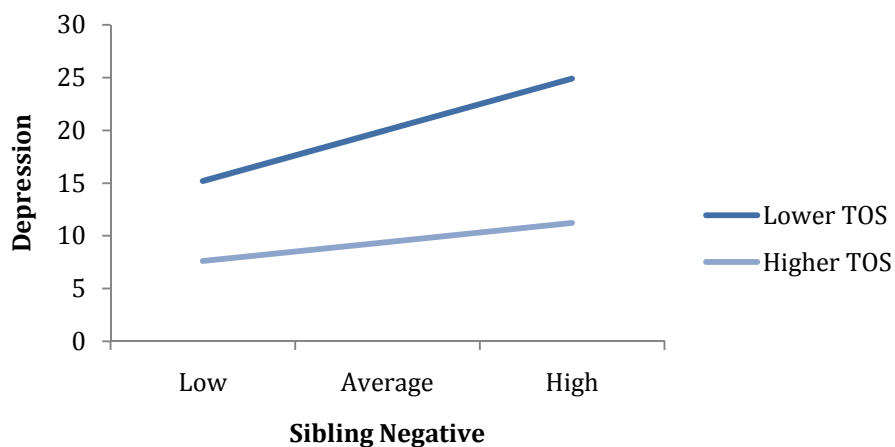


Figure 4: The moderating effect of total other support on the relationship between sibling negative on depression for boys.



To examine the potential influence of gender on the compensatory hypothesis predicting total stigma, the gender, sibling support, sibling negative, and total other support predictor variables were entered simultaneously. The first block was significant,  $F(4, 61) = 3.7, p < .01, R^2 = .20$ . There was a significant main effect for total other support,  $\beta = -.38, t = -2.5, p < .01$  and a marginally significant main effect sibling negative,  $\beta = .22, t = 1.8, p = .07$ . In the second block, the Gender x Sibling Negative interaction,  $\beta = -.39, t = -2.1, p < .05$  and Gender X Total Other



Support  $\beta = .34$ ,  $t = 2.0$ ,  $p < .05$  were significant. Similar to the prediction of depression, Figures 5 and 6 illustrate that sibling negative and total other support were both more predictive of stigma for boys than for girls. At step 3, neither the Gender X Sibling Negative X Total Other Support,  $\beta = .12$ ,  $t = 1.0$ ,  $p > .05$ , nor the Gender X Sibling Support X Total Other Support,  $\beta = .02$ ,  $t = .11$ ,  $p > .05$  interactions were significant.

Similar analyses were conducted to examine the influence of gender when it was included with acceptance and sibling relationship quality as a predictor of youth outcomes. Predicting depression, gender, sibling support, sibling negative, and acceptance were all entered simultaneously. The first block was significant,  $F(4, 61) = 5.8$ ,  $p < .001$ ,  $R^2 = .27$ . Individual beta weights indicated significant main effects of sibling support,  $\beta = -.31$ ,  $t = -2.6$ ,  $p = .01$  and acceptance,  $\beta = -.29$ ,  $t = -2.5$ ,  $p = .01$ . In the second block, neither the Gender X Sibling Support,  $\beta = .13$ ,  $t = .80$ ,  $p = ns$  nor the Gender X Acceptance  $\beta = -.08$ ,  $t = -.55$ ,  $p > .05$  interaction was significant; however, the Gender X Sibling Negative interaction was significant  $\beta = -.55$ ,  $t = -3.3$ ,  $p = .001$ . As previously stated, Figure 2 illustrates that sibling negative is more predictive of depression for boys than for girls. At step 3, neither the Gender X Sibling Support X Acceptance,  $\beta = .04$ ,  $t = .30$ ,  $p > .05$ ; nor the Gender X Sibling Negative X Acceptance,  $\beta = -.02$ ,  $t = -.16$ ,  $p > .05$  interactions were significant.

For predicting total stigma, gender, sibling support, sibling negative, and acceptance were all entered simultaneously. Similar to previous analyses, the first block was marginally significant  $F(4, 61) = 2.3$ ,  $p = .06$ ,  $R^2 = .13$ , with sibling negative as the only main effect  $\beta = .26$ ,  $t = 2.1$ ,  $p < .05$ . In step 2, the only significant interaction term was Gender X Sibling Negative,  $\beta = -.52$ ,  $t = -2.8$ ,  $p < .01$  which indicated that sibling negative was more predictive of total stigma for boys than for girls (see Figure 5). At step 3, neither the Gender X Sibling Support X Acceptance,

$\beta = -.25, t = -1.7, p > .05$ ; nor the Gender X Sibling Negative X Acceptance,  $\beta = -.03, t = -.25, p > .05$  interactions were significant.

Figure 5. The moderating effect of gender on the relationship between sibling negative and stigma.

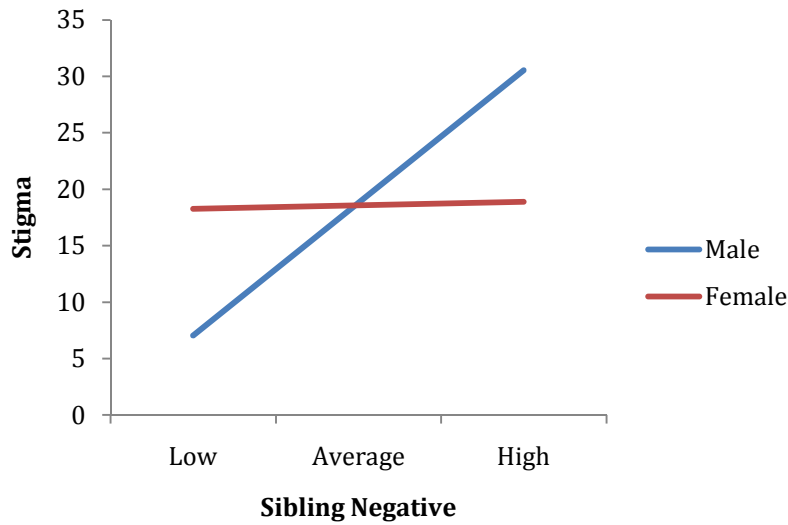
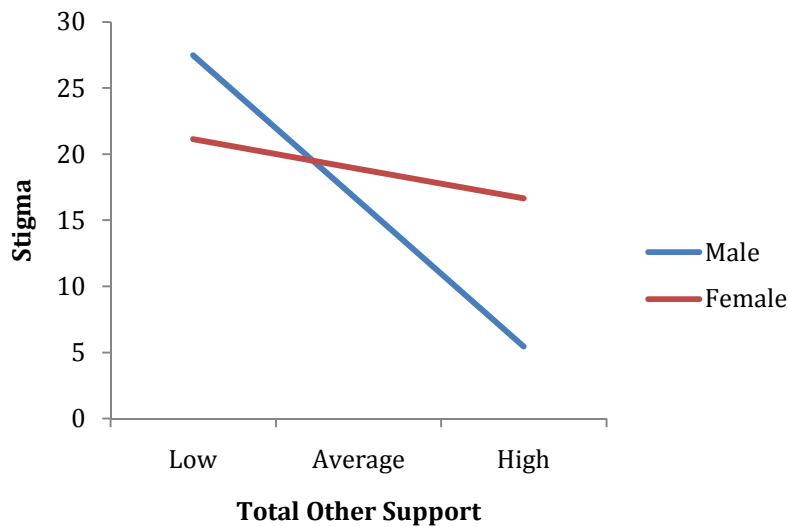


Figure 6. The moderating effect of gender on the relationship between total other support and stigma.



*Age*

To examine the potential influence of age on the compensatory hypothesis predicting depression, the age, sibling support, sibling negative, and total other support predictor variables were entered simultaneously. The first block was significant,  $F(4, 63) = 4.9, p < .01, R^2 = .24$ . There was a marginally significant main effect for sibling support  $\beta = -.25, t = -1.7, p = .08$ , and no significant main effect of age  $\beta = .15, t = 1.3, p > .05$ , sibling negative  $\beta = .08, t = .72, p > .05$ , or total other support  $\beta = -.20, t = -1.4, p > .05$ . At step 2 of the regression, none of the interaction terms were significant, Age X Sibling Negative,  $\beta = .03, t = .25, p > .05$ , Age X Sibling Support,  $\beta = .06, t = .35, p > .05$ , and Age X Total Other Support,  $\beta = -.18, t = -1.0, p > .05$ . In step 3, there was a significant 3-way interaction of Age X Total Other Support X Sibling Support,  $\beta = -.46, t = -2.5, p < .01$ ; however the Age X Total Other Support X Sibling Negative,  $\beta = .24, t = 1.7, p = .09$  was not significant. Figure 7 generally confirms the compensatory hypothesis for younger youth. Figure 8 shows an opposite effect for the older youth, where sibling support is only relevant in the context of high levels of other support.

Figure 7. The moderating effect of total other support on the relationship of sibling support on depression for youth ages 12-17.

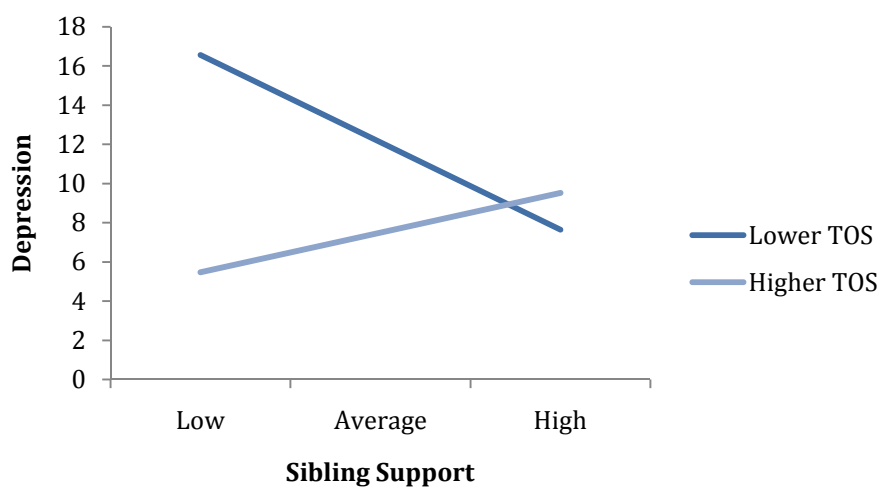
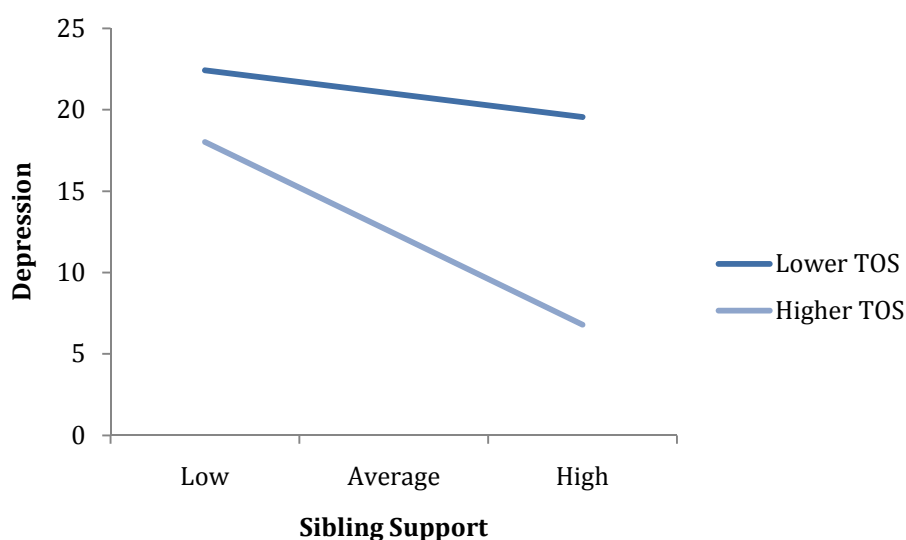


Figure 8. The moderating effect of total other support on the relationship of sibling support on depression for youth ages 18-23.



To examine the potential influence of age on the compensatory hypothesis predicting total stigma, the age, sibling support, sibling negative, and total other support predictor variables were entered simultaneously. The first block was significant,  $F(4, 63) = 4.7, p < .01, R^2 = .23$ . Beta weights indicated that there were significant main effects for age  $\beta = .25, t = 2.1, p < .05$ ,

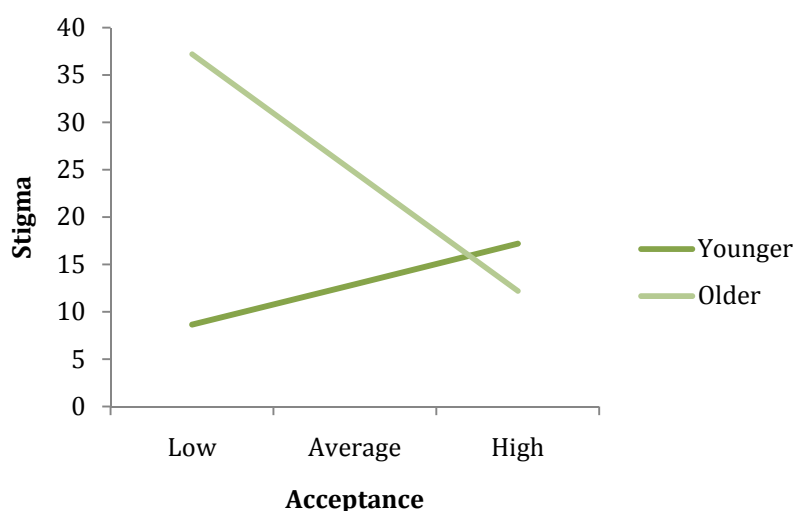
sibling negative  $\beta = .29, t = 2.5, p < .01$ , and a marginally significant main effect for total other support  $\beta = -.27, t = -1.8, p = .07$ . Direction of effects indicated that older youth endorsed higher total stigma levels. At step 2 of the regression, none of the interaction terms were significant, Age X Sibling Negative  $\beta = .13, t = 1.04, p > .05$ , Age X Sibling Support  $\beta = .09, t = .05, p > .05$ , and Age X Total Other Support  $\beta = -.13, t = -.80, p > .05$ . At step 3, neither the Age X Total Other Support X Sibling Support,  $\beta = -.30, t = -1.8, p > .05$ , nor the Age X Total Other Support X Sibling Negative,  $\beta = .18, t = 1.2, p > .05$  were significant.

Similar analyses were conducted to examine the influence of age when it was included with acceptance and sibling relationship quality as a predictor of youth outcomes. For predicting depression, the age, sibling support, sibling negative, and acceptance predictor variables were entered simultaneously. The first block was significant,  $F(4, 63) = 6.6, p < .001, R^2 = .30$ . In addition to the significant main effects of sibling support,  $\beta = -.26, t = -2.2, p < .05$  and acceptance,  $\beta = -.31, t = -2.8, p < .01$ . There was also a significant main effect of age on depression, such that older youth endorsed higher depression levels,  $\beta = .22, t = 1.9, p = .05$ . At step 2 of the regression, none of the interaction terms were significant, Age X Sibling Negative,  $\beta = .04, t = .34, p > .05$ , Age X Sibling Support,  $\beta = -.05, t = -.38, p > .05$ , and Age X Acceptance,  $\beta = -.09, t = -.66, p > .05$ . In step 3, neither the Age X Sibling Support X Acceptance,  $\beta = -.12, t = -.90, p > .05$  nor the Age X Sibling Negative X Acceptance,  $\beta = .10, t = .73, p > .05$  were significant.

To examine the influence of age when it was included with acceptance as a predictor of stigma, age, sibling support, sibling negative, and acceptance were entered simultaneously. The first block was significant,  $F(4, 63) = 4.7, p < .01, R^2 = .23$ . As previously indicated, there were significant main effects for age  $\beta = .32, t = 2.7, p < .01$  and sibling negative  $\beta = .30, t = 2.6, p < .01$ . There was a marginally significant main effect for acceptance  $\beta = -.23, t = -1.8, p = .06$ . At step 2,

there was a significant 2-way interaction of Age X Acceptance,  $\beta = -.21$ ,  $t = -1.9$ ,  $p = .05$ . As shown in Figure 9, acceptance predicted lower levels of stigma for older youth (ages 18-23), as expected. Neither the Age X Sibling Negative interaction,  $\beta = .09$ ,  $t = .74$ ,  $p > .05$  nor the Age X Sibling Support interaction,  $\beta = -.03$ ,  $t = -.22$ ,  $p > .05$  were significant. At step 3, neither the Age X Sibling Support X Acceptance,  $\beta = .12$ ,  $t = .85$ ,  $p > .05$  nor the Age X Sibling Negative X Acceptance,  $\beta = .08$ ,  $t = .60$ ,  $p > .05$  were significant.

Figure 9. The moderating effect of age on the relationship between acceptance and stigma.

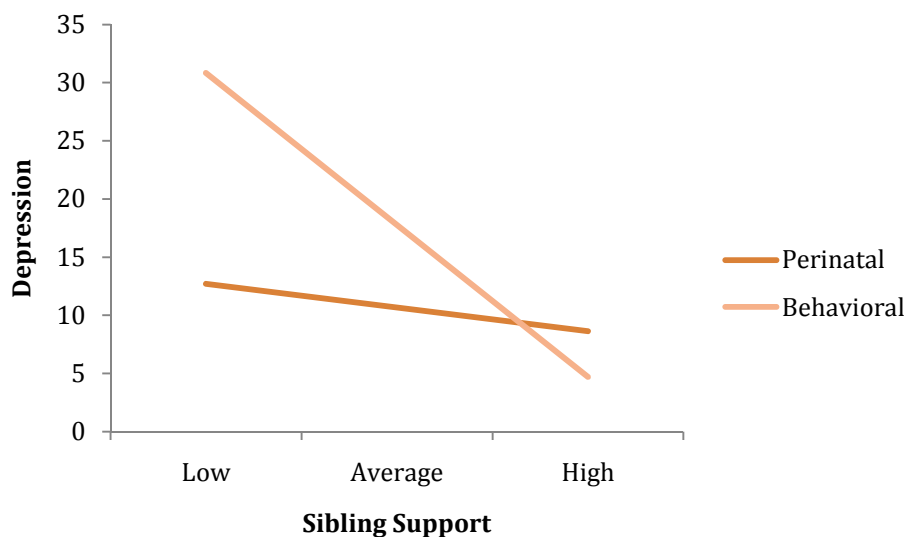


#### Route of Transmission

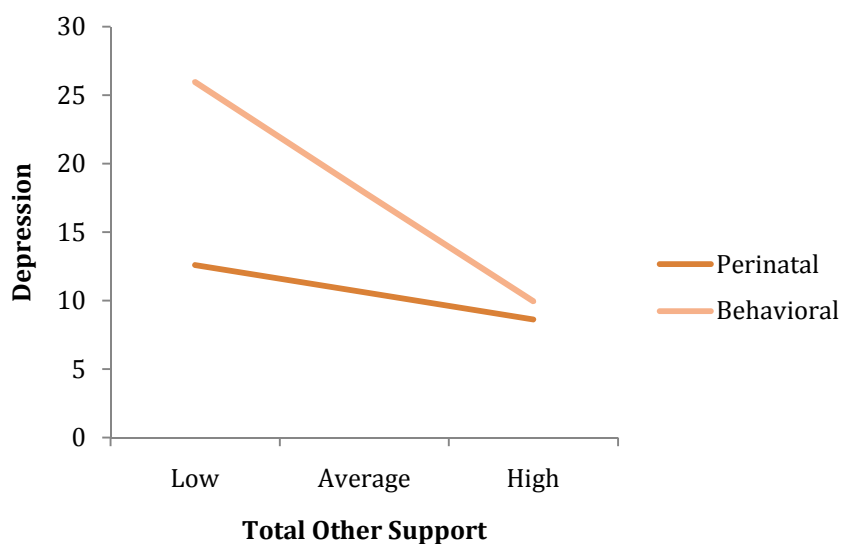
To examine the potential influence of route of transmission on the compensatory hypothesis predicting depression, the route of transmission, sibling support, sibling negative, and total other support predictor variables were entered simultaneously. The first block was significant,  $F(4, 62) = 6.8$ ,  $p < .001$ ,  $R^2 = .31$ . There was one significant main effect of route on depression,  $\beta = .32$ ,  $t = 2.9$ ,  $p < .01$  which indicated that youth who were behaviorally infected endorsed higher levels of depression compared to youth who were perinatally infected. At step 2, Route X Sibling Support interaction,  $\beta = -.35$ ,  $t = -2.2$ ,  $p < .05$  and Route X Total Other Support,  $\beta = -.31$ ,  $t = -2.2$ ,  $p < .05$  were significant. Figures 10 and 11 show that sibling support and total

other support predicted depression for youth who were behaviorally infected. At step 3, neither the Route X Total Other Support X Sibling Support,  $\beta = .01$ ,  $t = .06$ ,  $p > .05$  nor the Route X Total Other Support X Sibling Negative,  $\beta = -.05$ ,  $t = -.34$ ,  $p > .05$  were significant.

*Figure 10. The moderating effect of route of transmission on the relationship between sibling support on depression.*



*Figure 11. moderating effect of route of transmission on the relationship between total other support on depression.*

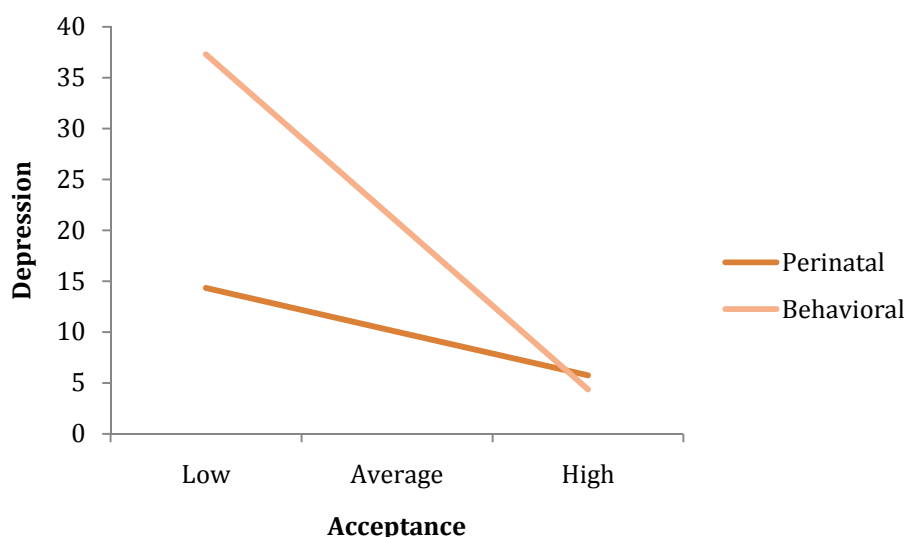


To examine the potential influence of route of transmission on the compensatory hypothesis predicting total stigma, the route of transmission, sibling support, sibling negative, and total other support predictor variables were entered simultaneously. The first block was significant,  $F(4, 62) = 4.2, p < .01, R^2 = .22$ . There were no significant effects in addition to the previously noted main effects of sibling negative  $\beta = .26, t = 2.3, p < .05$ , and total other support,  $\beta = -.32, t = -2.2, p < .05$ . In step 2, there were no significant interactions, Route X Sibling Support,  $\beta = .08, t = .32, p > .05$ , Route X Sibling Negative,  $\beta = -.03, t = -.22, p > .05$ , and Route X Total Other Support,  $\beta = -.34, t = -1.7, p > .05$ . At step 3, neither the Route X Total Other Support X Sibling Support,  $\beta = .07, t = .42, p > .05$  nor the Route X Total Other Support X Sibling Negative,  $\beta = .00, t = .02, p > .05$  were significant.

Similar analyses were conducted to examine the influence of route of transmission when it was included with acceptance and sibling relationship quality as a predictor of youth outcomes. For predicting depression, the route of transmission, sibling support, sibling negative, and acceptance predictor variables were entered simultaneously. The first step was significant,  $F(4, 62) = 10.4, p < .001, R^2 = .40$ . Beta weights indicated main effects for route  $\beta = .41, t = 3.9, p < .001$ , sibling support  $\beta = -.21, t = -1.9, p < .05$ , and acceptance  $\beta = -.39, t = -3.6, p < .001$ . In step 2, there was a significant Route X Acceptance interaction,  $\beta = -.32, t = -1.9, p < .05$ . Figure 12 shows that acceptance predicted depression for behaviorally infected youth. At step 3, neither the Route X Sibling Support X Acceptance,  $\beta = -.10, t = -.52, p > .05$  nor the Route X Sibling Negative X Acceptance,  $\beta = .12, t = .82, p > .05$  were significant.

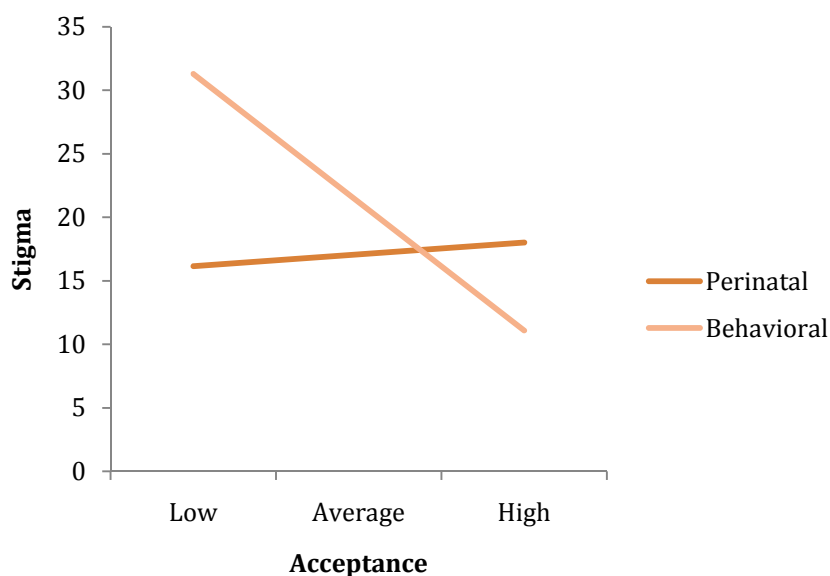


Figure 12. The moderating effect of route of transmission on the relationship between acceptance and depression.



Predicting stigma, the route of transmission, sibling support, sibling negative, and acceptance predictor variables were entered simultaneously. The first step was significant,  $F(4, 62) = 3.9, p < .01, R^2 = .21$ . Beta weights indicated significant main effects for route,  $\beta = .26, t = 2.2, p < .05$ , which indicated that youth who were behaviorally infected endorsed higher levels of total stigma compared to youth who were perinatally infected; sibling negative  $\beta = .28, t = 2.3, p < .05$ , and acceptance  $\beta = -.25, t = -1.9, p < .05$ . At step 2, there was a significant Route X Acceptance interaction  $\beta = -.57, t = -3.2, p < .01$ . Figure 13 illustrates that acceptance predicted total stigma only for youth who were behaviorally infected. At step 3, neither the Route X Sibling Support X Acceptance,  $\beta = -.12, t = -.56, p > .05$  nor the Route X Sibling Negative X Acceptance,  $\beta = -.01, t = -.07, p > .05$  were significant.

Figure 13. The moderating effect of route of transmission on the relationship between acceptance and stigma.



#### Discussion

The current study added to prior work on coping with HIV infection by investigating the contribution of personal and social resources to well-being for infected youth. Additionally, in focusing on psychological acceptance and siblings as resources that might be especially relevant for individuals with HIV, the study contributed new insights on neglected domains that can influence the psychosocial functioning of youth with chronic illness. As such, the findings may point to the importance of interventions that incorporate family and support systems to improve the effectiveness of clinical efforts with youth under these circumstances.

This study examined the personal and social resources that youth living with HIV might bring to coping with their disease. The research hypotheses were based on Rutter's (1987) theory of resiliency, and on a compensatory hypothesis about the relative impacts of family relationships (Boer et. al, 1992; Furman and Buhrmester, 1985). Overall, there was no support for the complex associations among resources posited in the resiliency model, notably the fourth

hypothesis which proposed that psychological acceptance as a personal resource would enhance resiliency by moderating the association between sibling relationship quality as a social resource and outcomes. However, there was clear support for some of the more direct effects of resources imbedded within the model. Greater psychological acceptance was associated with both less depression for behaviorally infected youth and with less perceived stigma for older youth. Both the positive and negative aspects of sibling relationships demonstrated importance for youth's psychological well-being, such that supportive sibling relationships were associated with lower depression for behaviorally infected youth, and negative sibling relationships were associated with greater perceived stigma for boys. Thus, the resources separately predicted the outcomes in expected ways, but only for subgroups of the sample. The results indicated only weak support for the compensatory hypothesis as well, with only some of the expected effects confirmed. When other support agents were lacking, a highly supportive sibling relationship seemed to protect younger youth from experiencing the depressive symptoms that were more common among the younger youths with unsupportive siblings. In addition, boys, but not girls, were vulnerable to the effects of negative sibling relationships when other supports were limited. Although both the resiliency theory and compensatory hypothesis were useful for interpreting the patterns that emerged, the findings also suggest that there are some unique interactions with gender, age, and mode of infection that are not readily explained by these models.

Psychological acceptance serves as a personal resource for youth to manage HIV-related distress because it facilitates coping with uncontrollable stressors. By focusing on relinquishing the struggle to change what cannot be changed (e.g. HIV status), individuals are better able to promote change in areas of life where change is possible (Greco & Hayes, 2008). Findings showing that psychological acceptance was related to lower levels of psychological distress and

perceived stigma in samples of individuals who struggle with substance abuse (Luoma et al., 2008) and chronic pain (Donaldson-Feilder & Bond, 2004; Vowles & McCracken, 2008) suggested that this personal resource might have similar impacts for HIV-infected youth, who frequently encounter similar stressors, such as social isolation. Consistent with the hypothesis, the current findings indicated that higher levels of acceptance were associated with lower levels of depression, but only for behaviorally infected youth and not the perinatally infected youth. The reason for the effect being restricted to this one group might be related to the severity of problems for this group and the meaning of the disease. That is, consistent with findings from other research (Abramowitz et al., 2009; Murphy et al., 2000), the behaviorally infected youth in this study endorsed higher levels of both depression and perceived stigma than the perinatally infected youth. Prior studies have suggested that there is significant distress connected to contracting HIV through behavioral means (Lyon & Woodward, 2003). Compared to perinatally infected youth, behaviorally infected youth experience enormous shame and guilt for contracting the disease as a result of their actions (Swendeman et al., 2006; Flicker et al., 2004). It is likely that the greater levels of difficulties required greater personal resources for coping and, thus, acceptance was relatively more important for this group. Also, it may be that acceptance was associated with lower depression scores for behaviorally infected youth because the disease was acquired as a result of personal actions, and therefore required internal reflection and coping efforts. For example, research on interventions with behaviorally infected adults (Logsdon-Conradsen, 2002; Rodriguez et al., 2010) indicated that psychological distress decreased after participants engaged in a mindfulness intervention, a component of acceptance. It is possible that the behaviorally infected youth in this study identified similar means to manage distress.

Another unexpected interaction showed that, consistent with the hypothesis, higher levels of acceptance predicted lower levels of stigma, but only for the older youth (ages 18-23). One potential explanation for the finding is that at older ages, cognitive flexibility is more advanced than at younger ages. Michaud and colleagues (2009) found that compared to younger youth, older youth were better able to perceive the long-term impact of HIV status disclosure on themselves and others and partially attributed this discrepancy to better cognitive and reflective skills in the older group. Thus, older youth in this study may have been more likely to engage in psychological acceptance than younger youth given their stage of cognitive development.

The current findings generally confirm the component of Rutter's (2000; 2006) theory which posits that one aspect of resilience involves personal resources to cope with stressors. But the findings also broaden the notion of personal resources to include psychological acceptance. Rutter's definition of personal resources is limited to individual attributes, characteristics, and ways of coping with a specific negative event. Rutter describes personal resources as an individual's self-efficacy, positive self-concept, and ability to recognize the positive aspects of an adverse event while not denying the negative. In comparison, psychological acceptance refers to a willingness to experience thoughts, feelings, and physiological sensations without avoiding them so that choices are made based on values, not based on negatively evaluated emotions or thoughts (Hayes, 1987; Hayes, Strosahl & Wilson, 1999) Therefore, personal resources might also encompass a set of complex cognitive and behavioral processes including willingness, awareness of values, and committed action.

The present study also extends the literature on psychological acceptance to include minority youth and HIV. The ability to generalize previous research findings to minority youth has been limited by the use of largely homogeneous, White samples in early studies (Greco et al,

2008). In showing that acceptance is a relevant construct for these youths, the findings have important implications for applying acceptance-based interventions for minority youth infected with HIV. Most interventions for HIV-infected youth are group-based and focus on teaching coping skills and providing psychoeducation about the nature of HIV, safety/risk behaviors, and the importance of medication compliance (Solorzano & Glassgold, 2010). In the future, interventions could incorporate an acceptance component. Adults with HIV evidenced significant improvements in depression, perceptions of stigma, anxiety, and health-related quality of life from interventions that included a mindfulness component (Logsdon-Conradson, 2002; Rodriguez et al., 2010). Interventions for non-infected adolescents that included an acceptance component have shown some positive effects for problems that are also concerns for these youth. For example, Metzler and colleagues (2000) reported a randomized trial that employed ACT as part of a program that reduced high-risk sexual behavior in adolescents. Wicksell et al. (2007) reported substantial improvements in reports of pain and related psychological distress for 14 adolescents with chronic pain. For youth infected with HIV, exercises that foster acceptance of negative thoughts and feelings such as shame, guilt, and depression may reduce the influence of such thoughts and feelings over behavior such as high-risk sexual behavior, poor medication adherence, and social withdrawal. Helping youth define valued directions they want to take and establish goals for their lives may orient them toward action that is not only about peer acceptance, but also about living in accordance with broader values connected to education, spirituality, leisure, health, and friendship (Heffner et al., 2002). Strengthening these processes could inoculate HIV-infected youth against peer influences to engage in risky behaviors (Bauermeister et al., 2009) and improve psychological well-being (Biglan et al., 2008).

In addition to psychological acceptance as a personal resource, the sibling relationship as a social resource in the resiliency model was confirmed by several findings, though in each case the association was restricted to only a subgroup of the sample. Consistent with research demonstrating the influence of relational support on psychosocial functioning for individuals infected with HIV (Kalichman, 2003; Lam et al., 2007), sibling support, independent of support from others, predicted less depression in the current study, though this effect occurred only for the behaviorally infected youth. Perhaps shame and guilt associated with becoming infected prevent these youth from seeking support from peers who may shun them in response (Swendeman et al., 2006), and thus make them particularly in need of support from a sibling. The hypothesis that negative sibling relationships might inhibit resiliency in the form of fostering greater perceived stigma was supported, but only for boys. The finding is consistent with qualitative research on youth who reported that rejection from family members perpetuated their fears associated with stigma (Hosek et al., 2000). The reason why this association occurred only for the boys may relate to relatively greater unmet needs for support among boys. Prior studies have demonstrated that boys' best friendships tend to be characterized by less self disclosure, closeness, affection, nurturance, trust, security, acceptance, and enhancement of worth than are girls' best friendships (Dwyer et al., 2010; Rubin et al., 2006). Thus, the limited emotional intimacy in boys' friendships may make the sibling relationship particularly salient as an alternative source of emotional support. In turn, this greater dependency on siblings as a source of support may also make boys susceptible to problems when the sibling relationship is hostile or antagonistic. Alternatively, it is possible that the findings may reflect an artifact related to the measure. It may be that the Network of Relationship Inventory (NRI) was not sensitive to capturing support or conflict within girls' relationships. There were no differences between girls

and boys on scores for the sibling relationship variables, nonetheless, critical features of girls relationships might have been missing from the measure. For example, overt conflict might be less salient than covert, manipulative behaviors in girls' relationships (Crick and Grotpeter, 1996). Similarly, girls might value types of support, which are not addressed in the NRI. Given the uncertain factors that contributed to the gender differences in the findings, it will be important for future studies to examine the impact of gender more thoroughly, including the impact of being a same- versus opposite-gender sibling pair. Studies to date that consider the effects of gender matching on sibling relationship quality and outcomes present mixed results, with some studies citing it as an influential factor (Buhrmester, 1992; Dunn et al., 1994; Tucker et al., 2001) while one seminal review indicated little effect (Brody, 1998).

This possibility that the greater impact of sibling relationships for boys has to do with the greater unmet need for support by boys than girls is consistent with the compensation hypothesis. Previous research suggested that siblings might develop positive relationships that compensate for the loss of support from parents and others during adverse circumstances, such as parents' marital distress, divorce, or death (Boer et. al, 1992). In the current study, the compensatory hypothesis was demonstrated in predicting depression for boys and younger youth (age 12-17 years), but in different ways. For boys, a negative sibling relationship was associated with depression, particularly in the context of low support from others. This finding again suggests that boys are more vulnerable than girls to sibling stress especially when they lack other forms of support. For younger youth, when other support agents were lacking, a highly supportive sibling relationship seemed to protect the youth from experiencing the depressive symptoms that were more common among the youths with unsupportive siblings. However, the pattern was not confirmed for older youth (age 18-23). Instead, for these youth, siblings seemed to potentiate



effects of other supportive relationships, but did not compensate for poor support from others. A possible explanation for the finding is that given the increasingly complex social contexts that accompany adolescent development, such as navigating mixed gender friend groups, romantic partners, and autonomy from family (Burhmester, 1992; Tucker et al., 2001), the support needs of older youth might be more complex than the needs of younger youth. It may also be that effective support for depression varies at different ages because it tends to emerge from different sources (Ge et al., 1994; Hankin, 2006). That is the effectiveness of support from a sibling might differ if the youth's distress was linked to social rejection, as is often the case with young children, versus romantic relationship difficulties, which is a more common source of stress for older adolescents and young adults. Notably, most research on the compensatory hypothesis has examined sibling relationships as compensating during early and middle childhood, when parental support was lacking (Hetherington, 1988, 1989; Bryant, 1992). The few studies that investigate the hypothesis in late adolescent sibling dyads suggest that sibling relationships provide comparable kinds of social benefits such as companionship, instrumental help, and intimacy, but are limited because these dyadic relationships are often not able to substitute for social belongingness (Shaver & Buhrmester, 1983; East & Rook, 1992; Seginer, 1998). Future studies should examine specific sources of psychological distress to further elucidate the most effective types of support for these youth at different developmental stages.

In contrast to the effects on depression, there was little support for the compensatory hypothesis predicting stigma. There was a significant finding predicting disclosure stigma that was contrary to expectations. Disclosure stigma is a unique type of stigma in that it involves not only concerns about disclosing HIV status oneself, but also concerns that people who already know one's HIV status will divulge that information to others. In the present study, when

support from others was lacking, sibling support had no effect on youth disclosure concerns. However, for youth who had high support from others, low sibling support was associated with relatively low disclosure stigma. Thus, for the youth in the current study, disclosure concerns were a significant worry, but a little less so when the sibling was unsupportive. It may be that because these youth have a strong need for social supports, when they do not have a close sibling to rely on, they are forced to overcome their fears of disclosure and divulge their status to others in an effort to obtain that support. Given that the finding is perplexing, additional research is needed to replicate the result.

The failure to confirm Rutter's notion about the interactive effects of personal and social resources for fostering resiliency suggests that this notion needs further explication. In the current framework, this notion was interpreted to imply that the relationship between sibling relationship quality and outcomes would be based on the youth's level of psychological acceptance, which would enhance the positive effects of sibling support and reduce the negative effects of sibling conflict. However, Rutter's theory does not actually specify the way in which personal and social resources are expected to interact. It is possible that effects are bi-directional, or are in some other ways more complex than the proposed moderational model. For example, research has established that the ways in which children behave in their interactions with others influence how other people behave towards them, which either increase or decrease the impact of psychosocial risk factors (Rutter, 1999). In the current study, a bidirectional effects model may better explain the relationships among the resources and the outcomes. Youth who are more depressed or perceive greater stigma may in turn develop more negative and/or less supportive sibling relationships.

The unexpected importance of route of transmission on the relationship among sibling relationship quality, psychological acceptance and distress outcomes suggests that greater attention be given to this issue. Specifically, youth who are perinatally infected might have different experiences compared to behaviorally infected youth. For example, time period since diagnosis and level of family involvement likely differ such that perinatally infected youth have been diagnosed for a longer period of time and as such, have families that are more involved in supportive care than the families of behaviorally infected youth. Thus, resiliency and support models might be reconceptualized to further reflect the contextual influence of route of transmission.

#### *Study Limitations and Future Directions*

While the present study provides further support for and broadens previous research involving psychological acceptance, siblings, and youth living with HIV, there are some limitations. The cross-sectional nature of the study limits conclusions about the long-term influence of personal and social resources on HIV-related distress. Whereas the current study is based on hypotheses that psychological acceptance and sibling relationship quality are predictive of depression and perceived stigma, given the cross sectional nature of the study, the temporal sequencing of these variables is unclear. Therefore, future studies that utilize prospective and longitudinal designs with a baseline assessment of psychosocial and relationship functioning prior to an HIV diagnosis would better allow researchers to understand the dynamic interplay between these variables. The current study is also limited by its reliance on self-report measures because a number of study variables were dyadic in nature. Thus, the use of multi-methods of reporting from multiple informants (e.g. siblings, caregivers, teachers) to assess sibling relationship quality and youth's psychosocial functioning would enhance the validity of future

findings by reducing reporter bias. An additional limitation is the low reliability of the psychological acceptance measure (AAQ-R) and thus caution should be used when interpreting related findings in the current study. The low internal consistency of the measure may be because the measure was constructed for use with adults and may not be relevant for use with younger children. Future studies that use the AAQ-R might aim to further explore the applicability and meaning of psychological acceptance in urban, low-income minority samples.

The current study used the broad scales of support and negative on the Network of Relationships Inventory (NRI) to examine relationship quality, and also looked at “other” support for the combined group of parents and friends. To further understand the nature of sibling relationship quality for these youth, it may also be important for future studies to examine specific subscales that compose the support and negative scales such as intimacy, affection, and conflict. Also, given that support from others was an important construct in the current study, it will likely be useful to compare the effects of support from family vs. others and explore support across specific relationships (e.g., partner, parent, best friend) as opposed to categorizing all other supports into one group. Similarly, it may also be beneficial to examine “other conflict” because it will likely be important to understand specific sources and types of conflict for these youth.

Although the unusual sample for this study extends generalizability of sibling support and psychological acceptance findings to minority youth, there are limitations with this sample. Because the participants in the current study were recruited from a local HIV and AIDS clinic and so received specialty care and prevention counseling, they may have greater knowledge and awareness about HIV and related issues than HIV-positive youth who have not been exposed to such care. It may be that with this increased awareness and exposure to programs, youth

experience increased support which is consistent with the sample, who on average reported high levels of support. In addition, the present sample cannot be assumed to represent youth who have been diagnosed but choose not to seek services.

Most youth in the present study reported high levels of support from siblings as well as others. Given that there are no normative samples to serve as a comparison, it is unclear what might explain the reports of high levels of support. One possible explanation is that there is a cultural component reflected in the data. Specifically, the high levels of support might represent the dynamic of the supportive “extended family” that is prevalent in African American communities (Williams et al., 2000). Alternatively, the youth in the study are all chronically ill which perhaps confounds reported levels of support such that being ill might be closely associated with relatively high levels of support from others. Lastly, there may be self-report bias, where youth were not willing to endorse negative aspects of their supports/lives within a research context. Research on reporting bias suggests that what is reported depends largely on who is reporting (Widmer & Weiss, 2000). As such, support reported by youth may only be moderately correlated with that support reported by providers. In future studies, it will be important to consider and explore the potential effects of these factors on results.

The conclusions regarding the compensatory hypothesis and resiliency theory are limited because the current study does not include additional factors that may be impacting the sibling relationship and reported level of psychological distress. Future research with sibling relationships of youth living with HIV might benefit from a broader systemic perspective and include measures of caregiver’s marital relationship, community support, and family environment. Recent literature on resiliency indicates that protective factors involve multiple pre-existing components such as temperament, cognitive level, genetic influences, cognitive

processing, and family environment (Rutter, 2006; Luthar & Cicchetti, 2000). The investigation of these factors as a set of processes, combining psychosocial and biological research approaches may improve research on resiliency. Prior research using resiliency models include samples that were under measurable conditions of adversity, as determined by an adversity index (Luthar, 1991; Connell et al., 1994; Werner, 1996). Rutter (2006) and others (Luthar & Cicchetti, 2000; Stattin et al., 1997; Steinhauer, 2001) suggest that the study of resilience should include quantitative measures of risk and protective factors. The current study does not include risk factors in the model, but instead focuses on the protective factors in the context of adversity.

Overall, the present study suggests that there may be value in including a sibling or another important person in group-based or individualized interventions for adolescents living with HIV. Individualized interventions that involve parents have evidenced gains in youth's medication adherence and psychological well-being (Murrell & Scherbarth, 2006). In their review of acceptance-based interventions, Greco and Eifert (2004) highlight the benefits of integrating acceptance-based work in family interventions for adolescents. In addition, given the suggested influence of negative sibling relationships on youths' perceptions of stigma, it will be important for interventions to include a psychoeducation component designed for families to ultimately reduce misperceptions of HIV that perpetuate stigma. Future research endeavors should examine the efficacy of intervention programs in individual and group settings to determine if the predicted benefit of both personal and social resources are compounding factors in the psychosocial well-being for youth living with HIV.

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