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# Equity of Social Support and Its Relationship with Depression, Anxiety, and Antiretroviral Medication Adherence Among Seroconcordant Dyads of HIV-positive African Americans and Their Informal Supporters

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EQUITY OF SOCIAL SUPPORT AND ITS RELATIONSHIP WITH DEPRESSION,  
ANXIETY, AND ANTIRETROVIRAL MEDICATION ADHERENCE AMONG  
SEROCONCORDANT DYADS OF HIV-POSITIVE AFRICAN AMERICANS AND  
THEIR INFORMAL SUPPORTERS

by

Angela R. Wendorf

A Dissertation Submitted in  
Partial Fulfillment of the  
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August 2014

ABSTRACT  
EQUITY OF SOCIAL SUPPORT AND ITS RELATIONSHIP WITH DEPRESSION,  
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Angela Wendorf

The University of Wisconsin-Milwaukee, 2014  
Under the Supervision of Professor Katie Mosack

Social support may be an important resource for those coping with stigmatized chronic illnesses, such as HIV/AIDS, as social support may buffer the deleterious impact of HIV-related distress (Derlega, Winstread, Oldfield, & Barbee, 2003; Stutterheim, Bos, Pryor, Brands, Liebrechts, & Schaalma, 2011; Ueno & Adams, 2001). Yet little is known about characteristics of social support among HIV-positive patients in relationships with other HIV-positive individuals and whether there is an equivalent perception and provision of support between each patient in the relationship. To examine how equity of support within the dyad may contribute to nuances in social support, mental health outcomes, and treatment adherence among HIV-positive individuals, I recruited 34 dyads comprised of HIV-positive African Americans and their HIV-positive supporters to complete a survey with measures of perceived social support, equity of support, relationship factors such as perceived quality of the relationship, depression and anxiety, and treatment adherence. The results indicate that perceptions of greater perceived social support from one's dyadic partner was associated with fewer depressive or anxiety symptoms. Index patients and informal supporters' perceptions of source-specific social support were not related to index patients' past month medication adherence.

Participants' own and dyad partners' perceptions of equity (i.e., deviation from equity) were not identified as significant predictors for any of the outcome variables. There was no evidence of significant partner effects for any of the study hypotheses. Thus, the results from this study may be most consistent with an actor-oriented model (Kenny & Cook, 1999), wherein the participants' outcomes are a function of the individuals' perceptions themselves, and their partners' perceptions have no effect on the individuals' outcomes. The results from this study indicate the protective effects of individuals' perceptions of being supported by a specific support person, generalized among a variety of relationships, on depressive and anxiety symptoms. Future research should explore the perceptions of support and the rules that may govern relationships among individuals in HIV-affected relationships to better understand the nuances in social support and their relation to mental health and treatment outcomes.

## DEDICATION

**To Benjamin, my collaborator in all things.**

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Equity of Social Support and its Relationship with Depression, Anxiety, and  
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The experience of having a chronic and life-threatening illness can present considerable psychological challenges related to the trauma of the diagnosis, resultant physical and functional impairments, and threats to health (Dunlop et al., 2004). In the case of HIV/AIDS, patients may also be likely to grapple with issues such as responding to stigma and discrimination, negotiating sexual relationships, and dealing with uncertainty related to health and medication effectiveness. Patients are also managing aversive short- and long-term medication side effects (e.g., diarrhea, neuropathy, lipodystrophy, liver disease, and so forth) while being reminded of the need for long-term medication usage and strict medication adherence to prolong survival. Consequently, HIV-positive patients are at increased risk for the development of depressive disorders (Ciesla & Roberts, 2001). Similarly, HIV-positive patients may be at risk for the development of anxiety disorders, particularly if they have not developed adaptive coping strategies to deal with HIV-related distress and uncertainty (O'Cleirigh, Hart, & James, 2008). One of the prominent self-care strategies for coping with HIV-related stress and managing depressive symptoms and anxiety endorsed by HIV-positive patients is seeking social support from others (Eller et al., 2005; Eller et al., 2010; Kemppainen et al., 2003; Kemppainen et al., 2006; Kemppainen et al., 2012; Tufts, Wessel, & Kearney, 2009).

## Social Support in the Context of HIV

Social support is conceptualized as interpersonally-provided aid in terms of emotional, self-esteem, informational, instrumental, and financial resources and assistance (Berkman, Glass, Brissette, & Seeman, 2000). Although several types of social support have been proposed in the literature, there are five primary types of social support that have gained consensus. As described by Cutrona and Suhr (1994; 120) the primary types of social support include informational support, tangible aid, emotional support, social network support, and esteem support. The authors describe *Informational Support* as “providing information about the stress itself or how to deal with it;” (pg.120) an example of informational support could be the provision of information by the patient’s medical doctor for different ways to cope with HIV medication side effects. Receiving financial assistance from a family member for medical bills would be an example of *Tangible Aid*, defined by the authors as “providing or offering to provide goods or services needed in the stressful situation” (pg. 120). The authors describe *Emotional Support* as “communicating love, concern, or empathy” (pg. 120), thus; when others affirm their love for the patient they are providing emotional support. On the other hand, *Social Network Support*, or “communicating belonging to a group of persons with similar interests or concerns” (pg. 120) might be expressed when a supporter shares examples of others who have successfully remained adherent to HIV medications. Finally, when a supporter emphasizes their HIV-positive loved one’s self-worth through “communicating respect and confidence in abilities,” they are demonstrating *Esteem Support* (Cutrona & Suhr, 1994, pg. 120).

Social support may be an important resource for those coping with stigmatized chronic illnesses. Social support provided by individuals in the patient's social network (i.e. informal supporters) has been proposed to influence the patient's illness representation, the process of adjustment to illness, experience of symptoms, management of symptoms, and adherence to medications (Spirig, Moody, Battegay & De Geest, 2005). In the context of HIV, social support has been shown to buffer the deleterious impact of HIV-related distress on individuals' psychosocial functioning (Derlega, Winstread, Oldfield, & Barbee, 2003; Stutterheim, Bos, Pryor, Brands, Liebrechts, & Schaalma, 2011; Ueno & Adams, 2001). Furthermore, social support can be used to manage uncertainty associated with the experience of HIV/AIDS (Brashers, Neidig, & Goldsmith, 2004), assist with antiretroviral medication adherence efforts (Hamilton, Razzano, & Martin, 2007; Stumbo, Wrubel, & Johnson, 2011), and instill hope in patients (Harris & Larsen, 2007).

Social support may be an especially relevant resource for HIV-positive African Americans who are disproportionately affected by the disease. For instance, although African Americans comprise 14% of the population, they make up 46% of the HIV-positive population living in the United States, which is an estimated 1.2 million people (Centers for Disease Control and Prevention [CDC], 2011). Furthermore, African Americans account for 44% of new HIV infections each year (CDC, 2011). In fact, African Americans represent the greatest proportion of cases of HIV-positive women, heterosexual men, injection drug users, and infants (CDC, 2007). Disparities in the distribution of power and resources and resulting social inequalities that are particularly prevalent in the African American community (e.g., poverty, decreased access to health

care, lack of insurance, incarceration) may significantly contribute to increased rates of HIV infection, poorer health outcomes, fewer coping resources, and increased rates of emotional distress among African Americans living with HIV/AIDS (Davidson, 2011; Zierler & Krieger, 1997).

Seeking social support has been identified as a primary self-care behavior among African Americans living with HIV (Tufts, Wessell, & Kearney, 2009). Support from others coping with HIV/AIDS may be particularly helpful for patients because of the social isolation, stigma, and discrimination that people living with HIV/AIDS may experience (Coates et al., 1987). Peer support has been shown to be an important resource for coping with HIV and can be even more helpful than family support (Adelman & Frey, 1997; Spirig, 1998; Brashers, Neidig, & Goldsmith, 2004), because people may perceive friends as being more helpful than family (Serovich, Kimberly, Mosack, and Lewis, 2001). People living with HIV turn to peers for informational support, advocacy, emotional support, and understanding. Peer support has also been found to facilitate skills for decision-making and advocating for one's own health care (Brashers, Haas, Klinge, & Neidig, 2000; Brashers, Neidig, & Goldsmith, 2004).

### **Social Support and Depression**

Associations between the lack of positive social support and the presence of unsupportive interactions with depression among HIV positive individuals are evident in the literature (Siegel, Ravhis, & Karus, 1994, 1997; Ingram et al., 1999; Hays, Turner and Coates, 1992; Serovich et al., 2001). Among individuals living with HIV/AIDS, the presence of social support has been associated with fewer depressive symptoms (Ingram et al., 1999; Metts, Manns, & Kruzic, 1996; Siegel, Karus, & Raveis, 1997). Research

indicates that perceived and enacted HIV-related social support is inversely associated with depressive symptoms among HIV-positive women and men, such that lower levels of actual or perceived support are consistently associated with higher frequency or severity of depressive symptoms (Carrieri et al., 2003; Fukinishi et al., 1997; Heckman et al., 2004; Rabkin et al., 1997; Simoni, Huang, Goodry, & Montoya, 2006; Turner, Hays, & Coates, 1993). Additionally, some researchers have found that perceived social support has a stronger inverse association with depressive symptoms than enacted support (McDowell & Serovich, 2007). Being satisfied with the quality of social support has been associated with a decreased likelihood of depression (Hays, Turner, & Coates, 1992, Ingram et al., 1999). On the other hand, negative or unsupportive interactions have been linked with depression among HIV-positive individuals. In a sample of 271 people living with HIV, Ingram et al., (1999) identified three types of unsupportive interactions associated with depression; insensitivity, disconnecting, and blaming. Depression may also create strain and stress in interpersonal relationships within this context, making it more difficult to obtain continued support from others, resulting in a diminished quality of support received from others (Knowlton, Curry, Hua, & Wissow, 2009; Schrimshaw, 2002). Consequently, depressive symptoms could be exacerbated if the person living with HIV/AIDS experiences a loss of support, completing a vicious cycle of diminishing support and increasing depressive symptoms.

### **Social Support and Anxiety**

Compared to the literature on social support and depression, there has been considerably less research conducted on the topic of social support and anxiety. Among individuals living with HIV/AIDS, the most prevalent anxiety-related disorders are



adjustment disorders with anxiety, generalized anxiety disorder, and posttraumatic stress disorder (Kerrihard et al., 1999; Kessler et al., 2005). Low partner support has been identified as a potential predictor of the development of adjustment disorder with anxiety in HIV-positive men, along with a history of generalized anxiety, and a coping style characterized by low mastery or control over life events (Dew et al., 1997). More recently, researchers have examined the differential effects of social support by support providers on anxiety symptoms for people living with HIV/AIDS. Gordillo and colleagues (2009) found that emotional support from family and friends has been associated with lower levels of anxiety symptoms among HIV-positive men and women living with HIV, but emotional support from partners was not significantly associated with anxiety.

Most research examining social support and anxiety has been focused on the realm of fear and anxiety symptom management (Kemppainen et al., 2003; Kemppainen et al., 2006; Kemppainen et al., 2012) and has included cross cultural samples of people living with HIV/AIDS in Kenya, South Africa, Norway, Taiwan, and the United States. Kemppainen and colleagues (2003) examined perceived causes of anxiety symptoms and fearfulness among 73 HIV-positive individuals in the United States who reported anxiety as their most troublesome HIV-related symptom. Participants attributed their anxiety symptoms and fears to concerns about the personal or existential impact of HIV (i.e., concerns about being HIV positive, concerns about how the virus was contracted, worry about HIV as a punishment, concerns about treatments; worry about changing physical appearance; concerns about the future, fears about death); social relationships and HIV (i.e., worry about contagion, disclosure, discrimination, losses, concerns about

the impact HIV has on the family, fearing the responses of healthcare providers; and concerns related to structural issues (i.e., economics and housing). The most frequent causes of fear and anxiety were concerns about death and worries about the future (Kemppainen et al., 2003). HIV-related death anxiety, a prominent fear described above and related to death due to HIV illness, has been shown to be modestly and inversely associated with social support in a recent meta-analysis of 18 studies examining death anxiety in people living with HIV/AIDS (Miller, Lee, & Henderson, 2012). Thus, social support appears to have a modest protective effect for the presence of death anxiety.

Seeking social support is a common strategy for the management of HIV-related fear and anxiety. For instance, in the study conducted by Kemppainen et al. (2003), 21% of the 73 participants reporting anxiety as their most troublesome HIV-related symptom in the study reported seeking advice from supportive family members, friends, medical providers, and HIV-positive peers to cope with anxiety. In a more recent study conducted by Kemppainen and colleagues (2012), 343 HIV-positive participants from Kenya, South Africa, and the United States endorsing anxiety as a prominent HIV-related symptom, reported utilizing social support self-management strategies, including talking with family and friends (n=199, 58.0%); talking with others (n=144, 42%), and attending a support group (n=83, 24.2%). Among 502 HIV-positive individuals from Norway, Taiwan, and the United States who endorsed anxiety as a prominent HIV-related symptom reported talking with family and friends as a strategy to manage their anxiety (n=398, 58.25 daily, 32.7% monthly). However, talking with family and friends was only rated as a moderately effective self-care behavior for anxiety among this sample (Kemppainen et al., 2006). It is unclear what aspects of seeking support from family and

friends were beneficial and which were less advantageous for management of anxiety symptoms.

### **Social Support and Adherence**

Evidence suggests that limited social support (Ammassari et al., 2002; Catz et al., 2000; Fogarty et al., 2002; Machtinger & Bangsberg, 2005) and less stability of social support is associated with non-adherence to HIV medications (Johnson et al., 2003). On the other hand, researchers have found that the presence of positive social support is related to adherence (Cox, 2009; Gonzalez, et al., 2004; Murphy et al., 2004; Remien et al., 2003) and satisfaction with social support is related to greater adherence (Vyavaharkar et al., 2007). Conversely, less stability of social support has been associated with non-adherence to HIV medications (Johnson et al., 2003).

The relationship between social support and adherence may, however, be more complex than some have demonstrated. For instance, the nature of the relationship between the support provider and recipient may have differential effects on the perception of support by the recipient (Johnson et al., 2003; Schwarzer, Dunkel-Schetter, & Kemeny, 1994; Serovich et al., 2001). Individuals with HIV report perceiving more social support from partners or friends than from family members (Johnson et al., 2003; Schwarzer, Dunkel-Schetter, & Kemeny, 1994; Serovich et al., 2001). There are also complex results when types of relationships, supporter factors (such as HIV status), characteristics of support, and medication adherence have been examined. For example, contrary to the general finding that support is predictive of adherence, some have found that having a primary partner is actually predictive of *non*-adherence (Johnson et al., 2003; Knowlton et al., 2011).

Recently there has been increased attention on the examination of couple-level variables associated with HAART adherence (Knowlton et al., 2011; Johnson, Dilworth, Taylor, Darbes, Comfort, & Neilands, 2011). For instance, Knowlton and colleagues (2011) examined main partner factors associated with adherence to HAART among a diverse, primarily African American, population of HIV-positive women in Baltimore and found that medication adherence rates differed drastically between those without a partner, those with a seronegative partner, and those with a seropositive partner. Specifically, rates of HAART adherence (self-reported past seven day recall) were highest (i.e., 92%) for non-partnered women and lowest (i.e., 57%) among those in seroconcordant relationships, i.e., those in which both members of the couple are HIV-positive. Results from adjusted analyses indicated that “better” (e.g., greater than 90%) medication adherence was 75% less likely among women in seroconcordant relationships; moreover, better medication adherence was 78% less likely among women who relied on their HIV-positive partner for emotional support. Additional analyses revealed that there was a discrepancy with support needs and support receipt among women with partners. Overall, 53% of HIV-positive women with either a seropositive or seronegative partner reported preferences of receiving the most emotional support from partners; however, only 35% indicated that their partner was indeed their main supporter. The discrepancy was even greater among women with a seropositive partner (i.e., in seroconcordant relationships), with 68% of women reporting preferences for their partner as their main HIV-supporter, and only 32% receiving main HIV-related support from their partner. Thus, support needs did not appear to be met among this sample of HIV-positive partnered women, particularly among those in seroconcordant relationships.

When support is enacted by informal supporters, people living with HIV describe the types of emotional and instrumental support that they receive with respect to medication adherence, such as coaching, providing medication reminders, monitoring medication adherence, filling prescriptions, and assisting with medication administration (Wrubel et al., 2008). Behaviors that are perceived as helpful include those that demonstrate empathy and teamwork or partnership and behaviors that are perceived as unhelpful include when support attempts seem intrusive, insincere, dismissive, or avoidant (Barbee, Derlega, Sherburne, & Grimshaw, 1998; Mosack & Petroll, 2009). Patients and health care providers have described what this looks like in the HIV/AIDS health care context when informal supporters attend medical appointments; examples given for unhelpful support attempts include when the treatment supporter nags the patient or dominates discussions with health care providers (Mosack & Petroll, 2009; Mosack & Wendorf, 2011). Even supportive behaviors that informal supporters perceive to be in the interest of the recipients' treatment adherence may not be. For instance, Beals and colleagues (2006) found that caregivers' reminding HIV-positive patients to take medications was not significantly associated with medication adherence. Taking these findings into account, researchers have hypothesized that it may be the unhelpful interactions between partners that contribute to poor rates of medication adherence (Johnson et al., 2003).

In summary, although the extant literature on social support in the context of HIV has largely documented positive associations between social support and positive physical and mental health outcomes, the mechanisms linking social support with physical and mental health outcomes and the ways in which social support might

contribute to negative outcomes remain unclear. Part of the problem may be because there is an insufficient emphasis on the underlying dimensions of social support; in particular, on social exchanges (i.e., giving and receiving support) within supportive relationships. However, it is important to note that there has been scant exploration of the dimensions of support and exchange of support for individuals in HIV-affected relationships outside of the context of partnerships; that is, for those in HIV-affected supportive relationships irrespective of romantic, conjugal, or other familial ties. Indeed, there are gaps in the literature on social support in the context of broad HIV-affected relationships, particularly on the transactional nature of social support as related to mental health and treatment adherence (Wrubel, Stumbo, & Johnson, 2008; Knowlton et al., 2011). Researchers have hypothesized that unhelpful interactions between partners may contribute to poor rates of medication adherence (Johnson et al., 2003). However, the parity of support exchanged in the relationship has not yet, to my knowledge, been examined in the context of broad seroconcordant HIV-affected relationships. Thus, little is known about whether there is equivalent receipt and provision of support between each HIV-positive patient in the relationship.

### **Equity of Social Support in Relationships**

Equity theory suggests that close relationships incorporate a balance of “give and take” between members of the relationship, and that an imbalance in the support provided and received is associated with dissatisfaction and negative psychological consequences. According to this theory, then, an imbalance in support provided and received in the relationship can have negative psychological consequences such as guilt or demoralization and can create perceptions of debt or obligation within a relationship due

to violations of the norm of reciprocity of support (Walster, Walster, & Bersheid, 1978; Gleason, Iida, Bolger, & Shrout, 2003; Kleiboer, Kuijer, Hox, Schreurs, & Bensing, 2006).

There may be differential psychosocial and emotional consequences based on the way that individuals within relationships perceive their overbenefitting or underbenefitting from the support exchange. For instance, when individuals receive more support than that which they provide (e.g., overbenefitting), they may feel guilty, too dependent on others, and incompetent to deal with stressors (Liang, Krause, & Bennett, 2001; Lindorff, 2000; Lu & Argyle, 1992) while those providing more support than receiving (e.g., underbenefitting) may become resentful or experience decreased morale (Liang, Krause, & Bennett, 2001). Having mutual exchange of support in relationships, which influences perceptions of equity, has been associated with positive perceptions of support and better physical and mental health outcomes compared to those with non-reciprocal support in their relationships (Chandola, Marmot, & Siegrist, 2007). Results from qualitative research conducted with HIV-positive gay couples provide evidence of participants' viewing their relationships as more supportive and satisfactory when the support is balanced between partners and they have opportunities to give and receive support (Haas, 2002). In an early study exploring opportunities to provide support to supporters, Hays and colleagues (1990) found that the degree to which HIV-positive gay men endorsed giving support to members of their social support network was strongly correlated with their psychological well-being. Qualitative analyses of interview data from the same study revealed that being able to give support to social network members

was identified as a helpful support behavior, and that participating in peer support groups provided an important opportunity to provide support (Hays, Magee, & Chauncey, 1998).

When patients or informal supporters are coping with a chronic illness such as HIV, the patient's health status and support needs may influence the balance of support in their relationships. Indeed, equity of support has been examined in the context of health status, though to my knowledge not in the context of HIV health status. In general, those with poorer health status who require more caregiving or support, such as patients in palliative care, may perceive that they are overbenefiting from support (McPherson, Wilson, & Murray, 2007). What is unclear, however, is the relationship between health status and perceptions of differential benefit among those in close relationships in which both members of the relationship are dealing with an illness such as HIV or AIDS, considering that care and other forms of support are exchanged between members of the relationship who are each dealing with a complex illness.

An examination of equity of support (and, conversely, deviation from equity of support) may help to better explain complex associations between perceived social support, mental health, and treatment adherence among HIV-positive individuals in close relationships with other people living with HIV/AIDS. Furthermore, it is important to examine these issues because an improved understanding of social support mechanisms contributing to emotional adjustment and treatment adherence could reveal areas for intervention to affect change at individual (e.g., mental health) and interpersonal levels of functioning (e.g., communication, interpersonal effectiveness) and address relationship and treatment adherence issues for HIV-positive individuals supporting others living with



HIV/AIDS. Results of the present study may be able to lay the groundwork for development of psychosocial interventions for HIV-positive persons and their supporters.

### **Present Study**

The purpose of the present study was to examine the relationship between equity and perceived social support with variables including depression, anxiety, medication adherence, and disease status among seroconcordant dyads of African Americans and their informal supporters. The present study will draw from populations with a high burden of HIV. Wisconsin state surveillance reports indicate that 57% of HIV/AIDS cases are concentrated in Milwaukee County, with 75% of African American HIV cases being located in Milwaukee County. Significant racial and ethnic disparities exist in terms of prevalence and risk factors for HIV, with the African American community being hardest hit by the epidemic. For example, from 2007-2011 in the state of Wisconsin, African American males were 5-10 times more likely to be diagnosed with HIV than Caucasian males; while African American women were more than 25 times more likely to be diagnosed with HIV than Caucasian women. For persons aged 15-29, 77% of cases were African American, and for those 30 or older, 51% of cases were African American (Wisconsin Department of Health Services AIDS/HIV Program, 2010). Furthermore, recent data indicates that there is extremely high prevalence of HIV among African American males who have sex with men (MSM) in Wisconsin, with one-in-three or 32% of African American MSM being HIV positive (Wisconsin Department of Health Services AIDS/HIV Program, 2012). A high burden of HIV also exists for African Americans in Ohio. In 2009, African American adults were 6 times as likely to be diagnosed with HIV compared to Caucasian adults. African American males were

approximately 5 times more likely to be living with HIV than Caucasian males, while African American women were more than 12 times as likely to be living with HIV compared to Caucasian women (Ohio Department of Health, 2011). In Columbus, Ohio located in Franklin County, African Americans accounted for 36% of the cases of individuals living with HIV infection. When the fact that African Americans comprise only 12% of the state population (Ohio Department of Health, 2011) is taken into account, the stark disproportionality of the HIV epidemic is evident.

This study has the following specific aims and research goals: (1) To examine whether equity of support, or perceived equality of support, within seroconcordant dyads predicts depression, anxiety, and medication adherence above and beyond perceived social support; and (2) to examine how mismatch in disease status among members of the dyad (e.g., HIV-positive, no AIDS diagnosis and HIV-positive, AIDS diagnosis) may predict equity of support, depression, and anxiety among the dyad members. In line with these aims, I tested several hypotheses to examine associations between variables of interest and to test prospective models of relations between variables. My specific hypotheses follow:

### **Model 1: Perceived Social Support, Support Equity and Medication Adherence**

#### Hypothesis 1: Actor Effects

1. It is hypothesized that greater levels of actor perceived social support and greater actor equity (lower deviation from equity) will be associated with greater rates of medication adherence.

#### Hypothesis 2: Partner Effects

2. It is hypothesized that higher levels of partner perceived social support will be associated with higher rates of index patient medication adherence and greater partner equity (lower deviation from equity) will be associated with higher rates of medication adherence.

#### Hypothesis 3: Model Fit

3. It is hypothesized that actor and partner equity of support (as measured by deviation from equity) will predict medication adherence above and beyond perceived social support from the dyad partner.

### **Model 2: Perceived Social Support, Equity, and Depressive Symptoms**

#### Hypothesis 4: Actor Effects

4. It is hypothesized that higher levels of actor perceived social support and greater actor equity (lower deviation from equity) will be associated with lower actor severity of depressive symptoms.

#### Hypothesis 5: Partner Effects

5. It is hypothesized that higher levels of partner perceived social support and greater partner equity (lower deviation from equity) will be associated with lower actor severity of depressive symptoms.

#### Hypothesis 6: Model Fit

6. It is hypothesized that actor and partner equity of support (as measured by deviation from equity) will predict severity of depressive symptoms above and beyond perceived social support from the dyad partner.

### **Model 3: Perceived Social Support, Equity, and Anxiety Symptoms**

#### Hypothesis 7: Actor Effects

7. It is hypothesized that greater levels of actor perceived social support and greater actor equity (lesser deviation from equity) will be associated with lower actor severity of anxiety symptoms.

#### Hypothesis 8: Partner Effects

8. It is hypothesized that greater levels of partner perceived social support and greater partner equity (lesser deviation from equity) will be associated with lower actor severity of anxiety symptoms.

#### Hypothesis 9: Model Fit

9. It is hypothesized that actor and partner equity of support (as measured by deviation from equity) will predict severity of anxiety symptoms above and beyond perceived social support from the dyad partner.

### **Model 4: AIDS Status Concordance, and Equity, Depressive and Anxiety Symptoms**

#### Hypothesis 10: Between-Dyads Variable Predictions

10. It is hypothesized that discordant dyad AIDS status (i.e., one partner has a diagnosis of HIV and the other has a diagnosis of AIDS, representing greater disease progression) will be associated with greater inequity (greater deviation from equity), greater severity of depressive symptoms, and greater severity of anxiety symptoms.

### **Significance of the Present Study**

This study will enable us to better understand the social support mechanisms which contribute to mental health outcomes and treatment adherence. Once we have a better understanding of the social support mechanisms that contribute to improved adherence, we will have a better idea of how to address salient relationship and treatment

adherence issues for HIV-positive individuals supporting others living with HIV/AIDS, and be better able to utilize social support in HIV adherence interventions. Moreover, being able to effect change in treatment adherence over time has the potential to redress racial disparities in HIV health and health care (Mugavero et al, 2009).

## **Methods**

### **Design**

This study was considered a cross-sectional reciprocal standard design, as both members of the dyad were measured and each person is a member of only one dyad. This design allows for the assessment of the variability in responding both between and within dyads in the present study. Further, the analyses used in the present study allow for the simultaneous and independent estimation of the effects of each participant's self report on both his or her own behavior and their dyad partner's behavior (Campbell & Kashy, 2002).

### **Participants**

Participants were 34 HIV-positive African American individuals (i.e., "index patient") and 34 HIV-positive adults (e.g., partners, family members, or friends; i.e., "informal supporters") from Milwaukee, Wisconsin; Chicago, Illinois; and Columbus, Ohio. My sample was drawn from high prevalence populations for HIV/AIDS in these urban locations.

Specific inclusion criteria for the "index patient" include age 18 or older, being African American, having an HIV diagnosis, being currently prescribed antiretrovirals, and that they can identify and successfully recruit an adult "informal supporter" who is also HIV-positive, already aware of the index patient's HIV status, and who has already discussed HIV and/or HIV medications with the "index patient." Inclusion criteria for

“informal supporters” include being 18 or older, having an HIV diagnosis, and self-identification as an “informal supporter” for the HIV-positive “index patient.” Only the index patient member of the dyad must have been African American; the informal supporter may have been of any ethnicity. Furthermore, dyads did not need to be romantically involved and I intended to enroll individuals in a broad variety of supportive relationships. Exclusion criteria included solitary individuals and dyads in which English was not spoken. Specific exclusion criteria pertaining to the participants’ relationship included dyads in which there is evidence that the relationship was not a legitimate one (i.e., information about the type or length of relationship was inconsistently reported by members of the dyad) or which was not intimate enough (i.e., the members do not talk regularly), or those in which either individual reported relational violence within that dyad.

To estimate the sample size required to detect statistically significant differences in dependent variables consistent with the aims of the study, adequate power to detect consequential nonindependence must be determined. Consequential nonindependence is defined as the level at which the intraclass correlation associated with nonindependence results in a  $p$ -value of .10 when it should equal .05 (e.g., a Type I error). The minimum number of dyads to have adequate power of .80 to detect consequential nonindependence is 35 dyads (Kenny, Kashy, & Bolger, 1998), using a recommended liberal alpha test value ( $\alpha=.20$ , two-tailed; Myers, 1979). As an estimation of the power to detect statistically significant differences in dependent variables in the study, Kenny, Kashy, and Cook (2006, p. 180) have indicated that a sample size of 50 dyads may result in a medium effect size of .5 with power of .64 (adjusted for nonindependence) or .697

(unadjusted for nonindependence). Taking into consideration concerns about feasibility, a sample size of 50 dyads was targeted for the pilot study. Due to difficulties obtaining eligible participants, my sample size is restricted to 34 dyads, which should result in the ability to detect a large effect size.

### **Procedure**

Institutional Review Board approval was obtained for all aspects of the proposed study. Participants were recruited from outpatient infectious disease clinics, community health centers, and community-based agencies providing services to patients with HIV/AIDS in three Midwestern urban cities, Milwaukee, Wisconsin; Chicago, IL; and Columbus, Ohio. Recruitment strategies included distributing fliers and handbills, recruiting through medical provider word of mouth (i.e., discussing study opportunities with patients and colleagues), and snowball sampling. Potential participants were invited to call the Patient Advocacy and Research lab at UW-Milwaukee for more information about the study. After contacting the lab, they were screened over the phone for inclusion in the study. Participants who identified one individual who would be an appropriate “informal supporter” for the study and who met other eligibility requirements were instructed to have the intended informal supporter call the same number in order to also be screened. Each potential participant was screened separately to determine whether the dyad was eligible for participation.

Dyads who met eligibility criteria were invited to take part in a larger mixed methods study, the duration of which was approximately 2 ½ hours. Participants were asked to bring their HIV medication along to their appointment. During this one-time visit, dyads were asked to come to a community research center in downtown

Milwaukee; Chicago, IL; or Columbus, Ohio to complete a self-report psychosocial survey (approximately 1 ½ hours in length) and an observed communication task (approximately 30 minutes in length). The survey included questions related to demographics, treatment adherence, medication adherence self-efficacy, problem-solving styles, perceived and enacted social support, equity of support, depression symptoms, and symptoms of anxiety. They were also asked to complete a brief debriefing questionnaire following the communication task and participate in a brief follow-up phone call in which they were asked to answer a single survey question. For the purposes of this study, I analyzed survey responses exclusively. For this survey, the “index patient” and the “informal supporter” completed identical questionnaires which took approximately 90 minutes to complete.

Questionnaire data were collected on individual, password-protected laptops using the ACASI (Audio Computer Administered Self Interview) module of QDS Questionnaire Development System (NOVA Research Company). Survey data was exported from the QDS survey instrument to a password-protected computer in the Patient Advocacy and Research Lab. Participants were each paid \$30 for their time following the completion of the study appointment. In addition, child care, bus fare, and refreshments were available to participants as warranted. Participants received transportation compensation even if they did not complete the study.

Approximately one week after the completed study appointment, one participant in each dyad was randomly selected and contacted to answer a follow-up survey question. The purpose of the follow-up question was to examine test-retest reliability of the equity survey item corresponding with hypotheses one, two, three, and four. Research staff



contacted the participant at the number provided on the consent form and asked them the follow up question over the phone. Participation in this component took approximately one minute and participants did not receive any additional compensation for their participation. Not more than one participant from each dyad was contacted to respond to this item and only a subset of those who consented to this procedure were contacted.

### **Materials and Measures**

**Demographics.** Participants were asked to answer basic sociodemographic and relationship questions including the nature of the relationship between individuals in each dyad. Specifically, participants reported their age, gender, current relationship status, race/ethnicity, highest level of education completed, gross monthly income, and number of children they have. In addition, they reported HIV-related demographic information such as HIV status, where diagnosed with HIV, year of diagnosis, believed method of HIV infection, HIV-related services received, most recent CD4 and viral load count, and HIV-related health care appointment attendance.

**Perceived Social Support.** To measure participants' degree of perceived social support, the Social Provisions Scale (Cutrona & Russell, 1987) was used. Participants completed both the original (general) questionnaire which asks participants to consider the degree of social support they perceived in general and the targeted source-specific questionnaire. For the purposes of this study, only data from the target-specific social support questionnaire was used, modified for use in the current study by having the target identified as their dyad partner. On the questionnaire, participants were asked to consider the degree of support they perceive from the person who accompanied them to the appointment (i.e., the other member of the dyad). The respondent indicated on a 4-point

Likert-type scale the extent to which each statement describes his/her current social network. Responses ranged from 1 (strongly disagree) to 4 (strongly agree). A total score was computed by summing all items. Higher scores indicate a greater degree of perceived support. With regard to the validity of the Social Provisions scale, there is good evidence of discriminant, predictive, and convergent validity (see Cutrona & Russell, 1987; Russell & Cutrona, 1984).

There is evidence for good convergent validity and acceptable internal consistency reliability for the Source-Specific Social Provisions scale (Cutrona, 1989). For this study, internal consistency for the Source-Specific Social Provisions scale was good with  $\alpha=.85$ . For the purposes of my analyses, source-specific perceived social support (Source-Specific Social Provisions Total Score) was treated as a predictor variable to test hypotheses 1-9 and as an outcome variable as a test of hypothesis 10.

**Equity.** To assess equity of support in the dyadic relationship, a one-item measure modified from Kuijer, Buunk, & Ybema (2001), which was based on the Hatfield Global Measure of Equity/Inequity (Hatfield, 1978), was used. The item was intended to measure the equality of support from a give-and-take perspective within the dyad. The original item used by Kuijer et al. (2001) read, “When you look at your relationship with your partner, from a viewpoint of give-and-take, how would you describe your relationship at the moment? The original 5-pt response scale ranged from (1) S/he is doing a lot more for me I am doing for him/her to (5) S/he is doing a lot less for me than I am doing for him/her. The item used in this study was modified from Kuijer et al. (2001) to change the wording from “partner” to “person you came in with today” in order to reflect the broad nature of relationships among dyads that were recruited. Two anchor

points were added to the scale, based on personal communication with R. Kuijer (2011) and to be consistent with the 7-point scale construction of the original Hatfield Global Measure of Equity/Inequity from which the measure was originally modified. The anchor points that were added to the scale was “more” and “less”. The actual item in my study read, “When you look at your relationship with the person you came in with today, from a viewpoint of give-and-take, how would you describe your relationship at the moment?” Participants endorsed one of the following options (based on personal communication from Kuijer et al., 2001), (1) S/he is doing a lot more for me than I am doing for him/her; (2) S/he is doing more for me than I am doing for him/her; (3) S/he is doing a bit more for me than I am doing for him/her; (4) S/he is doing as much for me as I am doing for him/her; (5) S/he is doing a little less for me than I am doing for him/her; (6) S/he is doing less for me than I am doing for him/her; (7) S/he is doing a lot less for me than I am doing for him/her. Consistent with Kuijer, Buunk, and Ybema’s (2001) recommendations, anchor points are recoded for data analyses in such a way that 1 = +3, 2 = +2, 3 = +1, 4 = 0, 5 = -1, 6 = -2, 7 = -3. For scoring, two linear terms are constructed to assess deviation from equity and over/underbenefit (Kuijer, Buunk, & Ybema, 2001). In the current study, the linear term for over/underbenefit was not examined as I was more interested in the deviation from equity rather than the direction of inequity. For the linear term of deviation from equity, the original scores representing underbenefit, -3, -2, and -1 are recoded to +3, +2, and +1, while the positive scores representing equity (0) and overbenefit remain the same, thus creating a four-point scale ranging from 0 (equity) to 3 (inequity). For the purposes of this study, the linear term of deviation from equity will be designated as the predictor, and in some cases, the outcome variable.

No validity data had been reported for the modified equity measure (Kuijer, Buunk, & Ybema, 2001). The original similarly-worded Hatfield Global Equity measure (1978) correlates with other measures of equity, however. Sprecher (1986,1988), for example, found the Hatfield Global measure is positively and significantly correlated with the Sprecher Global Equity measure (correlations range from  $r = .45$ , to  $.52$ ,  $p < .001$ ), which was created to measure day-to-day equity. Sprecher (2001) also ran correlations with a multi-faceted measure of equity to the Hatfield Global Measure (with  $r$ 's ranging from  $.43$  to  $.73$ ).

As this is a one item measure, no internal consistency reliability metric can be computed. However, test-retest reliability data for the current sample was calculated and is reported below. To address potential concerns with reliability of the measure, I randomly selected one member of the dyad approximately one week after the study appointment to administer this item verbatim as the follow-up question described above. Responses from the member of the dyad were compared with the original response to calculate test-test reliability for this item. Results of the test-retest reliability analysis ( $N=21$ ) indicate good reliability, Pearson's  $r = .48$ ,  $p = 0.03$ .

For the purposes of my analyses, support equity (from the initial questionnaire data) was treated as a predictor variable to test hypotheses 1-9 and as an outcome/dependent variable to test hypothesis 10.

**Depression.** The severity of depression (i.e., higher total depression scores) was assessed using the Beck Depression Inventory – Fast Screen (BDI-FS; Beck, Steer, & Brown, 2000). The BDI-FS is a seven-item self-report inventory designed for the assessment of depression with medical populations, in which somatic symptoms due to

the patient's medical condition may overlap with somatic criteria for depression. Thus, to minimize potential false positive cases of depression in these samples, the BDI-FS assesses the cognitive and affective factors of depression which has been recommended in HIV-positive samples (Kalichman, Rompa, & Cage, 2000; Kalichman, Sikkema, & Somlai, 1995). Participants marked their response for each item (a symptom of depression according to Diagnostic and Statistical Manual of Mental Disorders – Text Revision criteria [DSM-IV-TR]; American Psychological Association, 2000) that best describes how they were feeling in the past two weeks. Each item is rated on a 4-point scale, from 0 to 3, corresponding to an increase in severity for the depressive symptom. Previous research has reported adequate reliability for the BDI-FS, with good internal consistency ( $\alpha = .831$  in the current study). The BDI-FS has been used in HIV-positive populations with good validity and reliability. Krefetz and colleagues (2004) examined the psychometrics of the BDI-FS among a sample of HIV-positive patients with chronic pain, and found adequate internal consistency ( $\alpha = .84$ ) using a cut-off of scores greater  $\geq 4$ , correctly classified 81% of patients with a depressive disorder, and with 74% specificity and 90% sensitivity. For this study, good internal consistency for the measure was observed,  $\alpha = .83$ . For the purposes of my analyses, severity of depression (total depression score) was treated as an outcome variable to test hypotheses 4-6 and 10.

**Anxiety.** The severity of anxiety (i.e., higher total anxiety scores) was assessed using the Beck Anxiety Inventory – Fast Screen (BAI-FS; Beck & Steer, 1993). The BAI-FS is a 7-item self-report inventory designed for the assessment of anxiety with medical populations, in which somatic symptoms due to the patient's medical condition may overlap with somatic criteria for anxiety disorders. Thus, as with the BDI-FS, to

minimize potential false positive cases of anxiety disorders in these samples, the BAI-FS assesses the cognitive and affective factors of anxiety which has been recommended in HIV-positive samples. Respondents marked their response for each item (a symptom of anxiety according to the DSM-IV-TR; APA, 2000) that they may or may not have experienced over the past two weeks. Each item is rated on a 4-point scale, from 0 to 3, corresponding to an increase in the severity of the anxiety symptom. For this measure the items are simply summed. Beck et al. (1997) found that the sensitivity and specificity rates for identifying patients with and without anxiety disorders were, 85% and 81%, respectively, when a BAI-FS total cut-off score of 5 and above was used with 56 patients seeking medical treatment from family practice medical doctors. The coefficient  $\alpha$  of the BAI-FS total scores with these patients was .90. The BAI-FS has been used in HIV-positive populations with good validity and reliability results. Krefetz and colleagues (2004) examined the psychometrics of the BAI-FS among a sample of HIV-positive patients with chronic pain, and found adequate internal consistency ( $\alpha = .80$ ). For this study, adequate internal consistency for the measure was observed,  $\alpha = .91$ . For the purposes of my analyses, anxiety severity (total anxiety score) was treated as an outcome variable to test hypotheses 7-10.

**Medication Adherence.** To assess HIV medication adherence, a number of individual items were used, as recommended in the HIV medication adherence literature. For instance, Lu et al. (2008) compared multiple methods of self-reported HIV medication adherence with electronic measurement of medication adherence (the “gold standard” used in many randomized controlled clinical trials to monitor adherence) and found that a 1-month recall period was associated with less over-reporting of adherence

and that having patients rate their adherence over the past month was more accurate compared to having patients rate frequencies or percent of medication taken. Differing in some respects are Simoni and colleagues (2006) who recommend that investigators ask participants to self-report their medication adherence in several different ways such as using a 7-day recall, using normalizing language, and frame the question in different ways, such as using percentages and scale methods. To incorporate both sets of recommendations, several questions for self-reported questions were included such as (1) past 7-day recall of doses taken or missed, (2) percentage of medication taken in the last month using a visual analogue scale (0-100% with tick marks at intervals of 10), and (3) rating ability to take medications over the past month (Likert type scale; 1 very poor- 6 *excellent*). To score item (1), the 7-day adherence was calculated as 1 minus the proportion of the sum of the missed doses for the 7 days divided by the total possible number of doses. Item (2) was scored by noting the position of the electronic slider bar corresponding with their self-rated percent adherence over the past month. Item (3) was a single value corresponding to the response chosen by the participant on the Likert-type scale. For the purposes of my analyses, the three medication adherence items were included in correlational analyses and Item 2, or self-reported medication taken in the past month, was treated as the medication adherence outcome variable to test hypotheses 1-3.

### **Data Management and Preparation**

After the participants comprising 34 dyads completed the ACASI electronic survey, data were downloaded from the QDS ACASI server, uploaded into the QDS Data Warehouse, and imported to SPSS for data management and descriptive analyses. Data

were then cleaned and screened for missing values and adjusted based on recommendations for handling missing data (Acock, 2005). Items were summed and scales were computed for all measures as detailed above.

### **Data Analytic Strategy**

Descriptive statistics were calculated to describe the sample, independent sample T-tests were conducted to compare index participants and informal supporters with respect to sociodemographic and illness characteristics, and Pearson's bivariate product-moment correlations were run to examine associations between variables and to determine test-retest reliability for the Equity measure. To test hypotheses 1-10, inferential dyadic analytic methods described by Kenny, Kashy, & Cook (2006) were used which account for the probable non-independence of the dyadic data.

**Dyadic Data Analysis.** Data from patients and their partners or other supporters cannot be assumed to be independent from each other as responses from partners are often correlated (Kenny et al., 2006). In any close relationship, dyads are likely to share similar traits or characteristics and characteristics of one member of the dyad may influence the other member of the dyad. Methods must take into account the non-independence of dyadic data and should not be based on assumptions of independence of scores such as traditional multiple regression and analysis of variance approaches (Kenny et al., 2006).

With dyadic analysis, appropriate data analytic techniques are chosen based in part of whether the two dyad members can be theoretically or empirically distinguished or ordered by a variable or factor, such as gender, family role, birth order, or disease status (Kenny et al., 2006). However, since the participating dyads are a mix of



distinguishable (e.g., by gender, in the case of a dyad consisting of an HIV-positive male participant and an HIV-positive female) and indistinguishable (e.g., both male, HIV-positive) subtypes and there is no way to order the members within the dyad, all were treated as indistinguishable in the analyses (Kenny & Ledermann, 2010).

The Actor-Partner Interdependence Model (APIM) was used as a statistical framework for examination of the effect that the index participants' predictor variable had on their own outcome variable (actor effect) and on the outcome variable of the dyad partners (partner effect) and vice-versa, while accounting for nonindependence in the dyad responses (see Figure 1). In this framework, the dyad is the level of analysis and each member of the dyad has a score on a particular independent or predictor variable, as well as a score on a particular outcome or dependent variable.

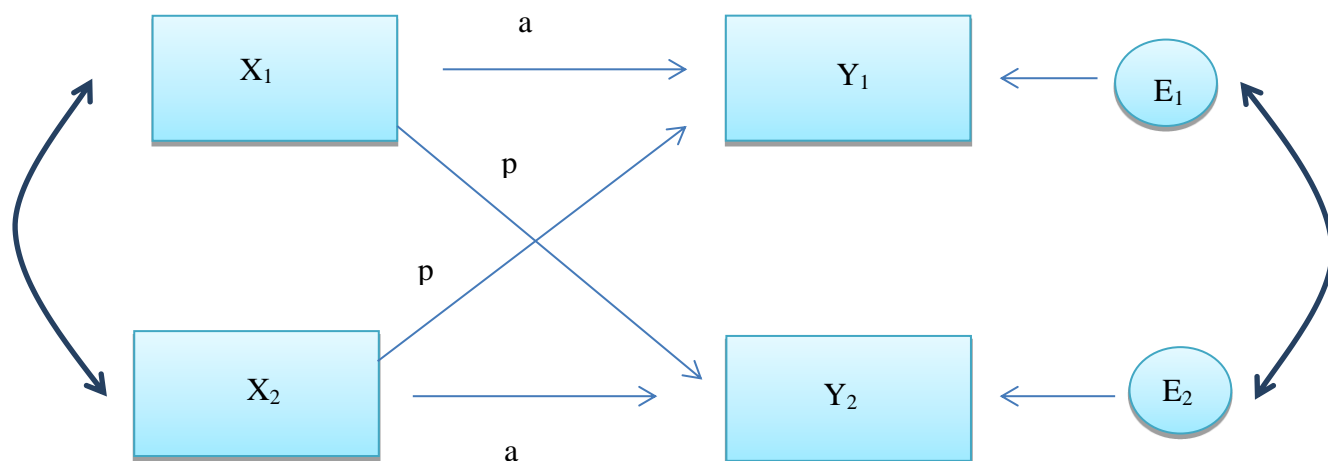


Figure 1. The Actor-Partner Interdependence Model (APIM). “a” represents the actor effect, “p” represents the partner effect, “ $X_1$ ” and “ $X_2$ ” are the predictor variables for each member of the dyad, and “ $Y_1$ ” and “ $Y_2$ ” are the dependent (outcome) variables for each member of the dyad. “ $E_1$ ” and “ $E_2$ ” represent the unexplained sources of error influencing the outcomes. Note, the assignment of 1 and 2 are arbitrary due to the indistinguishable nature of the dyads.

The APIM analytic approach allows for simultaneous examination of the effects of the index participants' and informal supporters' predictor variables on their pooled values for the outcome variables (Kenny et al., 2006). For example, when using this method, it is possible to examine the effects of the respondent's scores on equity or perceived social support on their own and on their partner's outcome variables, such as depressive symptoms, anxiety symptoms, and medication adherence (partner effect). Due to the dyad members being indistinguishable in these data, there is only one actor effect and one partner effect for each predictor variable that contributes to the outcome variable. If the dyads were distinguishable (e.g., patients and healthy partners; heterosexual couples only), it would be possible to parse apart an actor effect and partner effect for each individual. Since the dyads are indistinguishable in this case, it would be arbitrary to categorically differentiate the two members of the dyad; instead the estimates must be pooled together (Kashy, Donnellan, Burt, and McGue, 2008).

The APIM analytic approach allows for the testing of three different types of variables; namely, within-dyad variables, between-dyad variables, and mixed variables (Kenny et al., 2006). Scores on within-dyad variables are the same across dyads but vary between dyad members (e.g., gender among heterosexual couples as a categorical within-dyads variable), whereas between-dyad variable scores are the same for members of the same dyad but vary across dyads (e.g., length of romantic relationship); and scores on mixed variables can vary both within and between dyads in the same study (e.g., both partners' reports on their individual depressive symptoms; Kenny et al., 2006). In my

study, I am examining mixed variables (which are the only types of variables that can be used in analyses to examine the unique contributions of actor and partner effects) and a between-dyads variable, AIDS status concordance.

The present study utilizes the APIM to examine the dyadic associations between equity and perceived social support with mental health (e.g., severity of anxiety and depressive symptoms) and medication adherence (see Figure 2), as well as dyadic associations between participant AIDS status concordance with equity, anxiety and depressive symptoms, and medication adherence (see Figure 3).

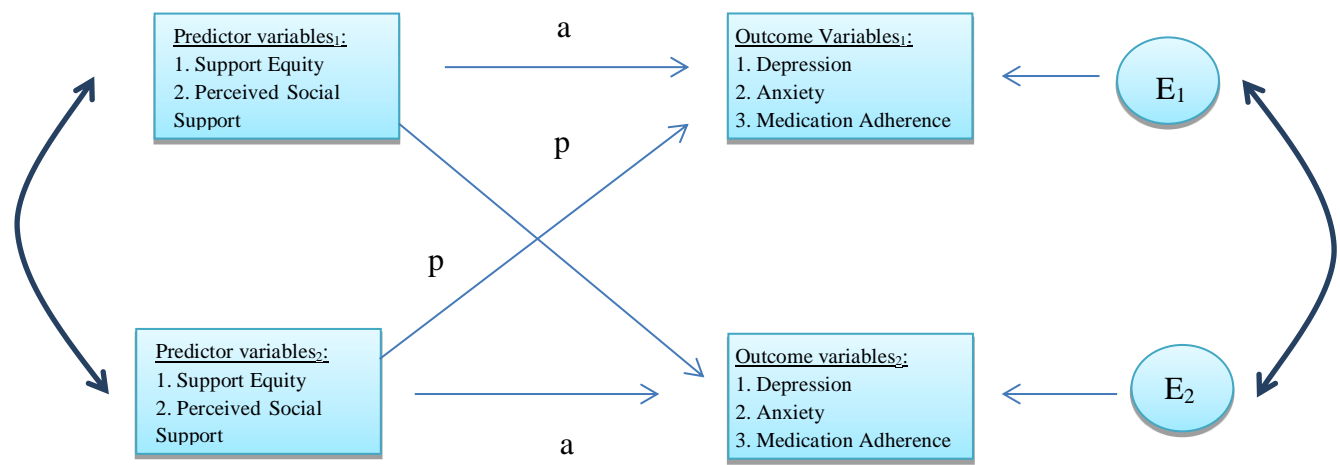


Figure 2. The Actor-Partner Interdependence Model (APIM) as applied to the present study, representative of hypotheses 1-3. “a” represents the actor effect, “p” represents the partner effect, “Support Equity” and “Perceived Social Support” are the explanatory/predictor variables for each member of the dyad, and “Depression,” “Anxiety,” and “Medication Adherence” are the dependent variables for each member of the dyad. “E<sub>1</sub>” and “E<sub>2</sub>” represent the unexplained sources of error influencing the outcomes. Note, the assignment of <sub>1</sub> and <sub>2</sub> are arbitrary due to the indistinguishable nature of the dyads.

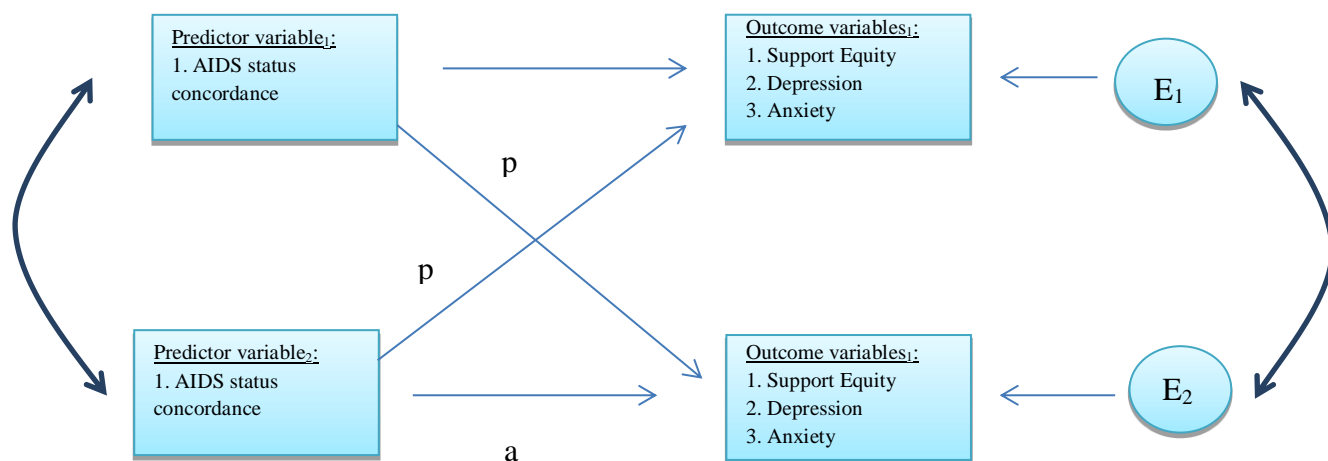


Figure 3. The Actor-Partner Interdependence Model (APIM) as applied to the present study, representative of hypothesis 4. “a” represents the actor effect, “p” represents the partner effect, “AIDS status” is the explanatory/predictor variable for each member of the dyad, and “Support Equity,” “Depression,” and “Anxiety,” are the dependent variables for each member of the dyad. “E<sub>1</sub>” and “E<sub>2</sub>” represent the unexplained sources of error influencing the outcomes. Note, the assignment of 1 and 2 are arbitrary due to the indistinguishable nature of the dyads.

Multilevel modeling (MLM; also known as hierarchical linear modeling or HLM) was used to estimate and test the APIM models. MLM has been recommended for analyses of non-independent indistinguishable dyadic data and this method allows for model coefficients to be estimated even when data are missing. Furthermore, MLM can also accommodate several types of dependent outcome variables and can be used to examine relationships between variables within a hierarchical data structure (Pollack, 1998).

For this study, dyads are considered to represent naturally occurring social groups of two people each. Within these parameters, there are two levels of data, upper Level 2 (dyad) and lower Level 1 (index participant and informal supporters nested within a dyad). The two levels are associated with unique modeling of variances; namely, on Level 1, the variance and relationship between both members of the dyad on an outcome

variable is modeled and the dyad members' responses are regressed on a predictor variable, while on Level 2, the variance in dyad means and dyad-level effects are modeled (Raudenbush, Brennan, & Barnett, 1995). MLM provides for the estimation of all model parameters (fixed and random sources of variance) within a single equation (Cook & Kenny, 2005).

The parameters of the regression model, the intercept (or constant) and slope of the regression line (or regression coefficient) represent unique characteristics of the dyadic data. The intercept represents the predicted value of the outcome variable when the predictor variable score is set to zero (i.e., held constant). Thus, the intercept represents the grand dyadic mean on the outcome variable. The regression coefficient, or slope of the regression line, represents the fixed effect; more specifically, the difference in the outcome variable corresponding for every 1-unit difference in the predictor variables. The values of the intercept are allowed to vary across dyads, but the slopes are held equal (or constrained) across dyads (Kenny, Kashy, & Cook, 2006, p. 89). There are also random effects (or residuals) for the variation in intercepts and error variance. Below is an example of the Level-1 and Level-2 models to test the APIM with the indistinguishable dyads in the current study:

$$\begin{aligned} \text{Level 1: } Y_{ij}(\text{MEDADH}) = & \beta_{0j} + \beta_{1ij} (\text{ACT\_SSSPSTOT}) + \beta_{2ij} (\text{PART\_SSSPSTOT}) + \\ & \beta_{3ij}(\text{ACT\_EQDEV}) + \beta_{4ij} (\text{PART\_EQDEV}) \\ & + r_{ij} \end{aligned}$$

$$\text{Level 2: } \beta_{0j} = \gamma_{00} + V_{0j}$$

In the Level 1 model above, the notation  $\beta_0$  refers to the nonzero intercept or constant, while  $\beta_1$ ,  $\beta_3$ ,  $\beta_5$ , and  $\beta_7$  represent actor parameter coefficients and  $\beta_2$ ,  $\beta_4$ , and  $\beta_6$

represent partner parameter regression coefficients. The notation  $i$  represents the dyad,  $j$  is the individual within the dyad,  $r$  is a residual error term, and  $Y$  is the outcome variable, which in this instance is medication adherence. For the Level 2 model,  $V_{0j}$  represents a random dyad effect.

As applied to test the APIM models, multilevel modeling techniques are used to model scores on dependent variables as a function of the index participant's and informal supporter's scores on predictor variables. Consider the modeling of the index participant and informal supporter's depressive symptoms as a function of their equity scores. Using the APIM model within the MLM analytic context, the index participant's outcome score (e.g., depressive symptoms) is regressed onto the index participant's own predictor variable score (e.g., equity). Regression coefficients from this aspect of the analysis; namely, the regression of index participant's outcome scores (e.g., depressive symptoms) onto their own predictor variable (e.g., equity) scores represent the mean actor effect for the predictor variable (e.g., support equity). Concurrently, informal supporters' outcome scores (e.g., depressive symptoms) are regressed onto informal supporters predictor scores (e.g., equity). Regression coefficients from this aspect of the analysis represent mean partner effects for equity scores. To put another way, actor effects are the influence of respondents' ratings on their own outcomes and partner effects are the effects of the respondents' ratings on the on the other dyad members' outcomes. These are main effects.

### **Data Structure**

The data set for the study analyses was created in SPSS and imported into HLM7 (Raudenbush, Bryk, & Congdon, 2004). The data were structured pairwise, as suggested

by Cook and Kenny (2005), with each individual participant having their own scores (actor) and their dyad partner scores (partner) recorded for each variable in the study. In the data set, each participant had their data recorded in one row, such that there were two rows for each dyad in the dataset. Each row included dyad ID, the participant's outcome scores, and actor and partner values for the mixed predictor variables. Thus, each participant's predictor values are entered twice, one as an actor variable for their own record, and once as a partner variable for the other dyad member's record. As a special case, the categorical variable of participants' AIDS status was dummy coded, designating values of 0 (no member of the dyad has a current diagnosis of AIDS), 1 (one member of the dyad has a current diagnosis of AIDS), and 2 (both members of the dyad have a current diagnosis of AIDS). A between-dyads variable, dyadic AIDS status concordance, was also created, following similar procedures as Eaton et al., 2009. This categorical variable was also effect coded, such that dyads with a concordant AIDS status would be represented with a code of 1 and dyads with a discordant AIDS status would be represented with a code of -1. The "dyad ID" variable was the linking variable that signified which individuals were grouped within which dyads (Campbell & Kashy, 2002).

### **Data Analytic Procedures**

The first step in analyzing dyadic data, before testing hypotheses, is to assess nonindependence of the dyadic data (Kenny et al., 2006). Nonindependence of the indistinguishable dyadic data was tested by calculating the intraclass correlations for all of the variables for both the dyad members' responses. According to Cohen (1988), intraclass correlations indicating non-independence can range from a small correlation of

0.1 to a large correlation of 0.5. Nonindependence of the data would also confirm that MLM is appropriate to estimate the APIM.

For the MLM analyses, all of the predictor and outcome variables were treated as Level 1 (first level) mixed variables and the dyad identification variable served as the Level 2 (second level) variable to link the two nested levels of data. As such, the first-level predictor variables represented the first-level fixed effects in analyses and the dyad ID variable represented the second-level random effect to account for possible correlations in relationship variables across individuals in the same dyad. In the multilevel modeling process, the first step is to fit a baseline (unconditional) model which provides estimates of the fixed and random parameters and variance of the intercept (dyadic mean) and slope (discrepancy score). If there was significant variation in the slope (discrepancy score) and intercept (dyadic mean), the next step would be to create a Level 2 model in which the slope and intercept are designated as outcome variables (Bryk & Raudenbush, 1987). Unrestricted maximum likelihood (or full maximum likelihood) was the method of estimation used in HLM7 to produce estimates of variance and covariance parameters for each level of the unconditional models, while restricted maximum likelihood estimation was used to produce estimates of variance and covariance for the intercept. For all models, residuals for Level-1 variables (as a proxy for random effects) were assessed for normality within the HLM7 program. Additionally, each independent variable was grand-mean centered (i.e., subtracting the actual values from the mean) to minimize multicollinearity of predictors and to allow for straightforward interpretation of main effects in the regression models. Standard errors, degrees of freedom, t values, significance testing, alpha levels, and lower and upper 95%



confidence limits were also provided for each of the parameter estimates in the final models.

To test hypothesis 1-3, multilevel modeling using HLM7 was conducted to examine the actor and partner main effects and interactions of the mixed predictor variables of equity (deviation from equity) and perceived social support (general and within the dyad relationship) on the mixed outcome variable of self-reported percentage of medication taken in the last month. Three separate models were created and tested. The first model I tested was the null model (baseline), which included only the outcome variable of past month medication adherence and no predictors; the effect of the intercept was estimated. The second model I tested included only actor values of perceived social support and partner values of perceived social support as predictors for past month adherence. I then tested a third model that included actor and partner values for equity (as measured by the deviation from equity term) because I hypothesized that equity would predict medication adherence above and beyond perceived social support. To examine whether the addition of variables at each step resulted in a statistically significant improved model fit, I conducted likelihood ratio tests, by computing and comparing the differences between the -2 Log Likelihood values for the different models (Campbell & Kashy, 2002).

To test hypotheses 4-6, multilevel modeling using HLM7 was conducted to examine the actor and partner main effects of the mixed predictor variables of equity (deviation from equity) and perceived source-specific social support (within the dyad relationship) on the mixed outcome variable of total severity of depressive symptoms. Three separate models were created and tested. The first model I tested was the null

model (baseline), which included only the outcome variable of total severity of depressive symptoms and no predictors; the effect of the intercept was estimated. The second model I tested included only actor values for perceived source-specific social support and partner values for perceived social support (within the dyad relationship) as predictors for total severity of depressive symptoms. For these models, I examined the contribution of both actor effects and partner effects for the participants' pooled scores on the outcome variable of severity of depressive symptoms

I then tested a third model that included actor and partner values for equity (as measured by the deviation from equity term) because I hypothesized that equity would predict total severity of depressive symptoms above and beyond perceived social support. To examine whether the addition of variables at each step resulted in a statistically significant improved model fit, I conducted likelihood ratio tests by computing and comparing the differences in -2 Log Likelihood values for the different models (Campbell & Kashy, 2002).

To test hypotheses 7-9, multilevel modeling using HLM7 was conducted to examine the actor and partner main effects of the mixed predictor variables of equity (deviation from equity) and source-specific perceived social support (within the dyad relationship) on the mixed outcome variable of total severity of anxiety symptoms. Three separate models were created and tested. The first model I tested was the null model (baseline), which included only the outcome variable of total anxiety severity and no predictors; the effect of the intercept was estimated. The second model I tested included only actor values for perceived social support and partner values for perceived social support as predictors for total severity of anxiety symptoms. I then tested a third model

that included actor and partner values for equity (as measured by the deviation from equity term) because I hypothesized that equity would predict total severity of anxiety symptoms above and beyond perceived social support. To examine whether the addition of variables at each step resulted in a statistically significant improved model fit, I conducted likelihood ratio tests, by computing and comparing the differences in -2 Log Likelihood values for the different models (Campbell & Kashy, 2002).

To address hypothesis 10, multilevel modeling using HLM7 was conducted to examine whether the relationship between between-dyads predictor variable of AIDS status concordance and outcome variables of support equity, severity of depressive symptoms, and severity of anxiety symptoms differed depending on the influence of the concordance in dyad AIDS status. Three separate models were created, one for each combination of predictor (between-dyads variable of AIDS status concordance) and outcomes (medication adherence, severity of depressive symptoms, severity of anxiety symptoms). To test hypothesis 10, MLM was conducted to test the main effects of the dyad members' AIDS status concordance on the mixed outcome variables of support equity, depressive symptoms, and anxiety symptoms. If there were potential confounding variables in the models that were significantly correlated with outcome variables, they were controlled for in all analyses.

## **Results**

Due to the limited sample size, significant and marginally significant differences and effects will be reported, so as to not exclude results that might achieve significance were these relationships tested within a larger sample size.

### **Demographics and Descriptives**

**Sample Characteristics and Descriptives.** During the recruitment phase of the larger mixed methods study from which these data were extracted, 161 individuals (index patients and informal supporters) called our lab to be screened for study participation; 88 met the eligibility criteria to participate; and 68 individuals (34 dyads) completed the study. Reasons for ineligibility included participating in a similar previous study, not identifying as African American or Black (index patient only), not currently taking HIV medication (index patient only), not having an HIV-positive supporter (index patient only), reported history of violence within the dyad, being too busy to participate, refusing to be video recorded, being in bad health, and being out of contact with study staff (e.g., having disconnected phone numbers). The final sample included 68 participants comprising 34 dyads. The majority of the 68 participants were male (48, 70.6%), although 20 women participated, as well (20, 29.4%). Participants varied in age, from age 22-66 ( $M=44.0$ ;  $SD=22$ ). For this HIV-positive sample, 18 participants (26.5%) had a current comorbid AIDS diagnosis, while the remaining 50 participants (73.5%) were HIV-positive and did not have a current AIDS diagnosis. Most participants lived at or below the poverty level, with 52 participants (76.5%) reporting an income of less than \$1000 per month; 8 participants (11.8%) reported receiving \$1000-1499 per month, 5 participants (7.4%) reported receiving \$1500-1999 per month, 2 participants (2.9%) reported receiving \$2000-2499 per month, and 1 participant (1.5%) reported that their income was unknown. These descriptive data, along with measures of central tendency for predictor and outcome variables for models, are displayed in Table 1.

Table 1. Descriptive summary of sample

<b>Characteristics</b>	<b>Mean (+/- S.D.) or <i>n</i> (%)</b>
Gender	
Male	48 (70.6%)
Female	20 (29.4%)
Age (years)	44.0 (+/- 22.0)
Income	
Less than \$1000/month	52 (76.5%)
\$1000-1499/month	8 (11.8%)
\$1500-1999/month	5 (7.4%)
\$2000-2499/month	2 (2.9%)
Unknown	1 (1.5%)
HIV status	
HIV-positive, no current AIDS diagnosis	50 (73.5%)
HIV-positive, current AIDS diagnosis	18 (26.5%)
Years since HIV diagnosis known	14.37 (14.76)
Source-Specific Social Support	35.39 (34.38), Range = 15-47
Equity (Deviation from Equity)	1.12 (1.19), Range = 0-3
Beck Depression Inventory-Fast Screen	4.74 (3.85), Range = 0-14
Beck Anxiety Inventory-Fast Screen	7.40 (5.63), Range = 0-19
Medication Adherence (N=58)	86.93% (20.29), Range = 0-100

**Dyad-level attributes.** For dyad-level attributes (Table 2), there were three types of dyads in terms of gender, with 19 male/male dyads (55.9%), 10 male/female dyads (29.4%), and 5 female/female dyads (14.7%). Dyad members reported being in various relationship types with each other including romantic relationships, with 8 dyads (23.53% of dyads) in romantic same-sex relationships, 3 dyads (8.83% of dyads) in romantic heterosexual relationships, while the majority of participants reported being in platonic relationships with each other with 21 dyads (61.8% of dyads) in friendships, while the remaining 2 dyads reported being family members (5.9% of dyads). Dyadic AIDS status was varied, with 18 dyads (52.9% of dyads) having both members concordant with an HIV positive diagnosis, but no AIDS diagnosis (i.e., HIV+/HV+), 2 dyads (5.9% of dyads) with a concordant AIDS diagnosis (i.e., AIDS/AIDS), and 14 dyads (41.2% of dyads) with a discordant AIDS status (i.e., HIV+/AIDS).

Table 2. Dyad-level attributes

<b>Characteristics</b>	<b>Mean (+/- S.D.) or <i>n</i> (%)</b>
Gender	
Male/male	19 (55.9%)
Male/female	10 (29.4%)
Female/female	5 (14.7%)
Relationship types	
Romantic relationships	11 (32.4%)
Same-sex relationships	8 (23.53%)
Heterosexual relationships	3 (8.83%)
Platonic relationships	
Friendships	21 (61.8%)
Family members	2 (5.9%)
Dyad AIDS status concordance	
HIV+/HIV+	18 (52.9%)
AIDS/AIDS	2 (5.9%)
HIV+/HIV+AIDS	14 (41.2%)

Index patients and informal supporters were compared with respect to sociodemographic characteristics (see Table 3) and disease characteristics (see Table 4) using Chi-square or independent sample t-tests as appropriate. Independent sample t-tests were conducted to examine whether there were differences in sociodemographic characteristics, disease characteristics, perceived social support, support equity, depressive symptoms, anxiety symptoms, and medication adherence between index patients and informal supporters.

The results indicate a significant difference in the past month medication adherence for index patients and informal supporters who reported being prescribed medication (n=30); informal supporters rated significantly higher medication adherence ( $t=-2.18$ ,  $p=.03$ ) than index patients.

Table 3. Comparisons between index patients and informal supporters on demographic and illness variables

Characteristics	Index patient Mean (S.D.) or <i>n</i> (%)	Informal Supporters Mean (S.D.) or <i>n</i> (%)	<i>t</i> or $\chi^2$	<i>p</i>
Age (years)	43.21 (9.21)	45.24 (10.51)	-.85	.40
Years Since HIV Dx	16.20 (19.36)	12.53 (7.77)		
Past month medication adherence (out of 100)	82.55 (24.73)	93.20 (10.45)	-2.19	.03
Undetectable viral load	Yes: 16 No: 11	Yes: 18 No: 5	2.06	.15

Table 4. Comparisons between index patients and informal supporters on predictor and outcome variables

Characteristics	Index patient Mean (S.D.) or <i>n</i> (%)	Informal Supporters Mean (S.D.) or <i>n</i> (%)	<i>t</i> or $\chi^2$	<i>p</i>
Source-specific social support, SSSPS	35.32 (6.28)	35.42 (5.39)	-0.07	.94
Depression, BDI-FS	5.29 (4.76)	4.29 (3.59)	.98	.08
Anxiety, BDI-FS	7.70 (5.85)	6.26 (5.57)	1.04	.71
Equity (raw score day of appt)	3.72 (1.92)	4.53 (1.38)	-1.91	.06
Deviation from equity	1.30 (1.34)	1.05 (1.08)	0.83	.41



**Correlational Analyses (test-retest reliability).** Pearson correlations were run to examine the scores on the equity measure (see Table 5) at the time of the study appointment and at a follow-up date approximately 1-2 weeks after the study appointment. Results of the zero-order correlations between the two sets of raw equity scores indicate that the two scores were correlated,  $r=0.48$ ,  $p<.05$ .

Table 5. Correlations among predictor and outcome variables in index patient-informal supporter dyads

	1	2
1 Raw equity scores at appointment	-----	-----
2 Raw equity scores at one-week followup	.48*	-----

\* $p<.05$ ; \*\* $p<.001$

### **Inferential Analyses/Actor-Partner Interaction Model Analyses**

**Nonindependence and hierarchical linear modeling assumption testing.** Tests to determine nonindependence for the indistinguishable dyads were conducted by computing intraclass correlations between scores on predictor and outcome variables reported by index participants and informal supporters. Results indicated that actor and partner predictor and outcome variables were not significantly correlated ( $r=0.01$ ,  $p=.37$ ). However, when considering the sample size required for consequential nonindependence (at least 35 dyads), Kenny, Kashy, and Bolger (1998) recommend that the data be treated as nonindependent regardless and dyadic data analysis remains the appropriate method to use. Tests to examine assumptions of normality, equal variance, and linearity indicated that the assumptions were met for hierarchical logistic and linear regression.

**Actor-Partner Interdependence Model analyses.** Results for the actor-partner interdependence model testing for each of the main hypotheses are presented next.

*Perceived Social Support, Support Equity and Medication Adherence.* For my first research question, I examined the degree to which equity compared with source-specific perceived social support (within the dyad relationship) to predict medication adherence among participants (N=29 dyads currently on antiretroviral medications). I used HLM7 to conduct multilevel modeling of the interdependent data for index patient outcomes. Three hypotheses (1-3) and two models were tested; the first model included actor and partner values of source-specific perceived social support (i.e., Source-Specific Social Provisions Scale Total Score) as a predictor for past month medication adherence; the second model included actor and partner values for deviation from equity as an additional predictor for index patient past month medication adherence.

The distribution of the medication adherence variable was significantly skewed in the negative direction, with more participants reporting higher values of medication adherence in the past month. To address this non-normal distribution, data were transformed using a log transformation to meet the assumptions of normality inherent in multilevel modeling. The values that follow are in units of log transformed data.

Results from the testing of the null models, presented in Table 6 indicated a significant Level 2 dyad effect on the dependent variable of past month medication adherence ( $p < .01$ ). Results from the test of variance components, presented in Table 7, indicate that there is a trend toward significance for the intercept of the outcome variable of past month medication adherence being affected by the Level 2 grouping variable of dyad (variance component = 0.01,  $p = 0.07$ ). Furthermore, the variance component for the

intercept is less than the variance component of the level 1 residual variance component, indicating that additional variables in the model are needed to predict the remaining residual variance in the outcome variable of past month medication adherence for both the index patient and the informal supporter.

Table 6. Null Model 1 Fixed Effects Results: Predicting Past Month Medication Adherence

	Estimate ( $\beta$ )	Standard Error	$t$ -ratio	$p$
Model 1 (Null)				
Intercept	1.90	0.04	45.80	<.01

Table 7. Final Estimation of Variance Components from Null Model 1: Predicting Past Month Medication Adherence

	Standard Deviation	Variance Component	$\chi^2$	$p$
Random Effect				
Intercept	0.12	0.01	39.73	0.07
Level-1, $r$	0.27	0.07		

I hypothesized that greater levels of actor perceived social support (from the dyad partner) and greater actor equity (lower deviation from equity) would be associated with greater rates of medication adherence in the past month. The estimated coefficient for the level-1 predictors of actor perceived source-specific social support (i.e., respondents' perceived support from the other dyad partner), partner perceived source-specific social support (i.e., the effect of the other dyad members' perceived support ratings on one's

own scores of perceived support) were -0.01 ( $p=0.87$ ), 0.01, ( $p=0.20$ ), while estimated coefficients for the level-1 predictors of actor perceived equity (i.e., respondents' rating of equity in the dyad relationship), and partner perceived equity (i.e., the effect of the other dyad members' equity rating on one's own equity rating) were -0.01 ( $p=0.83$ ), and 0.05 ( $p=0.16$ ), respectively. The results indicate that neither actor nor partner values of perceived source-specific social support nor ratings of equity had a significant effect on the dependent variable of past month medication adherence, according to patient self-report. Thus, hypothesis one and two were not supported.

To test hypothesis three, that equity of support (deviation from equity) will predict 30 day medication adherence above and beyond perceived social support, the goodness of fit of the full model including actor and partner values of Source-Specific Social Support and Equity predictors was compared to a model only including the actor and partner values of Source-Specific Social Support (see Tables 8 and 9 for model parameter estimates). Tests of the deviance statistic indicated that the contribution of the equity variables to the prediction of medication adherence was negligible ( $\chi^2=2.16$ ,  $p=.34$ ).

Table 8. Model 1 Fixed Effects: The Actor-Partner Interdependence Model Demonstrating the Actor and Partner Relationships of Perceived Source-Specific Social Support and Equity to Predict Past Month Medication Adherence

	Estimate ( $\beta$ )	Standard Error	<i>t</i> -value	<i>p</i>
Model 1, Step 2				
Intercept	1.90	0.04	47.29	<.01
Actor Perceived source-specific support	-0.01	0.01	-0.29	0.77
Partner Perceived source-specific support	0.01	0.01	1.29	0.21

Table 9. The Actor-Partner Interdependence Model demonstrating the actor and partner relationships of perceived social support and equity to medication adherence

Model 1, Step 3				
	Estimate ( $\beta$ )	Standard Error	<i>t</i> -value	<i>p</i>
Intercept	1.90	0.04	47.93	<0.01
Actor Perceived source-specific support	-0.01	0.01	-0.16	0.87
Partner Perceived source-specific support	0.01	0.03	1.32	0.20
Actor Equity (deviation from equity)	-0.01	0.03	-0.22	0.83
Partner Equity (deviation from equity)	0.05	0.03	1.46	0.16

*Perceived Social Support, Support Equity, and Depressive Symptoms.* For my second research question, I examined the degree to which equity compared with source-specific perceived social support (within the dyad relationship) to predict total severity of depressive symptoms among participants. I used HLM7 to conduct multilevel modeling of the data. Three hypotheses (4-6) and three models were tested; the first model which included the Level 2 grouping variable of dyad as well as the outcome variable of total depressive symptoms; the second model included the additional variables of actor and partner values of perceived social support (i.e., Source-Specific Social Provisions Scale Total Score) as a predictor for total severity of depressive symptoms; the third model included actor and partner values for equity (i.e., deviation from equity term) as an additional predictor variable for total severity of depressive symptoms.

Results from the testing of the null models (see Table 10) indicated a significant Level 2 dyad effect on the dependent variable of total severity of depressive symptoms

( $p < .01$ ). That is to say, there was a significant main effect for the intercept estimate.

However, results from the test of variance components, presented in Table 11, indicate that the variance of the intercept of the outcome variable of total severity of depressive symptoms was not significantly related to the Level 2 grouping variable of dyad (variance component = 0.40,  $p = 0.40$ ).

Table 10. Null model predicting depressive symptoms among participants - effects

Model 2, Step 1	Estimate ( $\beta$ )	Standard Error	$t$	$p$
Intercept	4.79	0.52	9.28	<0.01

Table 11. Null model predicting depressive symptoms among participants— final estimation of variance components

Random Effect	Standard Deviation	Variance Component	$\chi^2$	$p$
Intercept	0.63	0.40	34.53	0.40
Level-1, r	4.17	17.35		

I hypothesized that greater levels of actor perceived social support (from the dyad partner) and greater actor equity (lower deviation from equity) would be associated with lower rates of total severity of depressive symptoms. The results of fixed effect testing (see Table 12 and 13) demonstrated a significant actor effect for perceived social support. When the other predictor variables in the model were held constant, for every one-point increase in actor source-specific perceived social support, there was a 0.27 point decrease

in total severity of depressive symptoms ( $p=0.01$ ). However, equity as a predictor of total depressive symptoms was not significant in tests of fixed effects; thus, hypothesis four was only partially supported. As no partner effects were significant (indicating there was no effect of the other dyad members' perceived support or equity ratings on one's own rating of depressive symptoms), hypothesis five was not supported.

Table 12. Actor-Partner Interdependence Model demonstrating the actor and partner relationships of source-specific perceived social support predicting depressive symptoms

Model 2, Step 2	Estimate ( $\beta$ )	Standard Error	$t$	$p$
Intercept	4.79	0.47	10.25	<0.01
Actor Perceived Source-Specific Social Support	-0.25	0.09	-2.79	0.01
Partner Perceived Source-Specific Social Support	-0.06	0.09	-0.63	0.53

Table 13. The Actor-Partner Interdependence Model demonstrating the actor and partner relationships of perceived social support and equity to depressive symptoms

Model 2, Step 3	Estimate ( $\beta$ )	Standard Error	$t$	$p$
Intercept	4.79	0.46	10.45	<0.01
Actor Perceived Source-Specific Social Support	-0.27	0.09	-2.98	0.01
Partner Perceived Source-Specific Social Support	-0.04	0.09	-0.46	0.65
Actor Equity (deviation from equity)	0.62	0.39	1.62	0.12
Partner Equity (deviation from equity)	0.03	0.39	0.09	0.93

To test hypothesis six, that equity of support (deviation from equity) will predict total severity of depressive symptoms above and beyond perceived social support, the goodness of fit of the full model including actor and partner values of Source-Specific Social Support and Equity predictors was compared to a model only including the actor and partner values of Source-Specific Social Support (see Table 13 for parameter values). Tests of the deviance statistic indicated that the contribution of the equity variables to the prediction of total severity of depressive symptoms was negligible ( $\chi^2=22.72$ ,  $p=0.27$ ). Thus, hypothesis six was not supported and the contribution of the actor and partner values for equity (deviation) to the predictive model for total severity of depressive symptoms was negligible.

Table 13. The Actor-Partner Interdependence Model demonstrating the actor and partner relationships of perceived social support and equity to depressive symptoms

Model 2, Step 3	Estimate ( $\beta$ )	Standard Error	<i>t</i>	<i>p</i>
Intercept	4.79	0.46	10.45	<0.01
Actor Perceived Source-Specific Social Support	-0.27	0.09	-2.98	0.01
Partner Perceived Source-Specific Social Support	-0.04	0.09	-0.46	0.65
Actor Equity (deviation from equity)	0.62	0.39	1.62	0.12
Partner Equity (deviation from equity)	0.03	0.39	0.09	0.93

***Perceived Social Support, Support Equity, and Anxiety Symptoms.*** The third research question examined the degree to which equity compared with source-specific perceived social support (within the dyad relationship) to predict total severity of anxiety



symptoms among participants. I used HLM7 to conduct multilevel modeling of the interdependent data. Three hypotheses (7-9) and three models were tested; the first model which included the Level 2 grouping variable of dyad as well as the outcome variable of total severity of anxiety symptoms; the second model included the additional variables of actor and partner values of perceived social support (i.e., Source-Specific Social Provisions Scale Total Score) as predictive of total severity of anxiety symptoms; the third model included actor and partner values for equity (i.e., deviation from equity term) as predictive of total severity of anxiety symptoms.

Results from the testing of the null models indicated a significant Level 2 dyad effect on the dependent variable of total severity of anxiety symptoms ( $p < .01$ ; Table 14). Results from the test of variance components, presented in Table 15, indicate that the variance of the intercept of the outcome variable of total severity of anxiety symptoms was not significantly related to the Level 2 grouping variable of dyad (variance component = 0.05,  $p > .5$ ; Table 15).

Table 14. Null model predicting anxiety symptoms among participants – final estimation of variance components

Random Effect	Standard Deviation	Variance Component	$\chi^2$	$p$
Intercept	0.22	0.05	29.16	>0.5
Level-1, r	5.72	32.66		

I hypothesized that greater levels of actor perceived social support (from the dyad partner) and actors' perception of greater equity (lower deviation from equity) would be associated with lower total severity of anxiety symptoms. The results of fixed effect

testing (see Table 15 and 16) demonstrated a trend toward significance for an actor effect for perceived social support as a predictive of total severity of anxiety symptoms. When the other predictor variables in the model were held constant, for every one-point increase in actor source-specific perceived social support, there was a 0.26 point decrease in total severity of anxiety symptoms ( $p=0.06$ ). However, equity as a predictor of total anxiety symptoms was not significant in tests of fixed effects; thus, hypothesis seven was only partially supported. As no partner effects were significant (indicating there was no effect of the other dyad members' perceived support or equity ratings on one's own rating of anxiety symptoms), hypothesis eight was not supported.

Table 15. Null model predicting anxiety symptoms among participants - effects

Model 3, Step 1	Estimate ( $\beta$ )	Standard Error	$t$	$p$
Intercept	6.99	0.69	10.06	<0.01

Table 16. Actor-Partner Interdependence Model demonstrating the actor and partner relationships of source-specific perceived social support predicting anxiety symptoms among participants

Model 3, Step 2	Estimate ( $\beta$ )	Standard Error	$t$	$p$
Intercept	6.99	0.66	10.58	<0.01
Actor Perceived source-specific support	-0.26	0.13	-2.06	0.05
Partner Perceived source-specific support	-0.03	0.13	-0.27	0.79

To test hypothesis nine, that equity of support (deviation from equity) will predict total severity of anxiety symptoms above and beyond perceived social support, the goodness of fit of the full model including actor and partner values of Source-Specific Social Support and Equity predictors was compared to a model only including the actor and partner values of Source-Specific Social Support (see Table 17 for model parameter values). Tests of the deviance statistic indicated that the contribution of the equity variables to the prediction of total severity of anxiety symptoms was not significant ( $\chi^2=0.87, p=>.5$ )—Thus, hypothesis nine was not supported.

Table 17. The Actor-Partner Interdependence Model demonstrating the actor and partner relationships of source-specific perceived social support and equity to anxiety symptoms among participants

	Estimate ( $\beta$ )	Standard Error	<i>t</i>	<i>p</i>
Model 3. Step 3				
Intercept	6.99	0.66	10.64	<0.01
Actor Perceived source-specific support	-0.26	0.13	-1.99	0.06
Partner Perceived source-specific support	-0.03	0.13	-0.23	0.82
Actor Equity (deviation from equity)	0.37	0.55	0.68	0.51
Partner Equity (deviation from equity)	0.35	0.56	0.63	0.53

*AIDS Status, and Support Equity, Depressive and Anxiety Symptoms.* The fourth research question was focused on whether the relationship between AIDS status concordance and outcome variables of equity, severity of depressive symptoms, and severity of anxiety symptoms differed depending on the concordance of dyad AIDS status among participants. I used HLM7 to conduct multilevel modeling of the

interdependent data. One hypothesis (10) and three models were tested. The between-dyads variable of dyad concordance was created by assigning dummy codes to dyads for AIDS status concordance, with 0 signifying discordant dyads and 1 signifying concordant dyads. This variable was included as a level 2 variable in the regression models. Results of fixed effects (see Tables 18, 19, and 20) did not demonstrate significant effects for dyad AIDS status concordance on the outcome variables of equity, total severity of depressive symptoms, or total severity of anxiety symptoms, thus Hypothesis 10 was not supported.

Table 18. The Actor-Partner Interdependence Model demonstrating AIDS status concordance as a between-dyads variable predictor of equity (deviation from equity) among participants

	$\beta$	Standard Error	$t$	$p$
Intercept	1.26	0.25	5.06	<0.01
AIDS status concordance	-0.13	0.32	-0.42	0.68

Table 19. The Actor-Partner Interdependence Model demonstrating AIDS status concordance as a between-dyads variable predictor of depression among participants

	$\beta$	Standard Error	$t$	$p$
Intercept	4.54	0.82	5.56	<0.01
AIDS status concordance	0.44	1.06	0.41	0.69

Table 20. The Actor-Partner Interdependence Model demonstrating AIDS status concordance as a between-dyads variable predictor of anxiety among participants

	$\beta$	Standard Error	$t$	$p$
Intercept	6.71	1.09	6.17	<0.01
AIDS status concordance	0.46	1.42	0.32	0.75

## Discussion

The aim of this study was to better understand whether HIV-positive individuals' and their HIV-positive supporters' perceptions of support availability and balance (i.e., equity) within their relationship are associated with their own and their supporters' mental health and treatment-related health outcomes. Using the Actor-Partner Interdependence Model as a conceptual framework and hierarchical linear modeling as the statistical approach, the relationships between perceived source-specific social support and equity with depressive symptoms, anxiety symptoms, and medication adherence for index patients and their self-identified informal supporters were examined.

In this study, there was evidence of significant actor effects of perceived support from one's dyadic partner (i.e., source-specific social support) on total depressive symptoms and total anxiety symptoms, as hypothesized. Specifically, greater perception of dyadic social support was associated with fewer depressive or anxiety symptoms. Although there is a dearth of research examining source-specific social support among dyads with chronic illness (and no research examining source-specific social support for dyads in supportive relationships coping with HIV), the closest proxy may be the perception of partner or spousal support from studies in which one member of the couple has a chronic illness, most commonly cancer. My findings are consistent with others' research, such as Gremore and colleagues (2011) who found negative relationships between partner support and depressive symptoms among women coping with breast cancer and their healthy partners. In a similar vein, Lal & Bartle-Haring (2011) found that partner unsupportive behavior was positively associated with depression among patients with chronic lung disease. Findings from psycho-oncology literature suggest a negative

relationship between perceived family support and psychological distress among patients and healthy spouses coping with prostate and breast cancer (Baider, Ever-Hadani, Goldzweig, Wygoda, & Peretz, 2003). When researchers have examined general social support in the context of patients and their healthy partners coping with chronic illness, they have found such social support was negatively associated with psychological distress (Barry, Kasl, Lichtman, Vaccarino, & Krumholz, 2006; Thomson, Molloy, & Chung, 2012).

Contrary to my expectations, participants' perceptions of source-specific social support were not related to participants' past month medication adherence. The relationship between social support and HIV medication adherence in the literature has been documented as largely positive (Andersen et al., 2000; DiMatteo, 2004; Persson, Ostergren, Hanson, Lindgren, & Naucler, 2002), wherein greater perceptions of social support have been associated with greater rates of medication adherence. Conversely, there is literature indicating negative or neutral associations between perceived support and HIV medication adherence (Johnson et al., 2003; Knowlton et al., 2011). In the current study, it may be that the statistically insignificant results are due to neutral effects of the support perceived from their dyad partner, or due to low power to detect effects. The literature also shows us that not all support is created equal and there may be variability in the relationships between support and adherence based on the supporter and the perception of the nature of support for adherence. For instance, Wrubel, Stumbo, & Johnson (2010) have examined the dynamics of received support among serodiscordant and seroconcordant couples with HIV. The results of their qualitative interviews reveal variability in the attributions of who provides support for adherence; whether adherence

is viewed as a personal responsibility or couple responsibility depended on support preferences and the support exchange context of relationships. Thus, it may be that participants in our study tended to identify adherence as a personal responsibility and perceived support did not play a significant role with respect to their medication adherence. Moreover, relationship partners may be sought for particular types of support. For example, Stumbo, Wrubel, & Johnson, (2011) found that HIV-positive individuals sought instrumental or tangible support from their partners while receiving and seeing informal and emotional support from family members and friends. Although the sample size is too small to examine support and adherence patterns by relationship type, we might consider that index participants were not as reliant on supporters for adherence-related support based on their relation with the supporter.

Contrary to what I hypothesized, there was no evidence of significant partner effects for any of the study hypotheses. Thus, the results from this study may be most consistent with an actor-oriented model (Kenny & Cook, 1999), wherein the participants' outcomes are a function of the individuals' perceptions themselves, and their partners' perceptions have no effect on the individuals' outcomes. These results may be due to the nature of the dyads, in which both individuals are simultaneous coping with their own illness. Thus, participants may be more individually focused on their own coping with illness and there may be less carryover in terms of how their perceptions of social support and equity influence their supporters' mental health and treatment outcomes. Most of the literature examining mental health and treatment outcomes in a dyadic context incorporates patients and their healthy partners or caregivers, where there are distinct roles and supporters are often focused on the patient and their outcomes. In addition, a

larger sample size for the current study may have increased the likelihood of detecting partner effects.

Surprisingly, participants' own and dyad partners' perceptions of equity (i.e., deviation from equity) were not identified as significant predictors for any of the outcome variables. Although there is no research examining associations between equity and medication adherence, there is literature that supports associations between perceptions of inequity and psychological distress (Kuijer et al., 2001; Ybema, Kuijer, Buunk, DeJong, & Sanderman, 2001; Ybema et al., 2002). Perhaps an examination of reciprocity of support exchange (i.e., the balance between received and provided support transactions) rather than global perceptions of equity may better capture the negative effects of inequitable support (Kleiboer et al., 2006). On the other hand, researchers have argued that meeting partner needs in intimate relationships may be more important to individuals than having equity of support in the relationship (Clark & Mills, 1979; Clark & Chrisman, 1994). Another possibility to consider is the concept of equity preferences; that is, individuals' preferences for equity in their relationships. For instance, dyadic relationships may be set up in a way that one partner may be more comfortable giving support while the other partner may be more comfortable receiving support. Future work should incorporate an examination of equity preferences and equity agreements in relationships. Additionally, others have argued that perceptions of inequity may be more closely associated with relationship quality than with distress (Kuijer, Buunk, DeJong, Ybema, & Sanderman, 2004). To address this issue, future work should include measures of relationship quality into studies assessing the relationship between equity, psychological distress, and treatment outcomes.



Additionally, the non-significant results may be due to the way in which equity was measured as a global assessment and not a more discrete measurement. Investigators have also examined aspects of equity through use of author-derived scales assessing perceptions of underinvestment and perceptions of underbenefit (Ybema et al., 2001) and examining reciprocity of emotional and instrumental social support exchanges as a proxy for equity through diary or daily report studies (Gleason, Iida, Bolger, & Shrout, 2003; Kleiboer et al., 2006). Future studies should incorporate multiple measures of equity and reciprocity to gain a more comprehensive understanding of the nuances with respect to balance of support in relationships with respect to mental health and treatment outcomes. The assessment of equity should also occur at multiple time points. For example, the item in the current study is focused on perceptions of equity “at this moment” or the day of the appointment. A more stable assessment of equity might be obtained if participants were asked to consider the equity in their relationships over the past month, past year, and so forth. This may, in part, explain why the correlation between the equity ratings at the time of the appointment and one week later was not very strong. Additionally, the power issues may be associated with the lack of significance. With regard to future analyses of this data, it would be interesting to examine associations between the raw scores on the equity measure and outcome variables, as index patients and informal supporters differed on this score and the distribution would have more variability with the 7-point scale compared with the 4-point scale for deviation from equity.

Finally, there were no significant predictor effects of AIDS status concordance on the outcome variables of equity, depressive symptoms, or anxiety symptoms among dyads. Although there was a sizable proportion of dyads in our sample with a discordant

dyads AIDS status, perhaps their difference in AIDS status was did not play the most prominent role with respect to mental health and equity in the relationship. It may be the case that a more specific operationalization of discrepancy in health status or multifactorial assessment of health status was needed; this might be inclusion of symptom burden, health-related quality of life, functional limitations, or number of AIDS-defining conditions or complications as a way to assess the significance of participants' health status. It may also be the case that when there is a discrepancy in health status and one partner in the dyad has pressing health needs, equity may not be as much of a concern and needs-based rules for the relationship may dominate (Clark & Mills, 1979; Kuijer et al., 2001). Alternatively, perhaps examining concordance in a construct such as supporter burden or supporter role overload might better capture the relationship to mental health and equity in the relationship. For instance, significant caregiver burden and role overload have been described among HIV-positive caregivers, and have been associated with deleterious mental health outcomes and compromised self-care and management of HIV (Edwards, Irving, & Hawkins, 2011; Folkman et al., 1994; Land & Hudson, 2004; Land, Hudson, & Stiefel, 2003; Wight, 2000). Although burden and role overload associated with the provision of informal support was not examined explicitly in the present study, it may be an important area for future exploration with respect to equity and mental health in seropositive dyads. Furthermore, given the spectrum of relationship types representing in our sample (i.e., ranging from friendships to intimate relationships), the impact of a differential health status may not be as powerful on patients' or supporters' mental health and perceptions of equity in the relationship. The small sample size precludes further subdivision to examine the potential

differences in the relationships between AIDS status concordance, mental health, and equity by relationship type; however, future research is recommended to examine differences in these constructs.

### **Limitations**

Although findings from my study contribute to an understanding of equity and social support within HIV-affected relationships, there were several significant limitations that may have influenced the results. One such limitation pertains to the sample size. The sample size was small and as a result, there was reduced power to detect large effects. Specifically, I was only able to detect small effects which required a large difference. Although dyadic data analysis using multilevel modeling has been conducted with small samples, it is often the case that these studies too may have been underpowered. With additional participants, I would expect to find stronger relationships between key variables of interest.

There are a number of factors that may limit the generalizability of these results, including response biases common to self-report measures (e.g., erroneous recall and social desirability responding). Another issue affecting generalizability may be a self-selection bias due to the way in which dyads were recruited and enrolled in the study. For instance, index patients did the recruiting of the informal supporters and it is possible that the index participants perceived a more close relationship with the supporter than vice versa. However, we did attempt to minimize this by doing extensive screening of both partners to try to ensure that they were in a mutually supportive relationship of significance and free of abuse. Additionally, the participants in this study were quite

impoverished which may have influenced their perceived support (e.g., reduced financial support) and the relevance of perceived equity versus getting their needs met.

Additionally, the way in which the construct of equity was measured in this study may be a limitation. The use of a single item measure is not ideal. In future studies, inclusion of multiple methods of assessment of equity within the dyad will be implemented. Additionally, a construct that has been discussed as distinct from equity, but related, is reciprocity of support or the perception of returning support to others. Perhaps reciprocity may be relevant in this context of shared HIV illness and an interaction between equity and reciprocity on the outcome variables may have been observed. Future inclusion of the assessment of reciprocity in this line of research is recommended.

Finally, we utilized a cross-sectional research design for this project. Thus, causal inferences between perceived source-specific social support, equity, depressive symptoms, anxiety symptoms, and medication adherence cannot be established. That is to say, social support could improve mental health outcomes, but positive mental health could also influence how supportive one sees those around him or her. Longitudinal research is recommended to examine how the relationships between these variables may change over the course of coping with HIV/AIDS. Despite these limitations, there is still important information to be gained from this research, which holds promise for future research investigations and clinical practice.

### **Implications, Future Directions, and Conclusion**

Little is known about how the nuances and contextual factors associated with social support influence mental health and medication adherence outcomes in the context

of HIV. The present study was the first to examine, in a dyadic context, perceptions of equity among members of supportive relationships who are both HIV-positive. In fact, this study was the first to my knowledge to examine equity among dyads diagnosed with the same illness. Most investigators have examined coping and adjustment to chronic illnesses for patients and their healthy caregivers or healthy spouses. The results from this study indicate the protective effects of individuals' perceptions of being supported by a specific support person, generalized among a variety of relationships, on depressive and anxiety symptoms.

These results, although tentative, may imply that perceptions of support from important support persons of patients with HIV/AIDS are important with respect to mental health outcomes. Informal supporters who are also seropositive may be particularly useful supporters for people living with HIV/AIDS as they may be a source of peer support and education. Providers should work with patients when assessing their social support network, to identify potential supporters and in particular, supporters who may be HIV-positive.

Additional research is needed to learn how patients assess and evaluate support and equity within the relationship (e.g., whether certain forms of support contribute more to perceptions of equity than others), whether optimal matching of support plays a role with respect to perceptions of equity, and the mechanisms by which equity influences mental health, adherence to medication, and treatment engagement more broadly. Longitudinal research is recommended to examine changes in perceived equity and its relationship with mental health and treatment outcomes over time. Qualitative research examining the nature of various types of supportive HIV-seropositive relationships is

recommended to gain a better picture of the nuances in perceptions of support and the rules that may govern these relationships, whether it be having the perception of an equitable relationship, one in which individuals have their needs met, or some other type of dynamic that may be operating. Considering that these participants were living at or below the poverty level, it may be the case that getting their needs met, and obtaining instrumental or tangible forms of social support, may be more relevant than perceiving that the give and take within the relationship is equal. These and many other research questions are waiting to be answered.

### **Conclusions**

The receipt and provision of informal support and informal caregiving in the context of HIV/AIDS is common, particularly among populations that are disproportionately affected by the illness, such as African Americans. Yet, there remains much to be explored about the exchange and perceptions of support within close relationships of those coping with HIV/AIDS while providing support to others. If we are to gain a better understanding of how to utilize social support outside of the medical context to positively affect medical outcomes, we must examine the nuances of social support within these close relationships to understand their impact on individuals' and their supporters' mental health and treatment outcomes. This research is one of many steps toward a better understanding of the support dynamics within broad HIV seroconcordant relationships.

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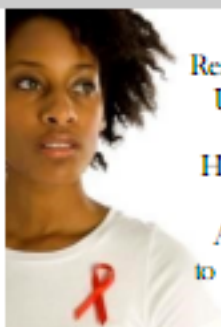
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## Appendix A. Study Recruitment Fliers

**ARE YOU OR IS  
SOMEONE YOU KNOW  
HIV POSITIVE?**

COMMUNICATION STUDY



Researchers at UWM are inviting HIV-positive African Americans to participate.

The study will involve

- completing a survey
- discussing your HIV experiences with someone you care about

You will be compensated for your time

For more information or to see if you qualify,  
Call • 414-877-8UWM or  
Email • patientlab@gmail.com

IRB 12028  
Approval Date 8/22/2011



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Appendix B. HIV Communication Survey (Selected Items Used in Dissertation Research)

**PI: Katie E. Mosack, Ph.D.; Student Co-PI: Angela R. Wendorf**

**Note: Survey is administered via QDS (ACASI) software and participants do not see question numbers or skip pattern directives, below.**

**Thank you for agreeing to participate in our study. We appreciate your time and honesty; your responses will help us improve and understand HIV treatment planning for those diagnosed with HIV/AIDS and their loved ones. Please be aware that some questions will be about your experiences with HIV. For others, we will ask you your thoughts about the experiences of the person who came with you today. If you have any questions as you complete this survey, please ask the interviewer.**

**Demographics**

1. What year were you born? \_\_\_\_\_
2. What month were you born? \_\_\_\_\_
3. What is your age in years? \_\_\_\_\_
4. What is your gender?
  - Male
  - Female
  - MTF Transgender
  - FTM Transgender
  - Other (please specify) \_\_\_\_\_
5. What most closely defines your *current* relationship status?
  - Not dating
  - Dating casually
  - In a committed relationship
  - Other (please specify) \_\_\_\_\_
6. With which race and/or ethnicity do you identify (select all that apply):
  - White/Caucasian
  - Black/African American
  - Hispanic/Latino /a
  - Asian or Pacific Islander
  - Native American
  - Other (please specify): \_\_\_\_\_

7. What is the highest level of education you have completed? (select one)
- Grade School
  - Some High School
  - Finished High School or High School Equivalent (GED)
  - Some College (no degree)
  - Earned Associates Degree
  - Earned Technical Degree
  - Earned a Bachelor's Degree
  - Earned a Master's Degree
  - Earned Doctorate/Medical/Law degree
8. Considering all sources of income, how much do you take home each **month** (gross income)?
- 0 (I did not receive or make any money)
  - \$1-499/month
  - \$500-999/month
  - \$1000-1499/month
  - \$1500-1999/month
  - \$2000-2499/month
  - \$2500 or more/month
9. Do you have any children?
- Yes
  - No

*If "No", skip Question 10 and 11, and continue to Question 12.  
continue to question 10*

*If "Yes",*

10. How many do you have? \_\_\_\_\_

11. How many children live with you? \_\_\_\_\_

**Now, we would like to ask you about ask you about your health, health care, medical appointments, your relationship with your doctor, and your experiences with medications. In all cases, we ask you to focus on your care and treatment as it relates to HIV.**

12. Have you ever been tested for and/or diagnosed with HIV?
- Yes
  - No

*If "no" skip questions 13 – 42 and continue to question 43. If "yes" continue to question 13.*

13. What is your current HIV status (choose one)

- HIV-positive, currently diagnosed with AIDS
- HIV-positive, no current AIDS diagnosis
  - i. If you answered “HIV-positive, no current AIDS diagnosis,” have you ever been diagnosed with AIDS?
    - Yes
    - No

14. Where were you diagnosed?

- STD clinic
- Planned Parenthood
- Primary Care Physician’s Office
- Community Health Center
- Health Department
- Hospital
- Blood bank
- Emergency Room/Urgent Care
- While locked up (e.g., jail, prison, detention facility)
- Other (please specify): \_\_\_\_\_

15. In what **year** were you diagnosed with HIV?

- 19 \_\_\_\_\_
- 20 \_\_\_\_\_
- I don’t remember the year\*
  - \*If you don’t remember exactly what year you were diagnosed, please estimate the year you may have been diagnosed: \_\_\_\_\_

16. In what **month** were you diagnosed with HIV? \_\_\_\_\_

### **Medication Adherence**

17. Each time you take your medications we consider that to be a dose. How many doses of your HIV medications do you take each day?

- 1 dose
- 2 doses
- 3 doses

***If you answered 1 dose answer question 33, then continue to question 37.***

***If you answered 2 doses answer question 34 and 35, then continue to question 37***

***If you answered 3 doses answer question 34, 35, and 36 then continue to question 37***

18. Of the 7 doses you were supposed to take during the last week, how many did you miss?

- 1

- 2
- 3
- 4
- 5
- 6
- 7

19. Of the 7 morning doses you were supposed to take during the last week, how many did you miss?

- 1
- 2
- 3
- 4
- 5
- 6
- 7

20. Of the 7 evening doses you were supposed to take during the last week, how many did you miss?

- 1
- 2
- 3
- 4
- 5
- 6
- 7

21. Of the 7 afternoon doses you were supposed to take during the last week, how many did you miss?

- 1
- 2
- 3
- 4
- 5
- 6
- 7

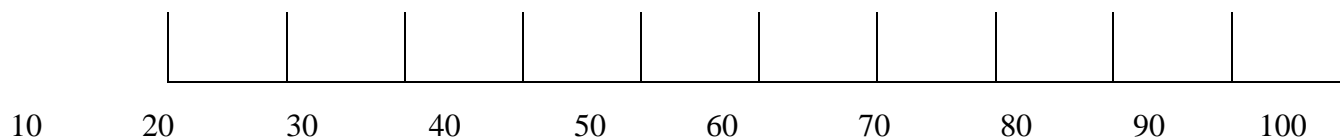
22. Many patients find it difficult to take all their HIV medication exactly as prescribed. Put a mark on the line below at the point that shows your best guess about how much of your prescribed HIV medication you have taken in the last month. We would be surprised if this were 100% for most people.

Example: 0% means you have taken no medication

50% means you have taken half your medication or all your medication about half the time



100% means you have taken every single dose of your medication



23. During the past **month**, rate your ability to take all your medications as prescribed

- Very poor
- Poor
- Fair
- Good
- Very Good
- Excellent

### **Anxiety Symptoms**

Assessed with the Beck Anxiety Inventory – Fast Screen/Primary Care)- Sample items are not reproduced.

### **Depressive Symptoms**

Assessed with the Beck Depression Inventory – Fast Screen – Sample items are not reproduced.

### **Source-Specific Perceived Social Support**

**In answering the next set of questions, please think specifically about your current relationship with the person who came with you today. As a reminder, none of the information that you provide will be shared with this person. Thank you again for your honesty.**

24. Please indicate to what extent each statement describes your current relationship with the person that came with you today. Use the following scale to indicate your opinion: So, for example, if you feel a statement is very true of your relationship with the person that came with you today, you would respond with “strongly agree.” If you feel a statement clearly does not describe your relationship, you would respond with “strongly disagree.”

	Strongly Disagree	Disagree	Agree	Strongly Agree
I can depend on him/her to help if I really need it.	<input type="checkbox"/>	<input type="checkbox"/>	<input type="checkbox"/>	<input type="checkbox"/>

I feel that I could not turn to him/her for guidance in times of stress.	<input type="checkbox"/>	<input type="checkbox"/>	<input type="checkbox"/>	<input type="checkbox"/>
S/he enjoys the same social activities that I do.	<input type="checkbox"/>	<input type="checkbox"/>	<input type="checkbox"/>	<input type="checkbox"/>
I feel personally responsible for his/her well being.	<input type="checkbox"/>	<input type="checkbox"/>	<input type="checkbox"/>	<input type="checkbox"/>
I feel s/he does not respect my skills and abilities.	<input type="checkbox"/>	<input type="checkbox"/>	<input type="checkbox"/>	<input type="checkbox"/>
If something went wrong, I feel that s/he would not come to my assistance.	<input type="checkbox"/>	<input type="checkbox"/>	<input type="checkbox"/>	<input type="checkbox"/>
My relationship with him/her provides me with a sense of emotional security and well-being.	<input type="checkbox"/>	<input type="checkbox"/>	<input type="checkbox"/>	<input type="checkbox"/>
I feel my competence and skill are recognized by him/her.	<input type="checkbox"/>	<input type="checkbox"/>	<input type="checkbox"/>	<input type="checkbox"/>
I feel s/he does not share my interests and concerns.	<input type="checkbox"/>	<input type="checkbox"/>	<input type="checkbox"/>	<input type="checkbox"/>
I feel s/he does not really rely on me for their well-being.	<input type="checkbox"/>	<input type="checkbox"/>	<input type="checkbox"/>	<input type="checkbox"/>
I could turn to him/her for advice if I were having problems.	<input type="checkbox"/>	<input type="checkbox"/>	<input type="checkbox"/>	<input type="checkbox"/>
I feel I lack emotional closeness with him/her.	<input type="checkbox"/>	<input type="checkbox"/>	<input type="checkbox"/>	<input type="checkbox"/>

### **Perceived Equity of Support**

**25. The next question is about the give-and-take that goes on in the relationship between you and the person you came in with today. We want you to judge the give-and-take (for instance doing things for each other, listening to each other, and talking about each other's problems) in your relationship.**

1. When you look at your relationship with the person you came in with today from a viewpoint of give-and-take, how would you describe your relationship? Please check one option.

- He/she is doing a lot less for me than I am doing for him/her
- He/she is doing somewhat less for me than I am doing for him/her
- He/she is doing as much for me as I am doing for him/her
- He/she is doing somewhat more for me than I am doing for him/her
- He/she is doing a lot more for me than I am doing for him/her

**Thank you for your honest responses. We appreciate your participation in the survey. At this time, please inform the interviewer that you are ready for the next portion of the study.**

## C. Curriculum Vitae

**ANGELA R. WENDORF, M.S., Ph.D. Candidate**

University of Wisconsin-Milwaukee  
 Department of Psychology  
 P.O. Box 413  
 Milwaukee, WI 53211  
 arwendorf@gmail.com aroethel@uwm.edu

### EDUCATION

**GRANTED**

**Doctorate (Psychology; Clinical Psychology Major, Social and Health Psychology Minor)**

**08/2014 (Expected)**

University of Wisconsin–Milwaukee, Milwaukee, WI

Advisor: Katie E. Mosack, Ph.D.

Dissertation Title: *Equity of Social Support and its Relationship With Depression, Anxiety, and Antiretroviral Medication Adherence among Seroconcordant Dyads of HIV-Positive African Americans and Their Informal Supporters*

Dissertation status: Passed defense on 11/11/2013

**Master of Science (Psychology)**

**12/2010**

University of Wisconsin–Milwaukee, Milwaukee, WI

Master's Thesis: *Examining the Influence of Depression on Antiretroviral Medication Adherence Decision-Making*

Advisor: Katie E. Mosack, Ph.D.

**Bachelor of Science (Psychology; Human Biology)**

**05/2007**

University of Wisconsin–Green Bay, Green Bay, WI

Honors Thesis: *Effectiveness of stress management techniques: Psychological and physiological indicators.*

Thesis Advisor: Regan A.R. Gurung, Ph.D.

Psychology Advisor: Regan A.R. Gurung, Ph.D.

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### HONORS AND AWARDS

2013 APA Student Travel Award, American Psychological Association

2012 Dissertation Fellowship for 2012-2013 academic year, Univ. of Wisconsin-Milwaukee Graduate School

2011 Outstanding Doctoral Student Professionalism Award by the Milwaukee Area Psychological Association

2008 Chancellor's Graduate Student Award, Univ. of Wisconsin-Milwaukee Graduate

School

2007 Chancellor's Graduate Student Award, Univ. of Wisconsin-Milwaukee Graduate School

2007 Chancellor's Leadership Medallion Award, Univ. of Wisconsin-Green Bay

2006 Distinction of Who's Who in American Colleges and Universities, Univ. of Wisconsin-Green Bay

## PRIMARY RESEARCH PROJECTS

Dissertation: *Proposed 7/13/2012, Defended: 11/11/2013*

- **“Equity of Social Support and its Relationship with Depression, Anxiety, and Antiretroviral Medication Adherence among Seroconcordant Dyads of HIV-Positive African Americans And Their Informal Supporters”**
- Project: Multi-site cross-sectional survey research examining the associations between equity of social support, depression, anxiety, medication adherence, and disease status among dyads comprised of HIV-positive African Americans and their HIV-positive informal supporters. An examination of equity of support may help to better explain complex associations between perceived social support, mental health, and treatment adherence among HIV-positive individuals in close relationships with other people living with HIV/AIDS.

Master's Thesis: *Defended 3/2010*

- **“Examining the Influence of Depression on Antiretroviral Medication Adherence: A Qualitative Study”**  
Project: Qualitative study utilizing in-depth individual interview methods to examine the impact of depression on medication adherence and medication adherence decision-making for patients with HIV/AIDS and depressive disorders. By identifying specific factors that influence medication adherence decision-making among individuals with HIV/AIDS and depressive disorders, researchers and clinicians could use these findings to target depressive symptoms and their influence on adherent behaviors.

## RESEARCH EXPERIENCE

**Data Manager**, Univ. of Wisconsin-Milwaukee, Department of Psychology, 7/2011-7/1/2013

- Assisted Katie Mosack, Ph.D., Assistant Professor of Psychology, on UWM's Research Growth Initiative- funded study in which we examined social support among HIV-positive individuals. The primary purpose of this mixed-methods project was to examine the association between subjective self-reports and

objective measures of social support-related communication among HIV-affected African American dyads.

- Assisted in the development and editing of grant proposals; assisted in survey development and management using ACASI software, developed consent forms and IRB protocols; recruited participants and administered surveys and interviews; coordinated qualitative data analysis using SPSS and NVivo qualitative analysis software; maintained databases of qualitative data; developed and maintained qualitative data codebooks, created coding development and training manuals for the study, trained graduate and undergraduate students on qualitative data analysis and implementation of the coding systems

**Graduate Research Assistant**, Univ. of Wisconsin-Milwaukee Department of Psychology, 11/2007-7/1/2013

- Assisted Katie Mosack, Ph.D., Assistant Professor of Psychology, with studies examining the patient experience of chronic or life-threatening illnesses, researching such aspects as perceived health, adjustment to chronic illness, treatment planning, adherence to medical regimen, and minority health disparities.
- Gained experience in quantitative and qualitative research methods, assisted in the writing and editing of consent forms and IRB protocols, recruited participants and administer surveys and interviews in the community, conducted quantitative and qualitative analyses of data (using SPSS, NVivo), created and presented research posters for quantitative and qualitative studies, assisted in the writing and editing of manuscripts, assisted in the development and editing of grant proposals, and supervised undergraduates and mentored thesis students

**Graduate Research Assistant**, Univ. of Wisconsin-Milwaukee, Department of Nursing, 1/2011-7/1/2013

- Under the direction of Penninah Kako, Ph.D., RN, FNP, BC, APNP, Assistant Professor of Nursing, gained experience in qualitative analytic methods such as constant comparative and narrative analysis for a study examining physical and mental health needs among HIV-positive women in Kenya. Assisted in qualitative data analysis and manuscript writing.

**Graduate Research Assistant/WOC**, Internal Medicine, Milwaukee VA Medical Center, 1/2010-7/1/2013

- Under the direction of Jeffrey Whittle, M.D., MPH, Associate Professor of Medicine, gained experience in intervention quality assurance methods through field observation and qualitative analysis for an RCT peer support intervention to improve hypertension control among veterans. The primary purpose of this project was to establish the efficacy of a novel peer support intervention to reduce hypertension among members of veteran service organizations. Conducted field observations for the RCT, conducted qualitative data analysis using Nvivo9

qualitative data analysis software, and assist in the writing and editing of manuscripts.

**Graduate Research Assistant**, Univ. of Wisconsin-Milwaukee Psychology Clinic Research Team, 1/2008-1/2010

- Under the direction of Jonathan Kanter, Ph.D., Assistant Professor of Psychology, gained experience in therapy process and outcome research by analyzing data collected from UWM Psychology Clinic clients
- Assisted in the progression of the psychology clinic as a Practice Research Network for therapy research

**Graduate Research Assistant**, Univ. of Wisconsin-Milwaukee, 06/2007-11/2007

- Assisted Marcellus Merritt, Ph.D., Assistant Professor of Psychology, with studies of stress and cardiovascular health disparities, psychophysiology and health status
- Gained experience using psychophysiological equipment for measurement of cardiovascular reactivity and heart rate variability, recruited participants and ran experiments in the lab, data entry, assisted in the development and editing of grant proposals

**Undergraduate Research Assistant**, Summer Program for Undergraduate Research, Univ. of California-Los Angeles, 6/2006-9/2006

- Assisted Vickie Mays, Professor of Clinical Psychology and Health Services, with research in minority health disparities, public health, and community psychology
- Assisted in the development of a diabetes education and prevention program for urban American Indian youth
- Developed a tool kit and fact sheet series on California urban American Indian mental health for faculty and health professionals

**Undergraduate Research Assistant**, Univ. of Wisconsin-Green Bay, 12/2005-5/2007

- Assisted Regan A.R. Gurung, Professor of Psychology and Human Development, with social psychological studies examining how context, clothing, and body size influence impression formation, perception, and objectification among undergraduates; designed and conducted an honors thesis experiment in which I examined psychological and physiological correlates of stress management and associations with undergraduate mental health
- Conducted literature reviews, wrote abstracts, recruited participants and ran experiments in the lab, learned and used SPSS for statistical analysis, created and submitted IRB and undergraduate research grant proposals, analyzed salivary cortisol samples using high sensitivity ELISA assays

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## PUBLICATIONS

### Journal Articles:

1. Brouwer, A. & Mosack, K.E., **Wendorf, A.R.** & Sokolova, L. (in press). Patterns of Missing Data in Ethnic minority health research: A survey project with Russian-speaking immigrant women with hypertension. *Research and Theory for Nursing Practice*, 27.
2. Mosack, K.E., Brouwer, A.M., **Wendorf, A.R.**, Fletcher, K., Patterson, L., Ertl, K., & Whittle, J. (Feb 12, 2013 *Epub ahead of print*). Evaluation of a peer-led hypertension intervention for veterans: Impact on Peer Leaders. *Health Education Research*. DOI: 10.1093/her/cyt004.
3. **Wendorf, A.R.** & Mosack, K.E. (2013). Navigating hazardous conditions: Understanding HIV medication adherence in the context of depression. *Qualitative Health Research*, 23, 541-554. DOI: 10.1177/1049732312469462.
4. Mosack, K.E., **Wendorf, A.R.**, Brouwer, A.M., Patterson, L., Ertl, K., Whittle, J., Morzinski, J., & Fletcher, K. (2012). Veterans service organization engagement in "POWER," a peer-led hypertension intervention. *Chronic Illness*, 8, 252-264. DOI: 10.1177/1742395312437978.
5. Peters, J.W., **Wendorf, A.R.**, Gurung, R.A.R., & Filz, T. (2012). A survey of graduate and undergraduate teaching assistants. *College Teaching*, 60, 95-103. DOI:10.1080/87567555.2011.637250
6. Mosack, K.E. & **Wendorf, A.R.** (2011). Health care provider perspectives on the involvement of family in HIV treatment planning. *Qualitative Health Research*, 21, 1554-1566. DOI: 10.1177/1049732311413783.

### Book Chapters:

1. **Wendorf, A.R.**, Brouwer, A.M., and Mosack, K.E. (2014) *Stress and culture*. In R.A.R. Gurung (Ed.). *Multicultural Approaches to Health and Wellness in America*. Santa Barbara: ABC-CLIO Books.
2. Gurung, R. A. R., & **Roethel-Wendorf, A.** (2009). *Stress and mental health*. In S.Eshun, & R. A. R. Gurung, (Eds.), *Sociocultural Influences on Mental Health*. Malden, MA: Blackwell.

### Manuscripts Under Review

1. Anderson, R.E., Brouwer, A.M., **Wendorf, A.R.**, & Cahill, S.P. (under review). Threat response in a date rape scenario: Exploring qualitative themes. Submitted to *The Journal of Sex Research*.

### In Preparation

1. **Wendorf, A.R.** & Mosack, K.E. (in preparation). "There's something about having something incurable that you can never get over": The experience of depression among a diverse sample of patients dually diagnosed with HIV/AIDS and depressive disorders.
2. **Wendorf, A.R.**, Kako, P., & Stevens, P. (in preparation). A qualitative assessment of mental health needs among HIV-positive Kenyan women.

3. Mosack, K.E., Stevens, P.E., Wendorf, A.R., & Thomas, C.J. (in preparation) Problems experienced and social support needs of HIV-positive African Americans and their informal supporters.

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## PRESENTATIONS

### *Oral Presentations*

1. Billig, A., **Wendorf, A.**, Brouwer, A. M., Thomas, C., Wandrey, R., & Mosack, K.E. (November, 2013). Effects of partner support on relationship conflict and depression among HIV-positive dyads. Intersection of HIV and Mental Health. Symposium to be presented at the 2013 American Public Health Association Meeting in Boston, MA.
2. **Wendorf, A.R. (Co-chair)** & Mosack, K.E. (November, 2010). Examining the influence of depression on antiretroviral medication adherence decision-making and adherent behaviors. HIV and Depression: A Multidisciplinary Approach to HIV Prevention and Care. Symposium presented at the 2010 Association for Behavioral and Cognitive Therapies annual conference in San Francisco, CA.
3. Gurung, R.A.R., Hogan, T.P., Prieto, L.R., Weidert, J., **Roethel (Wendorf), A.**, & Dunn, D. (August, 2010). Best practices for training and using undergraduate teaching assistants. Symposium presented at the 2010 American Psychological Association annual conference in San Diego, CA.
4. Gurung, R.A.R., **Wendorf, A.R. (Co-chair)**, Suchday, S., Terre, L., Stern, M., Mann, T., & Luecken, L.J. (August, 2010). Various faces of health psychology: A panel discussion of FAQs about training and careers in health psychology. Symposium presented at the 2010 American Psychological Association annual conference in San Diego, CA.
5. Gurung, R.A.R. & **Roethel (Wendorf), A.J.** (August, 2007). Teaching for healthier minds and healthier bodies. In K. Vespia (Chair), Changing student attitudes and behaviors: Pedagogical challenges, models, and results. Symposium conducted at the American Psychological Association, San Francisco, CA.
6. **Roethel (Wendorf), A.J.** (August, 2006). Developing a curriculum on diabetes education and college readiness for urban American Indian Youth. Talk presented at the UCLA Summer Program for Undergraduate Research Symposium, Los Angeles, CA.

### *Poster Presentations*

1. **Wendorf, A. R.**, Thomas, C. J., Stevens, P. E., Wandrey, R., Billig, A., & Mosack, K. E. (August, 2013). Understanding HIV-related problems in the context of shared illness. Poster presented at the American Psychological Association Annual Convention, Honolulu, HI.
2. Mosack, K.E., Brouwer, A.M., **Wendorf, A.R.**, & Kulland, A. (May, 2012) Using the Health Belief Model to predict adherence among Russian-speaking immigrant women. Poster presented at the Association for Psychological Science, Chicago, IL.



3. Brouwer, A., **Wendorf, A.R.**, & Mosack, K.E. (April, 2012). Self-as-doer for diabetes: A disease-specific motivational measure for diabetes self-care behaviors. Poster presented at the Annual Meeting & Scientific Sessions of the Society of Behavioral Medicine, New Orleans, LA.
4. Brouwer, A., Patterson, L., **Wendorf, A.R.**, Ertl, K., Mosack, K.E., Whittle, J., Morzinski, J., & Fletcher, K. (April, 2012). Evaluation of a peer-led hypertension intervention for veterans: Health effects on peer leaders. Poster presented at the Annual Meeting & Scientific Sessions of the Society of Behavioral Medicine, New Orleans, LA.
5. **Wendorf, A.R.**, Bilkey, S., & Mosack, K.E. (November, 2011). Uncertainty among HIV-positive patients with comorbid depressive disorders. Poster presented at the 2011 Association for Behavioral and Cognitive Therapies annual meeting in Toronto, ON, Canada.
6. **Wendorf, A.R.**, Bilkey, S., Wollach, D., Ehlert, K., Woolverton, L., Brouwer, A.M., & Mosack, K.E. (August, 2011). Facilitators and barriers to medication adherence among HIV-positive patients with comorbid depressive disorders: A qualitative study. Poster presented at the 2011 American Psychological Association convention in Washington, D.C..
7. **Wendorf, A.R.**, Bilkey, S., Ehlert, K., Wollach, D., Brouwer, A.M., & Mosack, K.E. (April, 2011). Medication-taking attitudes and beliefs among HIV-positive adults with comorbid depressive disorders: a qualitative study. Poster presented at the 2011 Society for Behavioral Medicine annual meeting in Washington, D.C..
8. **Wendorf, A.R.**, Bilkey, S., Wollach, D., Ehlert, K., Woolverton, L., & Mosack, K.E. (April, 2011). Internalized HIV stigma and depressed mood among HIV-positive adults with comorbid depressive disorders: a qualitative investigation. Poster presented at the 2011 Society for Behavioral Medicine annual meeting in Washington, D.C..
9. **Wendorf, A. R.**, Jardas, J.R., Moore, E.M., Bilkey, S.T., Mosack, K.E. (November, 2010). Triggers for depressed mood in a diverse sample of HIV-positive patients with comorbid depressive disorders. Poster presented at the 2010 Association for Behavioral and Cognitive Therapies annual conference in San Francisco, California.
10. Brouwer, A.M., **Wendorf, A.R.**, Bilkey, S. & Mosack, K. E. (August, 2010). New Perspectives in predicting diabetes self-care behaviors: The Self-As-Doer. Poster presented at the 2010 American Psychological Association annual conference in San Diego, California.
11. Brouwer, A.M., **Wendorf, A.R.**, & Mosack, K.E. (April, 2010). Psychosocial differences in Type 1 and Type 2 Diabetes: The Self-As-Doer. Poster presented at the 2010 Society of Behavioral Medicine meeting, Seattle, WA.
12. Brouwer, A.M., **Wendorf, A.R.**, Espil, F.M., Sokolova, L., & Kucheras, S. (April, 2010). Exploring cultural themes in missing data: A survey project examining correlates of hypertension among Russian-Speaking immigrant women. Poster presented at the 2010 Society of Behavioral Medicine meeting, Seattle, WA. *Awarded the Student Meritorious Abstract Award and the Ethnic Minority and Multicultural Special Interest Group Student Abstract Award.*

13. Brouwer, A.M., **Wendorf, A.R.**, Espil, F.M., & Mosack, K.E. (August, 2009). Hypertension in Older Russian Immigrant Women: Complementary Therapy Usage and Acculturation. Poster presented at the annual APA conference, Toronto, Ontario, Canada.
14. **Wendorf, A.R.**, Brouwer, A.M., Espil, F.M., & Mosack, K.E. (May, 2009). Depression and adherence: Hypertension in older Russian immigrant women. Poster presented at the annual APS conference, San Francisco, CA.
15. Brouwer, A.M., **Wendorf, A.R.**, & Mosack, K.E. (May, 2009). Hypertension in older Russian immigrant women: Cultural identity and illness beliefs. Poster presented at the annual APS conference, San Francisco, CA.
16. **Wendorf, A.R.** & Mosack, K.E. (September, 2008). Medical providers' perspectives on family involvement in HIV treatment: Benefits, disadvantages, and challenges. Poster presented at the annual 2008 joint British Psychological Society Division of Health Psychology and European Health Psychology Society Conference, Bath, England.
17. Walther, M.R., Levine, J. C., Conolea, C. A., **Wendorf, A. R.**, & J. Kanter (November, 2008). Validation of the Polaris Outcome Assessment in a CBT Training Clinic. Poster presented at the ABCT annual conference, Orlando, FL.
18. **Wendorf, A.R.** & Reddy, D.M. (May, 2008). Increased academic success and retention in psychology through online instruction. Poster presented at the APS annual conference, Chicago, IL
19. Ports, K.A., Li-Barber, K.T., Fine, K.M., **Wendorf, A.R.**, Helion, A.M., Andresen, E.N., Fleming, R., & Reddy, D.M. (May, 2008). Increasing student success: Results from the University of Wisconsin-Milwaukee's U-Pace Initiative. Poster presented at the APS annual conference, Chicago, IL.
20. **Roethel (Wendorf), A.J.** (August, 2007). Effectiveness of stress management techniques: Psychological and physiological indicators. Poster presented at APA annual conference, San Francisco, CA.

### *Invited Community Talks*

1. Moore, K.M., Petrik, M., & **Wendorf, A.R.** (March, 2011). Psychological experiences following bariatric surgery. Presented at a meeting of the Froedtert Hospital Post-Bariatric Surgery Support Group on March 28, 2011 in Wauwatosa, WI.
2. Valvano, A., Moore, K.M., **Wendorf, A.R.**, & Wilson, A. (March, 2011). Mental health issues post-transplant. Presented at a meeting of the Froedtert Hospital Post-Abdominal Transplant Support Group on March 1, 2011.
3. **Roethel (Wendorf), A.J.** (2006). Stress management: A high school survival guide. Presented at Michicot High School, Michicot, WI for the freshmen workshop series.

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## CLINICAL EXPERIENCE

### **Internship in Clinical Psychology (APA-accredited)**

**8/26/2013-8/22/2014**

Veterans Affairs Palo Alto Health Care System, Behavioral Medicine Track

Current Rotations:

- Behavioral Medicine: Assessment, consultation, and intervention with veterans who are medical or surgical patients
  - Behavioral Medicine Clinic: Responsibilities include assessment and intervention with veterans referred for behavioral problems related to illness; treatment of anxiety, depression, or other mental health conditions related to medical problems
  - Hepatitis C Clinic: Responsibilities include assessment of veterans who are being considered for antiviral treatment of HCV and intervention for those who are currently on treatment; work within an interdisciplinary team
  - Hematology/Oncology Clinics: Responsibilities include assessment and intervention for patients with hematological or oncological disorders/disease; consultation/liaison; coordination and integration with multidisciplinary teams
- Inpatient Spinal Cord Injury Unit: Responsibilities include conducting evaluations and interventions with patients with spinal cord injuries; conduct screening of cognitive assessment and administer neuropsychological tests; provide care within well-integrated interdisciplinary team within the rehabilitation setting
- Upcoming Rotations (02/21/2014-08/22/2014):
  - Infectious Disease/HIV clinic, Smoking Cessation, MOVE TIME (weight loss intervention and bariatric clinic) First Step (90 Day Residential Substance Abuse Rehabilitation Program), Acceptance and Commitment Therapy Mini Rotation

**Health Psychology Practicum Student (Extern)**

**5/2012-12/2012**

Medical College of Wisconsin/Froedtert Hospital, Wauwatosa, WI

- Training in clinical health psychology/behavioral medicine within the Department of Transplant Surgery
  - Responsibilities include conducting psychological evaluations and follow-up for potential lung transplant candidates (d/t cystic fibrosis, chronic obstructive pulmonary disease, emphysema); providing inpatient consultation and interventions to hospitalized transplant candidates; and consulting with the transplant medical team
- Supervisor: Rebecca C. Anderson, Ph.D.

**Health Psychology Practicum Student (Extern)**

**09/2011-8/27/2012**

University of Wisconsin Hospitals and Clinics, Department of Orthopedics and Rehabilitation, Madison, WI

- Training in clinical health psychology/behavioral medicine within a physical rehabilitation department.
  - Responsibilities included providing psychological services such as intake assessments, individual therapy, and group therapy to medical outpatients in an outpatient health psychology department. Facilitated support groups for patients coping with various chronic illnesses (e.g., neurological disorders, pulmonary disorders, diabetes, obesity, fibromyalgia, tinnitus). Created program curricula for new psychotherapy groups for patients with medical illnesses.
  - Interventions included cognitive behavioral therapy, behavioral activation for depression, acceptance and commitment therapy, and cognitive-behavioral stress management.
- Supervisor: Heidi Beckman, Ph.D.

### **Health Psychology Practicum Student (Extern)**

**06/2010-08/2011**

Medical College of Wisconsin/Froedtert Hospital, Wauwatosa, WI

- Department of Trauma and Critical Care Surgery
  - Responsibilities included consultation/liaison with members of the medical trauma team and providing psychoeducation and individual cognitive-behavioral therapy to inpatients in a Level I trauma center. Other responsibilities included screening for mental status, acute stress disorder, and administering behavioral medicine-focused assessments to medical inpatients who experienced traumatic events and medical injuries.
  - Supervisor: Terri deRoon-Cassini, Ph.D.
- Department of Transplant Surgery
  - Responsibilities included providing individual cognitive-behavioral therapy to adult outpatients and medical inpatients awaiting or adjusting to liver, kidney, pancreas, or lung transplants; conducting psychological evaluations for potential liver, kidney, and pancreas transplant candidates; conducting psychological evaluations for living kidney donors; co-facilitating support groups for patients awaiting kidney transplants; co-facilitating support groups for patients who have received liver, kidney, and pancreas transplants; and consultation with the transplant medical team. Other responsibilities included administering diagnostic and behavioral medicine focused assessments to potential transplant candidates and living donors, providing follow-up on assessment results and the treatment plan for transplant candidacy, and report writing.
  - Supervisor: Rebecca C. Anderson, Ph.D.
- Departments of General Surgery and Plastic and Reconstructive Surgery
  - Responsibilities included providing individual therapy for medical patients with posttraumatic stress disorder, and health and behavior interventions to adult clients with comorbid medical illness (e.g., diabetes, morbid obesity, chronic pain, Crohn's disease, ulcerative

colitis, non-epileptic seizures), conducting psychological evaluations and health behavior interventions for potential bariatric surgery candidates, and collaboration with the outpatient medical teams.

- Interventions included cognitive behavioral therapy, Behavioral Activation for Depression, and Cognitive Processing Therapy
- Supervisor: Mark Rusch, Ph.D.

### **Graduate Student Therapist**

**05/2009-5/2013**

Practicum in Therapy, Psychology Clinic, University of Wisconsin-Milwaukee, Milwaukee, WI

- Training in adult and child outpatient therapy. Responsibilities include providing individual therapy to adult, adolescent, and child clients. Presenting concerns include mood disorders, insomnia, adjustment disorders, and social skills deficits. Interventions include: Behavioral Activation for Depression, Acceptance and Commitment Therapy, Dialectical Behavior Therapy Skills Training (individual format), CBT for Insomnia, and Affirmative Counseling. Additional responsibilities include administering assessment measures to potential clients.

Supervisors: Gwynne O. Kohl, Ph.D.; Jonathan W. Kanter, Ph.D.

### **Clinical Psychology Practicum Student**

**9/2007-5/2009**

Psychology Clinic, University of Wisconsin-Milwaukee, Milwaukee, WI

- Training in clinical interviewing, scoring, and report writing. Received training in empirically supported treatments for DSM-IV diagnoses.
- Received training in administration of psychological and neuropsychological assessment instruments for adults, clinical interviewing, scoring, and report writing.
- Training in the administration of child assessment instruments and projective instruments, clinical interviews, assessment scoring, integrative report writing, and classroom observation; emphasis on cultural and ethnic diversity. Provided assessment services and consultation to an Individualized Education Plan team at a local charter school

## **TEACHING EXPERIENCE**

**Project Assistant**, Undergraduate Research Apprenticeship Program in Psychology, UW-Milwaukee. 7/2008-6/2011.

- Developed and led structured discussions on topics related to research and professional development in psychology for undergraduate research assistants, facilitated interactive group discussion and presentation of research, answered questions, mentored and advised students

**Teaching Assistant**, Introductory Psychology UPace, UW-Milwaukee, 9/07-5/08,

- Facilitated web based instruction, monitored and provided individualized feedback on student progress in the online course, advised students, provided assistance with course material via email or face to face discussions, served as student-professor liaison

**Teaching Assistant**, Introductory Psychology, UW-Green Bay, 9/06-12/06,

- Developed and led exam review sessions, presented a lecture, served as a student-professor liaison

**Study group leader**, Introductory Psychology, UW-Green Bay, 9/06-12/06

- Developed and led structured discussions, answered questions, reviewed course material, and helped students prepare for exams on a weekly basis

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## **PROFESSIONAL AFFILIATIONS**

American Psychological Association (APA)

Member of Division 38 and 45

Association for Behavioral and Cognitive Therapies (ABCT)

Member of Behavioral Medicine Special Interest Group

Society of Behavioral Medicine (SBM)

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## **PROFESSIONAL ACTIVITIES**

### **National Organization Leadership**

- Graduate Student Chair, Educational and Training Council, Health Psychology (Div. 38, 2009-5/2012)
- Member, Behavioral Medicine Program Committee (ABCT, 2009-2010)

### **University Leadership**

- Student Representative, Clinical Training Committee, UWM Clinical Psychology Program (May 2012-May 2013)
- Grant Committee, Association for Graduate Students in Psychology (9/2007-5/2013)
- Grant Committee, Health Psychology Graduate Student Club (9/2008-5/2013)