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## **An Examination of Depression and Social Support among African American Women in Substance Use Recovery**

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An Examination of Depression and Social Support among  
African American Women in Substance Use Recovery

Proposal for a Dissertation  
Presented in  
Partial Fulfillment of the  
Requirements for the Degree of  
Doctor of Philosophy

By

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June 29, 2017

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## Abstract

Depression is responsible for widespread functional impairment and disability in 16 million individuals across the United States, as well as societal costs that exceed \$36 billion. There are numerous risk factors for depression, such as female gender, ethnic minority status, poverty, incarceration, and comorbid substance use disorders. Thus, low-income, criminal-justice-involved African American women in recovery from substance use problems represent a population that is particularly vulnerable to depression. Social support has been established as a protective factor against depression; however, the relationship between social support and depression has been understudied in such high-risk African American populations. The present study examined the relationship between social support and depression among low-income, criminal-justice-involved African American women in recovery, through the lens of Coyne's interactional theory of depression and Lewinsohn's behavioral theory of depression. The relationship between social support and depression was assessed via a cross-lagged path model. The mediational impact of social support on the relationship between Oxford House sober-living home residence and depression was also explored. Policy and treatment implications will be discussed, along with suggestions for future research.

*Keywords:* depression, social support, African American women, substance use recovery, criminal justice involvement

## Introduction

Depression is a prevalent, disabling, and highly recurrent mental health problem (Burcusa & Iacono, 2007) that affects over 350 million individuals worldwide (Marcus, Yasamy, van Ommeren, Chisholm, & Saxena, 2012). The functional impairment caused by depression contributes to costs to individuals and society in the form of higher healthcare expenditures, loss of worker productivity, individual disability, and early death (American Psychiatric Association [APA], 2013; Donohue & Pincus, 2007; Marcus et al., 2012). Despite the existence of effective treatments for depression, such as pharmacotherapy and psychotherapy (e.g., cognitive-behavioral therapy; Cuijpers et al., 2013a, 2013b), these services are not accessible to everyone.

Certain populations, particularly those who live in under-resourced areas, are exposed to barriers, such as lack of health insurance, availability of high-quality services, and medical expenses and transportation costs that may prohibit or reduce access to treatment (Davis, Ressler, Schwartz, Stephens, & Bradley, 2009; Santiago, Kaltman, & Miranda, 2013). It is these same populations who live in low-income, under-resourced areas that have an elevated risk for depression due to exposure to a number of socio-environmental risk factors (Belle & Doucet, 2003; Santiago, Wadsworth, & Stump, 2011; Schulz et al., 2006). Certain factors associated with risk for prevalence and severity of depression are female gender, socioeconomic and ethnic minority (e.g., African American) status, criminal justice involvement, and comorbid substance use disorders (Boschloo, van den Brink, Penninx, Wall, & Hasin, 2012; Fazel & Baillargeon, 2011; Fergusson, Boden, & Horwood, 2011; National Institute of Mental Health [NIMH], 2015a; Substance Abuse and Mental Health Services Administration [SAMHSA], 2012; Santiago et al., 2011; Williams et al., 2007). Thus, populations with such risk factors may have an increased likelihood of developing depression and/or having increased chronicity and severity of

symptoms than populations with fewer or no risk factors (NIMH, 2007; Oquendo et al., 2001). For populations at-risk for depression and treatment barriers, it becomes imperative to identify accessible factors beyond traditional treatments that may mitigate risk for depression, such as social support.

Social support is an established protective factor against depression (Almeida, Subramanian, Kawachi, & Molnar, 2011; Bronder, Speight, Witherspoon, & Thomas, 2014; Schulz et al., 2006). Research has demonstrated that populations with multiple risk factors may gain social support through Oxford House sober living homes, which have been shown to promote improved mental health and substance use outcomes (Groh, Jason, Davis, Olson, & Ferrari, 2007; Jason & Ferrari, 2010). There has been a good deal of theoretical research that has attempted to explain the interpersonal processes that impact social support and contribute to the onset, maintenance, and recurrence of depression (Hames, Hagan, & Joiner, 2013; Joiner & Coyne, 1999). However, there are competing theories that explain the predictive and reciprocal relationship between social support and depression; an understudied topic, particularly among at-risk, ethnic minority populations (Illangasekare, Burke, Chander, & Gielen, 2014). The present study will test competing theories on the dynamic between social support and depression in a longitudinal sample of particularly at-risk, justice-involved, predominantly African American women in recovery from substance use problems.

## **Depression**

Approximately five percent of the world's population, spanning 20 different age groups, reported having a major depressive episode in the previous year (Marcus et al., 2012). In the United States, approximately seven percent of the population, consisting of 16 million adults, endorsed at least one major depressive episode in the year prior to taking the 2012 National

Survey on Drug Use and Health (SAMHSA, 2013). The consequences of depression involve costs to the individual (e.g., impairment, disability, increased risk for additional physical and mental health problems and death) and society (i.e., economic burden).

Generally, depression may cause impairment to individuals across a variety of domains (e.g., daily functioning, interpersonal, occupational; APA, 2013). More specifically, the fifth edition of the Diagnostic and Statistical Manual of Mental Disorders (DSM-V) defined a major depressive episode as a period of at least two weeks, during which, a person experienced five out of nine symptoms. Diagnostic criteria for depression include depressed mood and/or loss of interest or pleasure in things they once enjoyed along with changes in appetite/weight, sleeping too much or too little, psychomotor agitation or retardation, fatigue/energy loss, feelings of worthlessness or guilt, difficulty concentrating or making decisions, and recurrent thoughts of death or suicidal ideation, suicide plan, and/or attempt (APA, 2013). Depression is associated with lower quality relationships, decreased work performance, and low earnings (Kessler, 2012). A large, national study, conducted by Strine and colleagues (2009) examined depression and associated variables in approximately 232,000 people across 41 states and territories. Strine et al. (2009) found that individuals with current depression reported impairment, due to such factors as physical illness or injury, pain, activity limitations, and anxiety, on a third to one-half of the days out of a month. Further, as depression severity increased, so did reported prevalence of life dissatisfaction, feelings of inadequate social support, and disability (Strine et al., 2009). The impairment and disability associated with depression has contributed to a significant portion of the overall burden caused by diseases and disorders (Ferrari et al., 2010).

Across global diseases/disorders, depression was ranked as the second leading cause of years of healthy life lost to disability (YLDs; NIMH, 2015b). YLDs occur as a result of

disability caused by depression that prevents individuals from living healthy, productive lives. Among mental health and substance use disorders, depression is the leading cause of disability (Marcus et al., 2012). The World Health Organization found depression to account for the greatest overall disease burden attributed to mental health and substance use disorders, measured in disability-adjusted life years (DALYs). DALYs represent the number of years of healthy life lost to ill-health, disability, or early death (Whiteford et al., 2013). Given the large amounts of impairment and disability individuals suffer due to depression, it follows that societal costs are also high. Depression is an economic burden to society, in part because it generates increases in healthcare utilization and related expenditures (Donohue & Pincus, 2007; Kessler, 2012). Additionally, it is the leading cause of absenteeism and reduced worker productivity (Beck et al., 2015; Donohue & Pincus; Kessler, 2012), resulting in a loss of \$36.6 billion per year in the U.S. (Lépine & Briley, 2011).

Depression is associated with a host of adverse outcomes. Some of the detrimental outcomes associated with depression are low educational attainment, unstable employment or unemployment, negative parenting behaviors, interpersonal discord, and suicidality (Beck et al., 2014; Hames et al., 2013; Hawton, i Comabella, Haw, & Saunders, 2013; Kessler, 2012; Lépine & Briley, 2011). In terms of suicidality, Compton and colleagues (2005) examined the role of depression in the relationship between social environmental factors (i.e., family relationships and social support) and suicide attempt among 200 urban African American. Compton et al. (2005) found that depression mediated the relationship between social support and suicide attempt. Depression has also been found to predict onset of certain chronic physical disorders (e.g., coronary artery disease, stroke, diabetes, heart attacks, and certain types of cancer). It has also

been related to a worsened course of physical disorders, non-adherence to treatment regimens, and early mortality due to related physical disorders (Kessler, 2012; Lépine & Briley, 2011).

**Risk factors for depression.** Research has identified various factors that are associated with increased risk for depression. Being female, living in low-income areas, being African American, having (a) substance use disorder(s), and criminal justice-involvement are all factors associated with depression (Boschloo et al., 2012; Boschloo, Vogelzangs, et al., 2012; Fazel & Baillargeon, 2011; Fergusson et al., 2011; NIMH, 2015a; SAMHSA, 2012; Santiago et al., 2011; Williams et al., 2007).

It has been well-established in the literature that female gender is associated with a significantly greater likelihood of experiencing depression (Aranda et al., 2012; NIMH, 2015a; SAMHSA, 2013) and having greater impairment due to depression than men (Whiteford et al., 2013). There is a 70% greater likelihood that women will experience depression compared to their male counterparts (NIMH, 2015a). Female gender is associated with onset of depression (Burcusa & Iacono, 2007) as well as a greater likelihood of recurrence than males (Birmaher et al., 2004). Rates of depression for women are higher than the national and global averages, falling somewhere between eight and 12% (Marcus et al., 2012; SAMHSA, 2013). National studies have demonstrated that women consistently exhibit approximately twice the rate of depression (Centers for Disease Control [CDC], 2012; SAMHSA, 2012, 2013) and experience a greater burden from mental disorders than do men in terms of impairment, cost, disability, and years of life lost (Whiteford et al., 2013). Globally, depression is the leading cause of years of life lost due to disability in women (NIMH, 2015b).

Research has demonstrated that socioeconomic status is related to depression (Burcusa & Iacono, 2007; Santiago et al., 2011). Living in neighborhoods with high poverty rates may

contribute to a number of socio-environmental stressors, such as financial stress, unemployment, crime, and neighborhood violence (Santiago et al., 2011). The stressful environments of low-income, under-resourced areas are associated with mental health problems, such as anxiety and mood disorders, including depression (Belle & Doucet, 2003; Galea et al., 2007; Wadsworth & Achenbach, 2005). Individuals living at or below the poverty level were approximately twice as likely to have experienced a major depressive episode in the past year compared to those who lived above the poverty threshold (10.4% vs. 5.6%; SAMHSA, 2012). Galea and colleagues (2007) examined incidence of depression among residents of New York City who had no history of depression. Individuals who lived in neighborhoods of low-socioeconomic status reported cumulative incidence of depression at approximately twice the rate of NYC residents living in neighborhoods of higher socioeconomic status. Research findings suggest that low-income urban neighborhoods expose individuals to a number of socio-environmental stressors that place residents at increased risk for depression, which may be exacerbated by a lack of resources and treatment barriers (Galea et al., 2007; Santiago et al., 2013).

African Americans are the ethnic/racial group most overrepresented in areas of poverty (27.2%; United States Census Bureau, 2013). Although rates of past year major depressive episode were somewhat lower for African Americans compared to European Americans (5.4% vs. 7.0%; SAMHSA, 2012), African Americans tend to experience more chronic and severe MDD than European Americans and are much less likely to undergo treatment (7.7% vs. 16.0%; NIMH, 2007; SAMHSA, 2012), perhaps due to treatment barriers associated with low-resourced areas (e.g., financial impediments, lack of transportation, healthcare, childcare; Davis et al., 2009; Santiago et al., 2013). Treatment barriers and the lack of treatment initiation among African Americans may contribute to an under-reporting of the number of cases of African

Americans with depression (Balis & Postolache, 2008; SAMHSA, 2012). Additionally, African Americans may face racial discrimination, which is associated with increased risk for depression (Hudson, Neighbors, Geronimus, & Jackson, 2016; Schmitt, Branscombe, Postmes, & Garcia, 2014).

Substance use disorders are often associated with depression (Davis et al., 2010; Swartz & Lurigio, 2006). According to the National Institute on Drug Abuse (2010), individuals who have substance use disorders are twice as likely to have a co-occurring mood disorder. Depression frequently co-occurs with substance use disorders (40.3% alcohol use disorder; 17.2% drug use disorder; 21% alcohol and drug use disorder; Pettinati, O'Brien, & Dundon, 2013), often leading to cumulative severity of consequences (Howland et al., 2009). Individuals with co-occurring major depressive disorder (MDD) and substance use disorders (SUDs) are at increased risk of serious adverse psychiatric events and hospitalization (Davis et al., 2010). They represent a significantly more impaired group than those with depression alone and are likely to have higher treatment costs and greater health care utilization (Davis et al., 2010; Howland et al., 2009). Davis and colleagues (2005, 2006, 2010) reported that individuals with comorbid MDD and SUDs had more severe depressive symptomology, longer duration of depressive episode, were 42% less likely to achieve remission than those without SUD, had more frequently co-occurring anxiety disorders, greater risk of current suicidal ideation, plans, attempts and history of suicide attempts (more so for women; SAMHSA, 2013), and greater overall functional impairment. Additionally, individuals with co-occurring mental health and substance use disorders are more likely to get arrested, have lengthier incarcerations, and be reincarcerated than those without co-occurring disorders (Peters, Wexler, & Lurigio, 2015).

By the end of 2013, the U.S. held 1,574,741 people in either federal or state prisons; 93% of the incarcerated population were male, while women comprised 7% of the population (Carson, 2014). Peters and colleagues (2015) determined that incarcerated populations are three to six times more likely to have serious mental illness than the general population, with rates of depression approximately four times as common (Mumola & Karberg, 2006). Those justice-involved individuals who have depression also have an elevated risk of recidivism (Baillargeon, Binswanger, Penn, Williams, & Murray, 2009). Additionally, substance use disorders are more prevalent among criminal justice populations than the general population, occurring at seven times the rate of the general population (Teitelbaum & Hoffman, 2012). Not surprisingly, co-occurring depression and substance use problems are elevated among justice-involved populations (Baillargeon, et al., 2010). Those with co-occurring mental health and substance use disorders are significantly more likely to have multiple reincarcerations (Baillargeon, Penn, et al., 2010).

While the criminal justice system is, on one hand, associated with populations with multiple risk factors, it in and of itself may also be considered a risk factor for depression. According to the National Commission on Correctional Health Care (2002, p. xii), most prisons “fail to conform to nationally accepted health care guidelines for mental health screening and treatment.” Without adequate screening for mental health problems, depression and other mental health problems may go unnoticed and treatment will not be an option for everyone who needs it. However, of those who are incarcerated and identified as having a mental health problem, only 34% of state inmates, 24% of federal inmates, and 17% of jail inmates actually received treatment since their admission (James & Glaze, 2006). Additionally, criminal justice populations have lower educational attainment than the general population, despite the

availability of prison education programs (Ewart & Wildhagen, 2011). Upon reentry, previously incarcerated individuals will be less likely to find employment with a criminal history in addition to an educational deficit, may be prohibited from receiving any type of public assistance, such as food stamps, a driver's license, student loans, and housing, and will be more likely to be homeless (Dumont, Allen, Brockmann, Alexander, & Rich, 2013; Legal Action Center, 2009). Although some prisons offer discharge planning to help promote continuity of care upon release, many criminal justice facilities simply do not have the necessary resources to provide adequate assistance to help high-need, low-resourced justice-involved populations upon reentry into their communities (Dumont, Brockmann, Dickman, Alexander, & Rich, 2012). An additional challenge for those seeking treatment in their communities is that many community-based mental health and substance use treatment centers may refuse to provide services to individuals with a dual diagnosis and a criminal justice history (Hoge, 2007). With 80% of releasees lacking health insurance and financial resources (Dumont et al., 2013), many will be forced to immediately stop mental health and substance use treatment and medications, leading to a potential perpetuation and exacerbation of symptoms (Dumont et al., 2012).

Women in the criminal justice system, the fastest growing population in prison (Celinska & Siegel, 2010), represent a population particularly vulnerable to mental health problems, such as depression. Way and colleagues (2008) found that incarcerated women are three times more likely to be diagnosed with a serious mental illness than men. Women are overrepresented among inmates diagnosed with depression (Baillargeon et al., 2009; Brink, 2005), with around half of justice-involved women reporting depression (Lynch et al., 2014; Saxena, Messina, & Grella, 2014). Depression may be compounded by the separation of incarcerated mothers from their children. Most of the women who are incarcerated are also mothers (80%) who may not be

able to see their children at all during their incarceration (50%), and who may be at risk of losing custody of their children (Zust, 2009). Additional risk for depression is brought on by high rates of substance use problems (30-60%) among women involved in the criminal justice system (Fazel & Baillargeon, 2011; Fazel, Bains, & Doll, 2006). Approximately 16% of justice-involved women have co-occurring severe mental illness, such as depression, and substance use disorders (Baillargeon, et al., 2010). Among those women who are justice-involved and depressed, almost 75% will have a co-occurring substance use disorder (Abram et al., 2003).

African American racial status adds another layer of risk to justice-involved populations. African Americans are over-represented in the criminal justice system. Overall, African Americans contribute to almost 40% of total incarcerated individuals (Carson, 2014), despite being only 12.6% of the U.S. population (United States Census Bureau, 2015). Being female adds additional risk for depression, particularly for justice-involved African Americans. African American women represent 22% of the female imprisoned population and are incarcerated at twice the rate of White women (Carson, 2014). Justice-involved African Americans were identified as having higher rates of illicit drug and alcohol dependence and drug abuse than White justice-involved populations (Lê Cook & Alegria, 2011). Additionally, justice-involved African Americans are less likely to receive either substance use or mental health treatment than White populations (Peters et al., 2015). This is particularly problematic because individuals with co-occurring disorders are unlikely to recover in the absence of long-term treatment (Peters et al., 2015). The reduced likelihood that high-risk populations, such as justice-involved African American women at risk for substance use problems and depression, will obtain mental health treatment highlights the need for additional supports that will help to mitigate depression.

**Protective factors for depression.** There are a variety of factors that have been found to be protective against depression. Some studies have identified familial factors, such as family structure, cohesion, and connectedness as critical protective factors against depression (Compton et al., 2005; Harris & Molock, 2000). A large review study, conducted by Hendrie and colleagues (2006), emphasized the importance of three different areas of protection, namely, resources (e.g., physical and mental health, socioeconomic status), engagement in meaningful activities (e.g., social activities, religious involvement), and social support. Identified protective factors may be more available to some and less available to others, depending on individuals' access to certain resources.

Familial factors have been identified as a source of protection against depression, particularly among African American populations. African Americans from a range of socioeconomic backgrounds endorsed lower rates of depression when they reported having supportive/cohesive families. Family cohesion (i.e., the extent to which family members were perceived as being concerned, committed, and supportive) and support (i.e., perceived support from family members) were protective against depression in a sample of African American college students, with family support explaining the majority of the variance in depression scores (Harris & Molock, 2000). African Americans of disadvantaged socioeconomic status also reported factors, such as family structure (i.e., two-parent family), cohesion (i.e., the extent to which family members are emotionally bonded to one another), and connectedness as critical protective factors against depression (Compton et al., 2005).

Resources relating to physical and mental health and financial support have been demonstrated in a number of studies have been identified as protective against depression among diverse populations. The Hendrie et al. (2006) study found that higher educational attainment,

higher socioeconomic status, good health, and better cognitive functioning were protective against negative emotional outcomes, such as depression. A large review study conducted by Fiske and colleagues (2009) similarly found that higher education levels, higher socioeconomic status, and better cognitive functioning served as protective against depression. Protective factors identified for both review studies were based on predominantly older Caucasian populations. Higher socioeconomic status was also found as a protective factor against depression among a sample of New York City residents consisting predominantly of ethnic-minority individuals, with residents living in lower socioeconomic neighborhoods twice as likely to experience depression (Galea et al., 2007). Individuals living in neighborhoods of higher socioeconomic status have greater access to resources that may be protective against depression. Conversely, lower socioeconomic status may be prohibitive of obtaining certain tangible resources that may protect against depression (Galea et al., 2007). African American mothers living in poverty-stricken urban areas represent a population with multiple risk factors for depression. Certain tangible resources were found to be protective against depression for these at-risk women, including financial support (e.g., loans), help with childcare, and transportation (Siefert, Finlayson, Williams, Delva, & Ismail, 2007). Unfortunately, many of the aforementioned protective resources are not easily accessible to individuals living in low-income, under-resourced areas (Belle & Doucet, 2003; Santiago et al., 2013).

Engagement in activities (e.g., meaningful, valued, physical) was identified as protective against depression and negative emotional outcomes (Fiske et al., 2009; Hendrie et al., 2006). Involvement in physical activities, such as exercise (Rothon et al., 2010) and sports (Babiss & Gangwisch, 2009) have been shown to reduce depression in a range of different age groups (Fiske et al., 2009). Engagement in religious/spiritual activities have been shown to have

protective effects on depression, regardless of ethnicity (Fiske et al., 2009; Hendrie et al., 2006; Maselko, Gilman, & Buka, 2009; Smith, McCullough, & Poll, 2003). Smith and colleagues (2003) conducted a large-scale meta-analysis of the relationship between religiousness and depression, and found that religious attendance was more protective for individuals with greater levels of stress.

Among a variety of populations, including different genders, ages, ethnic backgrounds, and socioeconomic status, social support has been identified as a strong protective factor against depression (Compton et al., 2005; Ellison & Flannelly, 2009; Fiske et al., 2009; Kendler, Myers, & Prescott, 2005). Positive social support from a variety of sources, such as religious-based social networks and families of different ethnic backgrounds (Chatters, Taylor, Lincoln, Nguyen, & Joe, 2011; Fiske et al., 2009; Hendrie et al., 2006; Lincoln, Taylor, Chatters, & Joe, 2012), and feeling connected to family and social networks (i.e., personal contacts and social relationships; Compton et al., 2005; Costello, Swendsen, Rose, & Dierker, 2008) provided protection against negative emotional outcomes, such as depression. Of note, there are social components to a number of protective factors against depression. For example, religious involvement and engagement in certain sports and physical activities may involve interaction with others. Thus, social support may be a potential by-product of certain protective factors, which may in turn contribute to the protective nature of the factor (Rothon et al., 2010). Social support has been implicated as a strong and significant source of protection against negative emotional outcomes, and its particular impact on depression warrants further exploration, especially among understudied populations with multiple risk factors.

### **Social Support**

Social support has been studied for decades and is a well-established protective factor against many physical and mental health problems (Cassell, 1976; Cobb, 1976; Cohen & Syme, 1985; Feeney & Collins, 2014; Thoits, 2011), including depression (Bronder et al., 2014; Schaefer, Coyne, & Lazarus, 1981; Strine et al., 2009) and substance use problems (Jason, Stevens, Thompson, & Legler, 2012; Peirce, Frone, Russell, Cooper, & Mudar, 2000). Social support generally refers to the functions provided by one's interpersonal ties in the form of support, aid, or resources (Cohen & Hoberman, 1983; Holt-Lunstad, & Uchino, 2015; Thoits, 2011). Functional support from relationships is typically provided via emotional or instrumental assistance (House & Kahn, 1985; Thoits, 2011). Emotional support may allow a person to feel esteemed, valued, loved and cared for (Cobb, 1976). Instrumental assistance consists of informational and/or tangible support (Semmer et al., 2008). Informational support may be delivered in the form of facts, advice, feedback, and reassurance to provide guidance and problem-solving assistance (Cohen & McKay, 1984). Tangible support provides behavioral aid and/or material products that may benefit a person and their circumstances (Cohen & Wills, 1985). Tangible behavioral support may consist of helping someone with a task (Thoits, 2011), whereas tangible material support may be provided through financial assistance (Richman, Rosenfeld, & Hardy, 1993). The benefits of social support are gained through interpersonal relationships and social group membership, and are commonly assessed through one's perceptions and beliefs about the availability of support from others (Holt-Lunstad, & Uchino, 2015).

Perceived social support represents the belief that a person may have access to beneficial resources from others, and has been consistently linked to positive health outcomes (Haber, Cohen, Lucas, & Baltes, 2007). For example, individuals who endorse perceived social support

have better substance use outcomes and are more likely to adhere to recommended treatment, lifestyle changes, and medication (DiMatteo, 2004; Lincoln et al., 2012; Peirce et al., 2000). Further, the possibility of receiving social support benefits has been shown to protect individuals against depression. A large, national study indicated that individuals who reported current depression were 3.8 times more likely to report rarely or never receiving social support than those without depression (Strine et al., 2009). Additional studies have identified an inverse relationship between perceived social support and depression among populations of various gender, ethnic, and socioeconomic backgrounds (Abdi, Amiri, & Mohammadi, 2015; Bronder et al., 2014; Fiske et al., 2009; Strine et al., 2009). Research findings have illustrated the interconnected nature of depression and social support.

Various studies have focused on the impact of social support on groups at risk for depression, such as mothers, low-income African American women, and individuals with substance use problems and/or criminal justice involvement. Mothers with two-to-three children, especially those with low marital satisfaction, reported significantly less social support than childless women (Abdi et al., 2015). Single mothers represent a group with significant risk for depression. They reported higher rates of depression, chronic stress, and less social support than married mothers (Cairney, Boyle, Offord, & Racine, 2003). Bronder and colleagues (2014) found that low-income African American women were four times more likely to be depressed with deficient social support than women with high social support. Compton and colleagues (2005) suggested that a decrement in social environmental factors (e.g., social support), may be the pathway through which urban African Americans become depressed and subsequently suicidal. Among individuals with alcohol use problems, deficient social support was associated with elevated depression, which, in turn, was associated with greater alcohol use (Peirce et al.,

2000). Among a high-risk sample of incarcerated women with substance use problems, Staton-Tindall and colleagues (2007) found that perceptions of social support decreased as severity of substance use and criminal involvement increased. Additionally, poor social support has been associated with self-harm (Morgan & Hawton, 2004) and increased depression among incarcerated individuals (Johnson et al., 2011). These research findings indicate that the protective nature of social support is degraded by multiple risk factors, further complicating the relationship between social support and depression.

Certain types and sources of social support tend to be particularly beneficial for certain populations with unique risk factors, such as female gender, low-income, urban African Americans, incarcerated populations, and populations with substance use problems. Kendler and colleagues (2005) conducted a longitudinal study of 1,057 opposite-sex pairs of dizygotic twins that examined global social support (i.e., emotional, tangible, and available sources, including friends, co-twin, and other family members) and depression. Sex differences were found, such that perceived global social support was significantly more protective against depression for women than men. Kendler et al. (2005) reported that women had significantly more social support than men, including larger and more interconnected social groups, as well as higher rates of depression, which may have driven the differential findings in the protective ability of social support. Family support was found to be particularly protective against depression among African American men and women of varying socioeconomic status (Bronder et al., 2014; Compton et al., 2005; Harris & Molock, 2000). Siefert and colleagues (2007) identified tangible social support (i.e., financial assistance and help with childcare and transportation) as protective against depression in a sample of low-income, urban African American mothers. Among a sample of incarcerated, predominantly African American women, perceived emotional support

was found to be protective against depression (Salina, Lesondak, Razzano, & Parenti, 2011). A literature review by Groh and colleagues (2007) found that abstinent social support (i.e., social support members who may be in recovery and abstain from substance use) and general parental support were predictive of positive abstinence outcomes, which may reduce the risk of depression (Peirce et al., 2000).

Although social support is a well-documented protective factor against depression and other negative health outcomes, there are some aspects of social support that may exacerbate risk for depression. Sense of belongingness that may result from group membership (Cobb, 1976) has been found to not only reduce depressive symptoms, but also protect against future depression relapse (Cruwys et al., 2013). Social group membership, involvement, and interactions protect against depression by providing relationships that become a source of social support (Cruwys et al., 2013). However, interpersonal relationships and participation in social groups involves interpersonal interactions, which bring about the possibility of negative interactions with others (Lincoln et al., 2012). Negative interpersonal interactions may involve conflict, excessive demands, and criticism, which may lead to emotional distress, including depression (Lincoln et al., 2010; Reinhardt, 2001). Despite the risk for negative interactions, the sense of belongingness that may result from group membership (Cobb, 1976) has been found to not only reduce depressive symptoms, but also protect against future depression relapse (Cruwys et al., 2013).

Social support, although generally protective against depression, for African American women, may sometimes increase stress levels and risk for emotional distress. Gray and Keith (2003) describe social support as involving responsibilities, duties, and obligations. Additionally, social support may also include potentially contentious relationships that bring

about conflict, demands, and expectations. Gray and Keith (2003) describe this phenomenon a “double-edged sword” because of the positive and negative consequences that may arise from different constellations of support.

Although social support among criminal justice-involved individuals has been associated with positive outcomes, there may be certain types of social support that do not promote positive outcomes. For example, there is concern that upon community reentry, formerly incarcerated individuals, faced with a lack of resources and positive social support (Salina et al., 2011), may reconnect with social networks that include members who engage in substance use and illegal activities. Affiliation with these types of pre-incarceration social networks places recently released individuals at increased risk of substance use, criminal behavior, and reincarceration (Fader, 2008; Martinez & Abrams, 2013). Many justice-involved individuals report a lack of positive social support in the form of family, peers, and role models (Wolff et al., 2013), which may make returning to negative social support sources more likely. Policies and programs that promote and/or provide positive social support resources may aid in the successful reentry of justice-involved populations and in the reduction of recidivism.

Membership and involvement in abstinent social groups was associated with improved abstinence and psychiatric outcomes among substance users (Groh et al., 2007; Majer, Chapman, & Jason, 2016; Majer, Jason, Aase, Droege, & Ferrari, 2013; Majer et al., 2008). However, not all social support is beneficial social support. Abstinent social support has been linked to positive health outcomes among populations with substance use problems; however, non-abstinent social support may present challenges to one’s sobriety. Individuals in recovery from substance use problems who maintained close involvement with pre-treatment networks of substance-using peers were more likely to relapse, which increased the risk for depression (Groh

et al., 2007; Peirce et al., 2000). Conversely, individuals in recovery who reported more abstinent and recovery-oriented social support were more likely to maintain abstinence (Zywiak, Longabaugh, & Wirtz, 2002). Belonging to abstinent social groups (i.e., relationships with individuals who abstain from substance use), such as Alcoholics Anonymous (AA) and Narcotics Anonymous (NA), may be one way to gain abstinent social support. A literature review conducted by Groh, Jason, and Keys (2008) determined that AA attendance and involvement was associated with larger, more stable social support groups, higher quality relationships, increases in abstinent, emotional, and tangible social support. The social support benefits from belonging to and involvement in AA promoted positive abstinence outcomes (Groh et al., 2008).

Additional settings that have been shown to provide support for individuals in recovery are Oxford House sober-living homes. Oxford house supportive living environments are democratically-operated, sober-living homes that provide residents with a built-in network of individuals in recovery from diverse backgrounds (e.g., Oxford House residents include men and women with criminal justice histories, ethnic minority status, and mothers, some with their children living in the houses; Jason & Ferrari, 2010). Houses are self-run, in that there are no staff members or therapists (. Houses are financially self-supported, as residents are required to pay a portion of the rent and utilities. House members assume roles, such as president, secretary, and treasurer, which provide an opportunity to bolster organizational, fiscal, and management skills. Substance use and disruptive behavior are not tolerated, and members who engage in the former or the latter may be expelled from the house. Additionally, Oxford House incorporates 12-step mutual support group (e.g., AA/NA) principles into their philosophy and structure. Oxford House residents are encouraged to attend 12-step meetings, providing further opportunity

for social group membership and support (Oxford House, Inc., 2012). Consequently, Oxford House residents have reported increased social support (Groh et al., 2007; Jason & Ferrari, 2010) and identified peer support as the number one reason for entering Oxford House (Majer, Jason, Ferrari, & North, 2002). Jason and colleagues (2012) found that relationships formed between Oxford House members predicted future abstinence, illustrating the importance of abstinent social support as well as the feasibility of Oxford House to provide such social support. Overall, Oxford House residence was associated with improved abstinence outcomes, employment stability and improved family relationships (Jason, Aase, Mueller, & Ferrari, 2009; Jason & Ferrari, 2010). Further, psychiatric severity was not an impediment to living in and benefitting from Oxford House for residents with substance use problems and those with comorbid psychiatric disorders; no difference in abstinence rates were reported (Majer et al., 2008). A two-year longitudinal study found that Oxford House residents with comorbid psychiatric and substance use problems reported better outcomes than those without psychiatric comorbidities (Majer et al., 2016). Additionally, those residents with high severity comorbid psychiatric and substance use disorders reported decreased psychiatric outpatient treatment utilization and increased medication adherence, suggesting that residence in Oxford House may facilitate psychopharmacological treatment adherence while also reducing the need for more frequent and intensive treatment utilization (Majer et al., 2008). Overall, supportive, self-run, sober-living environments, such as Oxford House, may provide numerous benefits to individuals with multiple risk factors.

The link between social support and depression has been demonstrated repeatedly in the research literature; however, the mechanism and route through which this relationship manifests is less clear (Feeney & Collins, 2014; Haber et al., 2007; Johnson et al., 2011; Sarason, Pierce, &

Sarason, 1994). Certain theories and research studies have attempted to clarify the relationship between social support and depression.

### **Interpersonal Theories of Depression**

For several decades, research on social support and depression has been largely influenced by interpersonal theories of depression, namely, Coyne's (1976b) interactional theory of depression and Lewinsohn's (1974) behavioral approach toward depression. Coyne's (1976b) theory suggests that depressed individuals interact with others in an aversive manner, consistent with a deficit in social skills, that may induce a negative mood in others and ultimately elicit rejection. This rejection coincides with a loss of social support that, in turn, leads to an exacerbation of depressive symptoms (Coyne, 1976a). Lewinsohn (1974) generated a social skills deficit hypothesis that suggests a denial or loss of positive reinforcement leads to depression. Both of these theories have generally been supported by the research literature (Segrin, 2000; Segrin & Dillard, 1992).

Coyne's (1976b) interactional theory of depression suggests that depressed individuals interact with others with impaired social behavior resulting from depression. Coyne suggests that the impaired social behavior results from negative reactions received from others, rather than just being a function of cognitive distortions (i.e., distorted, irrational thoughts and thought processes; Coyne, 1985, p. 303). Some examples of impaired social behavior/skill from individuals with depression are an expression of their negative mood through repeated complaints, self-accusations, a prominent need for reassurance from others (e.g., whether others care about them), and negative feedback seeking (Coyne, 1976a; Joiner & Metalsky, 1995). When reassurance is received, those who are depressed may be likely to doubt the sincerity of the individual's assertion and thus seek more frequent reassurance. To further elucidate the

interactional behaviors of individuals with depression, Coyne conducted a study involving a White, predominantly Protestant, middle-aged sample with a minimum of a high school education and found that depressed individuals were more likely to self-blame and seek advice and emotional support from others (Coyne, Aldwin, & Lazarus, 1981). This pattern of reassurance seeking may induce a negative mood state in others, contributing to a propensity to reject the depressed individual (Coyne, 1974; 1976a). The erosion of social support resulting from rejection then contributes to the exacerbation and maintenance of depression (Coyne, 1976b; Joiner & Metalsky, 1995).

A causal pathway from depression to impaired social skills and reduced social support has not been conclusively identified through the literature (Segrin, 2000). However, the research literature generally supports Coyne's findings that individuals with depression are more likely to have impaired social behavior and experience rejection from members of their social environments (Segrin & Abramson, 1994). A meta-analysis was conducted to assess Coyne's proposed theory, and found strong support for Coyne's (1976b) assertion that people with depression are likely to be rejected by members of their social support groups. Moderate support was reported for the negative mood-induction hypothesis (i.e., individuals with depression will induce a negative mood state in others; Segrin & Dillard, 1992).

Lewinsohn (1974; 1975) theorized that the driving force behind depression is a deficit in social skills. His behavioral approach toward depression posits that social skills are necessary to elicit positive reinforcement from others. Lewinsohn (1975) inferred that depression is caused by low rates of positive reinforcement from a lack of social support due to impaired social skills. Lewinsohn's theory was supported by studies that demonstrated that depressed individuals exhibited impaired social behaviors (Cole, Lazarick, & Howard, 1987; Libet & Lewinsohn,

1973; Youngren & Lewinsohn, 1980). However, he later considered the possibility of social skills as a consequence of depression, rather than a cause (Lewinsohn, Hoberman, Teri, & Hautzinger, 1985). Lewinsohn noted difficulty in examining the causal relationship, and evidenced primarily correlational support for the relationship (Youngren & Lewinsohn, 1980). Additionally, ambiguity around the conceptualization and operationalization of ‘social skills’ added another layer of complexity to the quest to elucidate the causal relationship between social skills deficits and depression (Lewinsohn & Rohde, 1987). Lewinsohn also explained that direct observation of one’s behavior in response to potentially reinforcing events was costly and practically very challenging, and thus a hindrance to directly assessing the causal relationship (Lewinsohn, 1985, p. 156).

The majority of studies that examined social support and depression through the lens of Lewinsohn’s (1974) social skills deficit hypothesis established an association between an erosion of social support through impaired social behaviors and depression. However, despite employing a variety of methods, such as using multiple indicators of social skills (Segrin, 1996), extension of between-wave time intervals (Hokanson, Rubert, Welker, Hollander, & Hedeem, 1989; Segrin, 1993), and large sample sizes (Lewinsohn, Hoberman, & Rosenbaum, 1988; Lewinsohn et al., 1994), they were not able to demonstrate clear temporal ordering of social skills leading to depression, as suggested in Lewinsohn’s behavioral theory (Segrin, 2000).

Segrin (2000) explained that although most research has failed to conclusively determine a causal pathway, there have been some studies, more than might be expected by chance, that have demonstrated causality. For example, Kelly and colleagues (1993) examined depression among a sample of 142 individuals (63% Caucasian, 32% African American, 5% Hispanic/other) who were infected with HIV and found that perceived social support predicted high levels of

depression. Another study, conducted by Cole and colleagues (1996) found support via a path analysis for social skills as an antecedent to depression in sixth graders, although, not third graders.

Cole and Milstead (1989) utilized a cross-sectional design and path analysis to examine both Coyne (1976b) and Lewinsohn's (1974) theories among a sample of 205 Caucasian undergraduate students. In support of Coyne's interactional theory of depression, Cole and Milstead (1989) found that depression had a significant negative effect on social skill, and social skill had a significant positive effect on social support. However, the reciprocal component of Coyne's theory and the unidirectional premise of Lewinsohn's theory that social skills predict depression was not supported. Given that both Coyne and Lewinsohn postulated that a reduction in social support would exacerbate depression, Cole and Milstead (1989) also examined the relation between social support and depression and found no direct relation. Possible explanations for the findings were provided, such as social support may relate more to severe manifestations of depression (only 3.9% of the sample endorsed severe depressive symptomology), and given the cross-sectional design, some of the skill deficits implicated as causes of depression may actually have been symptoms of depression. One large limitation of the study is that it was a cross-sectional design rather than longitudinal, and did not allow for testing of causal relations. Thus, Cole and Milstead (1989) could only infer causal relations.

Although there has been support for both Coyne's (1976b) interactional theory of depression and Lewinsohn's (1974) behavioral theory of depression, unequivocal support has not been found for either theory as an explanation of the causal relation between social support via social skills and depression (Cole & Milstead, 1989; Segrin, 2000; Segrin & Dillard, 1992). There are some noteworthy limitations in the majority of studies involved that examined these

theoretical relations. Most of the studies that were conducted were not longitudinal (Segrin, 2000). In general, there is a dearth of longitudinal literature that assesses social support and depression (Cacioppo, Hawkley, & Thisted, 2010), which hampers one's ability to examine causality. Also, the majority of samples utilized in studies that examined Coyne and Lewinsohn's theories were Caucasian, often undergraduate students, and of middle-class backgrounds (Cole & Milstead, 1989; Coyne, 1976b; MacPhillamy & Lewinsohn, 1974). With samples of such homogenous backgrounds, findings may not be generalizable to populations with more diverse backgrounds and those with more risk factors.

### **Rationale**

Depression has been established as a detrimental mental health problem, causing impairment to individuals across multiple domains (e.g., daily functioning, interpersonal, occupational; APA, 2013) and increased risk for a host of associated negative outcomes, such as substance use, low academic achievement, unemployment, and suicide (Beck et al., 2015; Hames et al., 2013; Hawton, i Comabella, Haw, & Saunders, 2013; Kessler, 2012; Lépine & Briley, 2011). Additionally, depression also contributes to a large economic burden to society (Donohue & Pincus, 2007; Kessler, 2012; Lépine & Briley, 2011). Despite the lack of consensus on the causality of the dominant proposed interpersonal theories of depression, research has demonstrated a strong interpersonal component to the exacerbation and improvement of depressive symptoms (Segrin, 2000; Segrin & Dillard, 1992).

Social support has been established as a strong protective factor against depression for many populations with diverse backgrounds and various risk factors. However, interpersonal ties may be strained by emotional burden generated by the impaired social behaviors of individuals with depression (Cole & Milstead, 1989; Coyne, 1974; 1976a; 1976b; Coyne et al.,

1987), which may lead to a reduction in social support. A lack or loss of social support may place depressed individuals at even greater risk of depression, particularly populations with multiple risk factors (Compton et al., 2005; Illangasekare et al., 2014).

There is a dearth of literature that examines the social support-depression relationship among high-risk groups, such as low-income, African American women with substance use histories and criminal justice involvement. Specifically, there is a lack of research that explores the temporal or causal relationship between social support and depression among such a high-risk group. These justice-involved African American women represent an extremely vulnerable group with a lack of resources and access to good treatment (Salisbury & Van Voorhis, 2009; Santiago et al., 2013). Social support has been shown to improve depressive symptoms, substance use, and recidivism among high-risk groups; however, not much is known about the causal mechanisms of that relationship. Previous examinations of the relationship between social support and depression based on Coyne's (1976b) interactional theory and Lewinsohn's (1974) behavioral theory of depression were conducted with predominantly Caucasian, middle-class populations. Exploring the temporal/causal relationship between social support and depression, including the strength of that relationship, among high-risk African American women may provide useful information that may have important implications for policy, treatment, and prevention/intervention efforts.

Co-occurring depression and substance use disorders among incarcerated women increases the likelihood of criminal recidivism and reincarceration (Baillargeon et al., 2010; Peters et al., 2015). Finding ways to mitigate depression and substance use problems may ultimately help to reduce the economic burden to society. Having a better understanding of causal/temporal relationship between social support and depression and the strength of those

relationships may help to provide direction in terms of prevention/intervention and treatment focus (e.g., it may be more beneficial to target depression reduction strategies, bolstering healthy social support, or a mix of both). Identifying cost-effective options to bolster healthy social support, such as through Oxford House recovery homes, may inform policies for at-risk women with co-occurring depression and substance use disorders.

The present study examined the relationship between social support and depression among a sample of low-income, justice-involved, predominantly African American women in recovery from substance use problems, half of whom were assigned to the Oxford House condition; the other half were assigned to usual aftercare (most of the participants entered the study from substance use treatment programs; Jason, Salina, & Ram, 2015). Specifically, the temporal relationship between social support and depression, depression and social support, the strength of those relationships, and the mediating impact of Oxford House condition on depression via social support was explored. Data from the two-year longitudinal study was examined via a cross-lagged model that incorporates five data points. The study was informed by Coyne (1976b) and Lewinsohn's (1974) interpersonal theories of depression, and tested the assumptions of these theories regarding the relationship between social support and depression. This is the first known study to attempt to establish temporal relations between social support and depression among low-income African American women with substance use and criminal justice histories. There are five research questions that guided the investigation: 1. Does social support predict change in depression? 2. Does depression predict change in social support? 3. Does Oxford House condition predict change in depression? 4. Does social support mediate the relationship between Oxford House and depression? 5. Is there a difference in strength between the relation of social support on depression and depression on social support?

## **Statement of Hypotheses**

H<sub>1</sub>: Social support will predict change in depression.

H<sub>2</sub>: Depression will predict change in social support.

H<sub>3</sub>: Oxford House will predict change in depression.

H<sub>4</sub>: Social support will mediate the relationship between Oxford House and depression.

## **Method**

### **Overview**

The project utilized previously collected data from a study involving 200 women who were recruited from the Cook County Sheriff's Women's Justice Programs at Cook County Jail and a variety of substance use treatment sites in the city of Chicago and its northern suburbs, between 2008 and 2011. Recruiters distributed study information, such as recruitment flyers, to several community-based organizations that provided substance use services and services for formerly-incarcerated women. Snowball recruitment techniques were utilized to obtain study participants. Women were eligible for the study if they endorsed having a substance use problem, a commitment to recovery (i.e., abstinence), and involvement in the criminal justice system (e.g., arrest, parole, probation, incarceration) within the previous two years. The study was approved by the study's Institutional Review Board (IRB), and all participants were enrolled through IRB-approved informed consent procedures. Participants were enrolled in the study and tracked over a two-year period (Jason et al., 2015).

### **Participants**

Participants consisted of 200 predominantly African American (74.5%) women who reported to be in recovery from substance use problems. The mean age of participants was 39.94 years ( $SD = 8.58$ ) and slightly less than half of the women (40.5%) endorsed education levels

below a high school diploma. The majority of participants were unemployed at baseline (~66%) and approximately half of the sample reported income levels at or below poverty level (Walt, Hunter, Salina, & Jason, 2014). Most of the participants were mothers (84.5%) who had an average of 2.8 children ( $SD=2.25$ ) and had never been married (63.5%). Heroin was the primary substance of choice among participants (47%). For further descriptive details regarding the sample, refer to Jason et al. (2015).

### **Procedure**

Over the two-year enrollment period, participants were interviewed five times at six-month intervals. At baseline, demographic information was collected (e.g., race, education, employment, housing, income, marital and motherhood status). Participant interviews included the completion of a standardized survey, as well as voluntary HIV tests at Waves 1 and 5. Participant stipends consisted of \$40 grocery store gift cards, followed by \$30, \$35, \$40, and \$45 cash for each of the subsequent waves. Participants were provided with city transportation cards to travel to and from the interview and an additional transportation card if they chose to receive off-site HIV testing.

Participants provided informed consent and were assigned to either the Oxford House (OH) condition or the Usual Aftercare (UA) condition; there was no systematic bias in condition assignment. Condition assignment was non-randomized; participants were assigned to the OH condition pending an available opening in an OH at the time of recruitment. The OH condition consisted of living in an OH recovery home. OH recovery homes are self-run, democratically-operated sober living environments for individuals in recovery from substance use problems. OH residents pay rent and are either employed or searching for employment. They are encouraged to attend 12-step mutual support meetings (e.g., AA, NA) and house business

meetings. Residents are assigned roles (e.g., president, treasurer, secretary) and comply with weekly chores. They may remain in the OH as long as they pay their rent, comply with chores, and abstain from substance use and disruptive behavior (Oxford House, Inc., 2012). The study utilized 23 OHs in the Chicago metropolitan area. Residency status of participants was provided by the OH organization on a weekly basis, in order to calculate length of participants' stay in OH. Participants stayed an average of 131 days in OH ( $SD = 14.0$ ).

Multiple tracking strategies were used to maintain contact with participants, given that this was a particularly transient population. Some of the strategies used were to call participants near their interview dates, update contact information at each interview, and call participants' indicated contacts or visit their last-known-address if their phones were disconnected. Multiple databases were accessed to obtain the locations of participants. At the two-year follow-up, 86% ( $n = 86$ ) of participants were interviewed in the OH condition; 84% ( $n = 84$ ) in the UA condition. Inability to contact participants accounted for the majority of attrition. Four UA-condition participants died over the course of the study, and one withdrew after her baseline interview. No OH-condition participants died or withdrew from the study. For further descriptive details regarding study procedures, refer to Jason et al., (2015).

## **Materials**

**Demographics and Background Characteristics.** Demographic and background characteristics were assessed by the Addiction Severity Index, 5<sup>th</sup> Edition (McLellan et al., 1992). Demographic/background items assessed race/ethnicity, education, abuse (physical, sexual, emotional), criminal justice involvement, and substance use (substance of abuse).

**Depression.** The Beck Depression Inventory – II (BDI-II; Beck, Steer, & Brown, 1996) is a widely-used measure of depressive symptoms. The BDI-II is a 21-item, 4-point Likert scale

(0-3, with 3 indicating the greatest severity) measure that assesses a variety of somatic-affective and cognitive depressive symptoms within the past two-week time period. Scores can range from 0 to 63, with higher scores indicating more depressive symptoms. The BDI-II has demonstrated good internal consistency ( $\alpha = .92$  to  $.93$ ), test-retest reliability ( $\alpha = .93$ ), and convergent validity (Beck et al., 1996). Among a sample of low-income, urban African Americans, the BDI-II was also found to have good internal consistency ( $\alpha = .95$ ; Compton et al., 2005).

**Perceived Social Support.** The Interpersonal Support Evaluation List (ISEL; Brummett et al., 2006; Cohen & Hoberman, 1983; Cohen, Mermelstein, Kamarck, & Hoberman, 1985) is a self-report measure of perceived social support. The 12-item version of this measure is a 4-point Likert scale (1 = Definitely False; 4 = Definitely True). Total scores range from 12 to 48, with higher scores indicating greater perceived availability of social resources. The measure consists of three four-item subscales, including tangible support, belonging support, and appraisal support. Tangible support is the perceived availability of material aid (“If I were sick, I could easily find someone to help me with my daily chores.”). Belonging support is the perceived availability of people with whom one can do things (“If I decide one afternoon that I would like to go to a movie that evening, I could easily find someone to go with me”). Appraisal support is the perceived availability of having someone to talk to about one’s problems (“There is someone I can turn to for advice about handling problems with my family.”). ISEL has been widely used and validated in research across diverse populations (e. g. Bates & Toro, 1999; Brookings & Bolton, 1988). The measure demonstrated adequate coefficient alphas for each of the three subscales: tangible support,  $\alpha = .70$ ; belonging support,  $\alpha = .70$ ; appraisal support,  $\alpha = .74$ ; Businelle et al., 2010). Reliability coefficients in the current sample were adequate for each

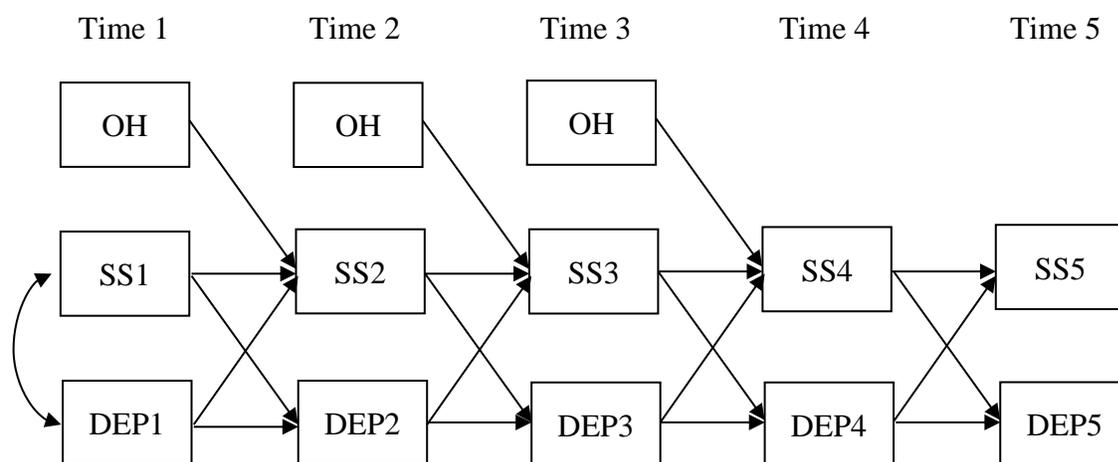
subscale: tangible support,  $\alpha = .71$ ; belonging support,  $\alpha = .79$ ; and appraisal support,  $\alpha = .69$  (Barringer, Hunter, Salina, & Jason, 2016).

### **Analytical Strategy**

**Cross-Lagged Path Analysis.** This study used a cross-lagged panel mediational analysis to examine changes in perceived social support and depression symptoms over time, including the mediational role of social support on the relationship between Oxford House condition and depression (Cole & Maxwell, 2003; Curran, 2000). The cross-lagged panel model (CLPM) approach is a form of structural equation modeling (SEM). CLPM is used to examine the effect of two or more variables on each other over time (Hamaker, Kuiper, & Grasman, 2015). The longitudinal design of the CLPM allows for stronger causal inferences to be made in comparison to cross-sectional models (Cole & Maxwell, 2003). The CLPM approach allows for the replication of the pattern of effects at each time point and the reciprocal association between variables (Lasgaard, Goossens, & Elklit, 2011). Thus, changes in individual differences on a measured construct were assessed from one time point to another (Selig & Preacher, 2009). All four hypotheses were tested using a CLPM analysis. Data from all five waves were used to test all hypotheses. Data was analyzed using Mplus 7 (Muthen & Muthen, 1998-2012). Goodness of fit of the CLPM was assessed using multiple fit indices (e.g., chi-square, root mean square error of approximation [RMSEA], comparative fit index [CFI], standardized root mean squared residual [SRMR]). Unstandardized regression coefficients ( $B$ ) and 95% confidence intervals were reported.

**Mediation Analysis.** Tate (2015) argues that conceptual constraints for time-ordered relationships are necessary to validate the use of mediation analysis. Research indicates that a stay of six months or more in Oxford House (OH) is associated with a variety of positive

outcomes, such as decreased substance use and criminal behavior (Aase et al., 2009; Jason et al., 2007; Jason et al., 2015). The six-month lag between time points provides the appropriate conceptual constraint that defines the time-ordered relation between variables, necessary to support the use of mediation analysis to test for indirect effects (Tate, 2015). Correlation and regression coefficients between variables measured at one time point were estimated and compared to correlations and regression coefficients of the variables measured at the next wave. Hypothesis 4 was examined across all five waves (at least three waves of data are necessary to achieve a fully longitudinal mediation model; Selig & Preacher, 2009). Figure 1 represents the CLPM.



*Figure 1.* Proposed cross-lagged model. OH = Oxford House condition; SS = perceived social support; DEP = depressive symptoms

The present study followed Cole and Maxwell's (2003) guidelines when using SEM to test a mediational model in a longitudinal design. Cole and Maxwell (2003) suggest five steps for the use of SEM in testing mediational effects in longitudinal data; however, because steps 1 and 2 require multiple measures of a variable (the proposed study will be relying on a single

measure of each variable), we only followed steps 3 through 5. Step 3 is a test of added components, step 4 is a test of omitted paths, and step 5 involves estimating mediational (and direct) effects. Steps 3 and 4 require at least three waves of data and all guidelines require the use of unstandardized data in order to obtain the most accurate parameter estimates, standard errors, and goodness of fit indices (Cole & Maxwell, 2003).

Step 3 compares a full model to a reduced model to determine whether causal processes exist that have not been anticipated by the mediational model. The full model includes three structural paths: 1) every upstream variable has an effect on every downstream variable; 2) all exogenous variables are allowed to correlate with one another; and 3) all downstream variable residuals are allowed to correlate with one another within a wave. The only difference in the reduced model is that residuals of the downstream variables are no longer allowed to correlate. If the comparison is significant, confounding variables may be responsible for some of the relations among variables. Identifying and controlling for such variables would be recommended (Cole & Maxwell, 2003).

Step 4 tests for omitted paths by comparing a full model to a reduced model in order to test the stationarity assumption. Stationarity assumes that causal paths will be identical at every wave (i.e., the degree to which one set of variables generates change in another will remain stable over time). All causal paths that are not part of the mediational model will be eliminated in the reduced model. If the comparison is significant, other causal relations may be biasing estimates of the mediational paths and should be explored via theory-driven follow-up tests (e.g., test of direct effects of Oxford House on depression and test for the presence-absence of wave-skipping paths; Cole & Maxwell, 2003).

Step 5 calls for an estimation of the overall direct and indirect effects in the mediational processes. Cole and Maxwell (2003) suggest estimating the total effect of  $X$  on  $Y$  (Oxford House on depression), estimating the overall indirect effect of  $X$  on  $Y$  through  $M$  (Oxford House on depression through social support), estimating the overall direct effect of  $X$  on  $Y$  that is not mediated by  $M$ , and testing the statistical significance of such effects.

**Bootstrap Approach.** Bootstrap methods were utilized to guard against the possibility of committing a Type II error (false negative) due to insufficient power (Shrout & Bolger, 2002). Evidence of positive skew has been found in studies of indirect effects with sample sizes under 400 (MacKinnon & Dwyer, 1993; Stone & Sobel, 1990). Under the assumption of normality, a positive skew tends to lead to asymmetric error rates. In this case, there would not be enough statistical power to reject the null hypothesis when testing for indirect effects (MacKinnon, Lockwood, Hoffman, West, & Sheets, 2002; Shrout & Bolger, 2002). Bootstrapping involves repeatedly resampling from the sample data in order to estimate a sampling distribution. The bootstrap distribution does not require distributional assumptions, and may thus provide more accurate inferences in the case of non-normative data or small sample sizes (Fox, 2002).

### **Missing Data**

Strategies were employed to account for data missing from various waves. Cases that were missing all items of a scale were removed, as recommended by Graham (2009; 2012). The significance of Little's Missing Completely at Random (MCAR) test were assessed to determine if data went missing systematically (e.g., certain data were more likely to go missing than others; Little & Yau, 1998). If data was missing not at random, T-tests were conducted on each relevant variable to identify problematic data.

## **Results**

## Descriptive Statistics

**Univariate Descriptives.** These data consist of five waves of depression and social support scores collected at 0 (baseline), 6, 12, 18, and 24 months. The basic descriptive statistics for the individual difference covariates and outcomes of interest are shown in Tables 1 and 2.

Table 1

### *Basic Categorical Individual Difference Characteristics*

Characteristic	<i>n</i>	%
<b>Race</b>		
African-American	149	74.5
Other	51	25.5
<b>Education</b>		
Less than High School	81	40.5
High School	55	27.5
More than High School	64	32.0
<b>Condition</b>		
Oxford House	100	50.0
Usual Care	100	50.0
<b>OH Dosage</b>		
< 6 months	77	77.0
≥ 6 months	23	23.0

The sample was largely comprised of African American women around the age of 40 with a broad range of educational attainment. The majority of participants in the Oxford House condition (77%) resided in those recovery homes for less than six months.

Table 2

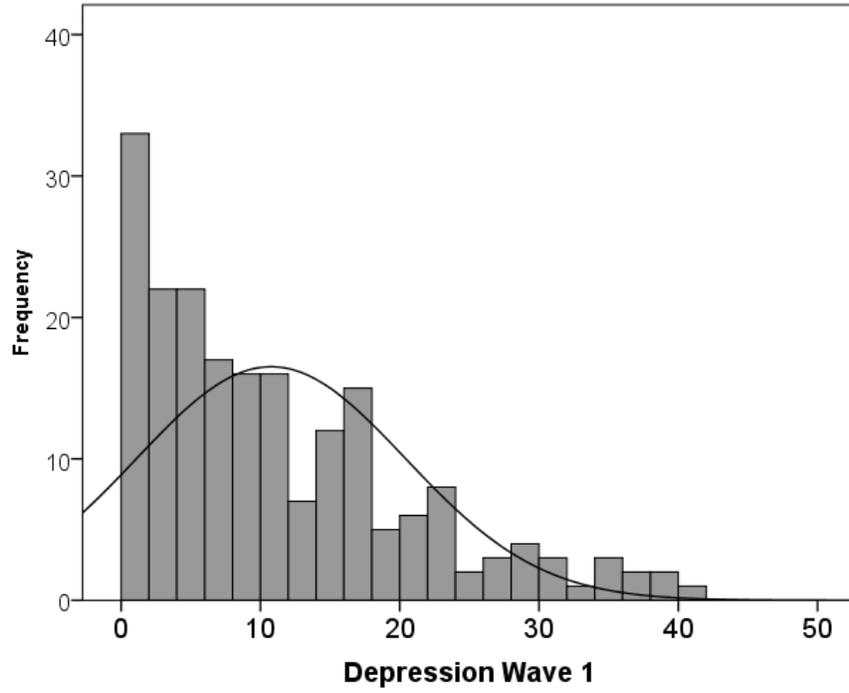
*Basic Statistics of Continuous Variables*

Variable	<i>n</i>	<i>M</i>	<i>SD</i>	<i>Median</i>
Age	196	39.94	8.58	41.0
OH Dose Days (natural log)	100	4.36	1.05	4.55
Depression W1	200	10.76	9.66	9.0
Depression W2	157	9.11	7.96	7.0
Depression W3	141	10.26	9.73	7.0
Depression W4	146	10.97	10.29	8.0
Depression W5	169	11.07	11.36	7.0
Social Support W1	199	27.82	7.04	29.0
Social Support W2	158	29.14	6.18	30.0
Social Support W3	141	29.26	6.35	31.0
Social Support W4	150	29.13	6.98	30.0
Social Support W5	170	30.29	6.28	32.0

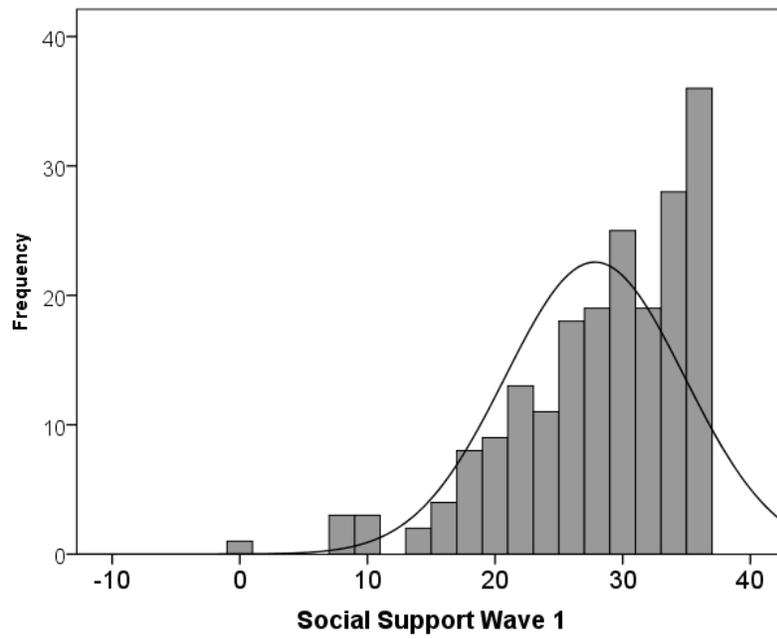
*Note.* Depression measured by BDI-II; Social Support measured by ISEL.

Overall, in comparing Wave 1 and Wave 5 scores of depression and social support, there was a slight increase in depression (2.9%) and a slightly larger increase in social support (8.9%).

The following figures (see Figures 2 and 3) display the histograms for the Wave 1 variables of interest (depression and social support). Both variables have a substantial range to measured values but did not exhibit either right or left skewness. In a comparison of standard errors generated by parametric and bootstrapping methods, there were no discernable or non-trivial differences. However, to protect against unpredicted violations of parametric assumptions, bootstrapping was employed to calculate standard errors and confidence intervals.



*Figure 2.* Histogram of depression at Wave 1.



*Figure 3.* Histogram of social support at Wave 1.

**Missing Data.** Missing data analyses were performed to test whether missing data could be assumed to be missing completely at random using Little's MCAR test (Little & Yau, 1998). Tests were performed on a data set using just Wave 1 and Wave 5 depression and social support variables with baseline covariates and on a data set including depression and social support variables for Waves 2, 3, and 4. For the reduced model (Wave 1 and Wave 5), Little's MCAR test was insignificant, indicating the missingness (15.5%) of Wave 5 was not significantly related to levels of depression or social support in Wave 1 or the covariates. For reduced model analyses, estimation of parameter estimates was completed using full information maximum likelihood (FIML), which does account for missing data patterns.

Utilizing all five waves of depression and social support data resulted in a significant Little's MCAR results ( $\chi^2_{(df=166)} = 235.944, p < .001$ ), as missingness was both higher in Waves 2 through 4 (maximum of 29.5%) as well as missingness in Wave 2 was predictive of future missingness. In addition, age was predictive of missingness in Waves 2 through 4, with younger individuals being more likely to be missing. To account for this systematic missingness between Wave 1 and Wave 5, all analyses utilizing the full five waves of data were performed using multiple imputation as well as FIML as a precaution to limit the possibility of biased estimates.

### **Individual Difference Covariates**

A reduced model (two-wave, Waves 1 & 5) was used to test for covariate relations with the baseline data (see Figures 4 and 5 and Table 3) that would be possible individual predictors with effects mediated across waves. Only race was a significant predictor of depression and social support levels, with depression being positively related to the Other race category (non-African American). This model in a reduced form had fit statistics consistent with a direct regression model with few mediated relationships (RMSEA = .066, CFI = .950, SRMR = .037).

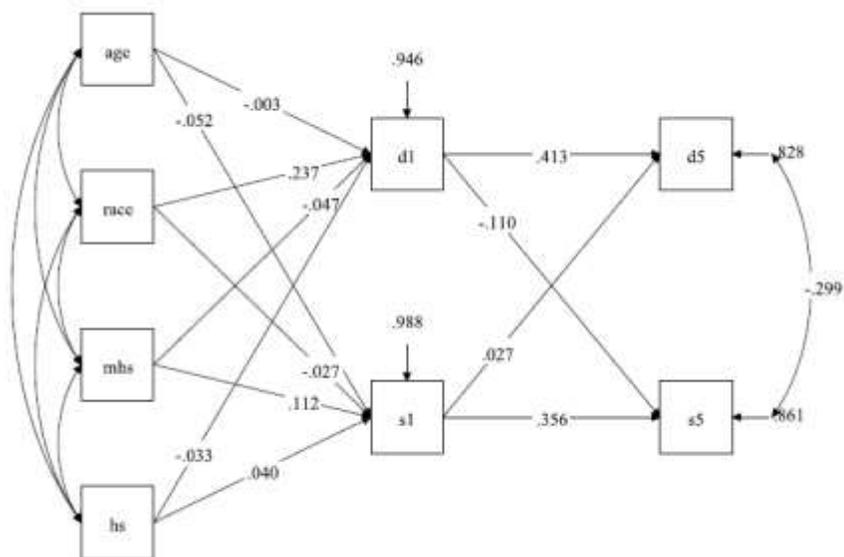


Figure 4. Full model testing covariates with standardized coefficients; d = depression; s = social support

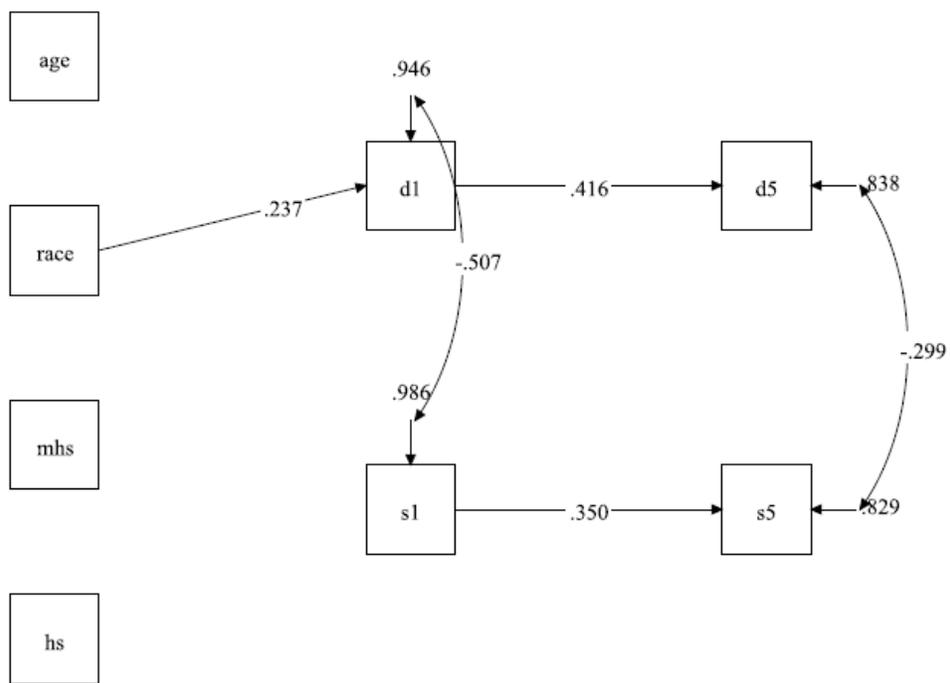


Figure 5. Full model testing covariates with significant standardized coefficients; d = depression; s = social support; mhs = more than high school education; hs = high school education

Table 3

*Standardized Parameter Estimates and Standard Errors of Covariate Relationships*

	Estimate	SE	Estimate/ SE	Two-Tailed P-Value
<b>D1 ON:</b>				
Age	-0.003	0.075	-0.036	0.971
More than High School	-0.047	0.078	-0.595	0.552
High School	-0.033	0.077	-0.428	0.668
Race	0.237	0.075	3.157	0.002
<b>S1 ON:</b>				
Age	-0.062	0.077	-0.799	0.424
More than High School	0.119	0.080	1.493	0.135
High School	0.047	0.079	0.597	0.550
Race	-0.040	0.079	-0.505	0.613
<b>INDIRECT:</b>				
Race to D5 via D1	0.098	0.037	2.669	0.008
Race to S5 via D1	-0.025	0.022	-1.175	0.240

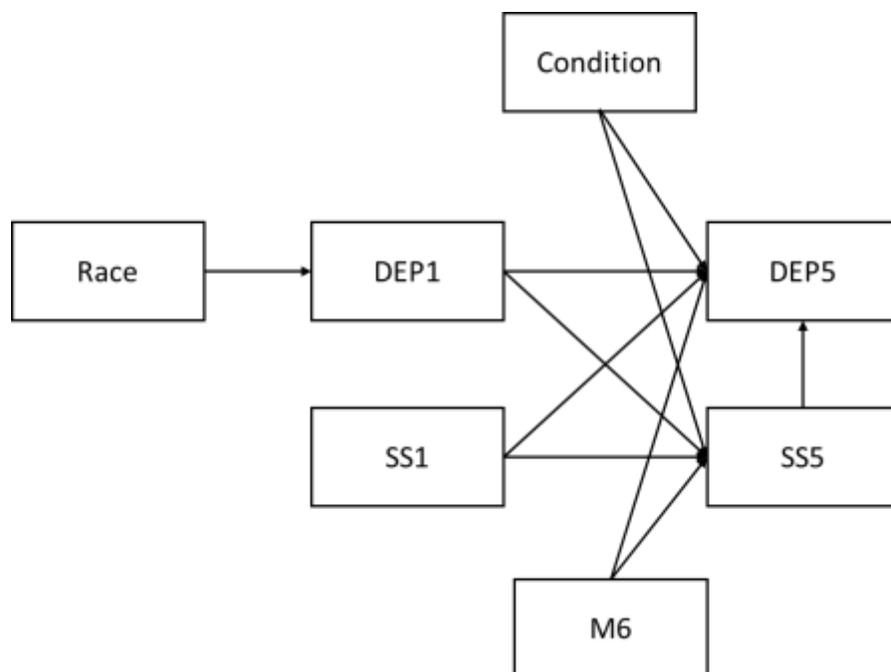
*Note.* D = depression; S = social support.

Race and depression at Wave 5 exhibited a significant indirect relationship, although the effect size was small ( $r \approx .1$ ). In subsequent analyses, race was the only individual difference covariate included as an independent predictor.

### **Hypotheses 3 & 4**

The reduced model was utilized to test for relationships as predicted by Hypothesis 3 and Hypothesis 4. Hypothesis 3 predicted that the OH condition or in a more restricted form, a stay of 6 months or more, would predict a change or group level difference in depression. Specifically, the OH condition would predict a lowering of depression levels. Hypothesis 4 is a structural refinement to Hypothesis 3; hypothesis 4 predicts that social support will mediate the relationship between OH and depression. While Hypothesis 3 is a direct relationship, Hypothesis 4 argues that this direct relationship can be modeled as an indirect relationship working through social support. Two independent variables were used to test these hypotheses—Condition, which is a dichotomous variable representing OH, or usual care (UC) placement and a dichotomous variable representing the sample population as having six months or more in an OH versus all other (i.e., dosage met or M6).

In testing the direct relationship of OH and depression, a significant relationship between condition and depression at Wave 5 would indicate any length of stay related to depression outcomes and a significant relationship of six-month dosage would indicate differential outcomes for those who stayed longer. An insignificant condition relationship but significant six-month dosage relationship would suggest an adequate dosage in OH would be predictive of Wave 5 depression levels. Figure 5 displays the model of directed relationships.



*Figure 6.* Path model of directed relationships to test for both direct and mediated effects of condition and M6 on depression; DEP = depression; SS = social support; M6 = OH stay of 6 months or more.

Both Hypotheses 3 and 4 were not supported by either condition or six-month dosage relationships. Table 4 lists the estimated standardized parameters, standard errors, and test results. The overall fit of this reduced model was good as expected (RMSEA = .048, CFI = .976, SRMR = .041). Secondary analysis was performed using the days in dosage (naturally logged) as a measure of the Oxford House experience. The relationships of this continuous dosage measure with depression ( $p = 0.395$ ) and social support ( $p = 0.111$ ) were also insignificant. Overall, these test results do not endorse condition or dosage as predictors of longer-term depression or social support levels, thus, both Hypotheses 3 and 4 lacked evidence for rejecting the null.

Table 4

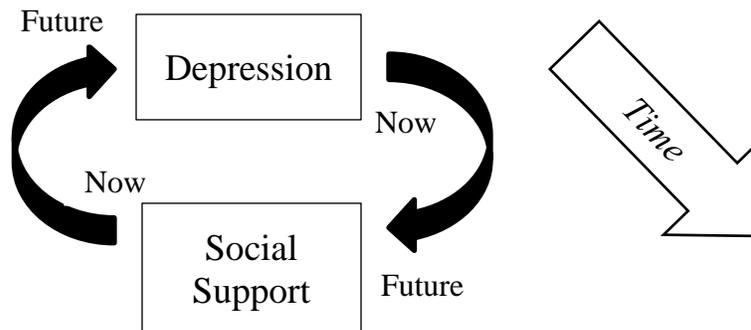
*Estimated Standardized Parameters, Standard Errors, and Test Results*

	<i>Estimate</i>	<i>SE</i>	<i>Estimate/ SE</i>	<i>Two-Tailed P-Value</i>
D1 ON:				
Race	0.210	0.059	3.572	0.000
D5 ON:				
D1	0.383	0.076	5.011	0.000
S1	0.122	0.085	1.429	0.153
Condition	-0.094	0.073	-1.289	0.197
M6	-0.060	0.070	-0.850	0.395
S5	-0.305	0.071	-4.290	0.000
S5 ON:				
D1	-0.096	0.085	-1.132	0.257
S1	0.343	0.081	4.215	0.000
Condition	-0.105	0.076	-1.370	0.171
M6	0.035	0.074	0.471	0.637
INDIRECT:				
Condition to D5 via S1	0.032	0.024	1.304	0.192
M6 to D5 via S5	-0.011	0.023	-0.468	0.640

*Note.* D = depression; S = social support; M6 = OH stay of 6 months or more.

**Hypotheses 1 & 2**

Hypotheses 1 and 2 represent a potential feedback mechanism in which the future states of social support and depression are mutually determined in either a balancing or reinforcing relationship. The basic relationship of Hypothesis 1 is that social support (now) will predict depression (future). Hypothesis 2 reverses the terms such that depression (now) will predict social support (future). Figure 7 displays the basic conceptual model.



*Figure 7.* The mutual relations of depression and social support providing feedback as they co-evolve through time.

From an analysis perspective, two major methodologies are commonly used for modeling this set of five observations over two years. One method is to nest the observations of depression and social support over time for an individual in columns of depression and social support with a separate variable capturing the time or wave. This type of data is termed “long.” The other method is to use separate variables for depression and social support by wave, thus there would be five depression variables and five social support variables in the dataset. This type of data organization is termed “wide.” The initial dissertation proposal was based on using wide data and thus, Hypotheses 1 and 2 will be addressed with wide data. However, the long data method has been analyzed in secondary analysis and is provided as a benchmark or basis for comparison of the originally proposed methods. Both methods result in consistent findings relative to Hypotheses 1 and 2.

Briefly, the random-effects model utilizing data in a nested long format found significant, yet small in effect size, relations between these now and future depression and social support scores. For current depression predicting future social support, the standardized estimated

parameter equaled  $-.096$  ( $SE = 0.040$ ,  $t_{(174)} = -2.395$ ,  $p = .017$ ). For social support now predicting future depression, the estimate was also significant but relatively of small effect size ( $b = -.158$ ,  $SE = .151$ ,  $t_{(174)} = -3.075$ ,  $p = .002$ ). This model had perfect fit statistics due to its configuration. Note that both coefficients are negative and thus increases in depression predict decreases in social support, which predict future increases in depression. This is a reinforcing feedback loop where momentum is stimulated rather than dampened by the co-association.

**5-Wave Wide Model.** The analysis of the 5-wave model in wide data format utilized multiple imputation (10 data sets) and bootstrapping (1000 draws) for the calculation of standard errors. Although FIML can effectively handle non-random missing data, multiple imputation is an equally effective alternative that can be used as a basis for comparison. No practical differences were found in the results of the two methods.

The final 5-wave model can be found in Figure 8 with the estimated coefficients and  $p$ -values in Table 5.

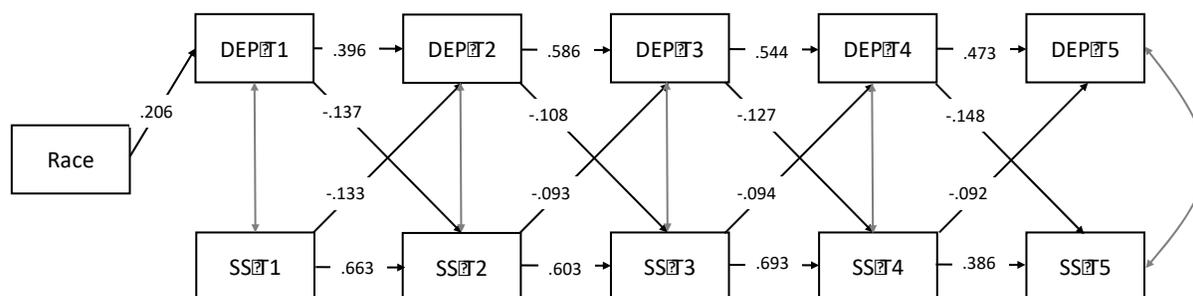


Figure 8. The full 5-wave cross-lagged model of significant relationships; DEP = depression; SS = social support.

Table 5

*The Estimated Standardized Regression Coefficients for the Full 5-Wave Model*

	<i>Estimate</i>	<i>SE</i>	<i>Estimate/ SE</i>	<i>Two-Tailed P-Value</i>
D1 ON:				
Race	0.206	0.063	3.262	0.001
D2 ON:				
D1	0.396	0.070	5.657	0.000
S1	-0.133	0.049	-2.706	0.007
S2 ON:				
D1	-0.137	0.040	-3.407	0.001
S1	0.663	0.045	14.884	0.000
D3 ON:				
D2	0.586	0.054	10.891	0.000
S2	-0.093	0.035	-2.686	0.007
S3 ON:				
D2	-0.108	0.032	-3.412	0.001
S2	0.603	0.055	10.882	0.000
D4 ON:				
D3	0.544	0.064	8.495	0.000
S3	-0.094	0.034	-2.741	0.006
S4 ON:				
D3	-0.127	0.037	-3.420	0.001
S3	0.693	0.048	14.316	0.000
D5 ON:				
D4	0.473	0.066	7.227	0.000
S4	-0.092	0.034	-2.699	0.007
S5 ON:				
D4	-0.148	0.043	-3.467	0.001
S4	0.386	0.087	4.434	0.000

*Note.* D = depression; S = social support.

The unadjusted r-squared for depression at Wave 5 was 0.274 and for social support, 0.225. In addition to these regression relationships, non-directional correlations between contemporaneous depression and social support were estimated as well. These between-correlations (e.g. depression Wave 1 with social support Wave 1) were all negatively signed and significant, ranging from -0.180 at Wave 2 to -0.510 at Wave 1.

Future levels of social support and depression are predicted by their direct-past level and the cross-contributions of the past levels of depression and social support, respectively. This model was compared against competing models to assess specification and fit. These models ranged from an approximate duplication of the long-format data model (full stationarity of between and cross-lagged relationships over time—Model 1) to a model that drops the cross-lag relationships and has the future simply being predicted by the direct past (Model 4). The cross-lagged model (assuming stationary cross-lags) had better fit characteristics and the best Akaike Information Criterion (AIC) score of the four models tested (see Table 6). The four models were:

- Model 1—Structurally Invariant (Relationships Stationary over Time)
- Original Model—Only Cross-Lagged Relationships Fixed as Stationary
- Model 3—No Relationships are Stationary over Time
- Model 4—Cross-Lagged Relationships are Deleted

Table 6

*The Specification and Fit of Models*

	Model 1	Original	Model 3	Model 4
AIC	13267.7	13195.1	13198.2	13253.2
$\chi^2$	177.35	117.77	112.10	155.50
df	54	39	33	39
$\chi^2/df$	3.28	3.02	3.40	3.99

*Note.* AIC = Akaike Information Criterion

Overall, these findings are supportive of the research Hypothesis 1, which predicts current social support having a significant relationship with future depression and Hypothesis 2, which predicts current depression having a significant relationship with future social support. These relations are small in effect size and mutually reinforcing.

### **Discussion**

The present study was designed to examine the reciprocal relationship between depression and social support across five waves of data, collected over two years, from a sample of predominantly African American women with criminal justice histories, in recovery from substance use problems. Additionally, the relationship between Oxford House condition and depression was explored. Results indicate a significant reciprocal relationship between social support and depression, such that social support predicts future depression and depression predicts future social support; these cross-lagged relations are perpetuated over time. Oxford House condition was not associated with depression and no indirect effects between Oxford House condition and depression were found, thus ruling out both hypotheses 3 (Oxford House condition will predict change in depression) and 4 (social support will mediate the relationship between Oxford House condition and depression).

Consistent with both Hypotheses 1 and 2, results show that social support predicted change in depression and depression predicted change in social support, after controlling for race. Race, in this case, non-African American women, consisting mostly of Caucasians, predicted slightly higher depression scores, which is consistent with the research literature (SAMHSA, 2012). Of note, average depression scores remained in the minimal depression range for both African American and non-African American study participants. This finding

suggests that although the difference in scores between African Americans and non-African Americans was statistically significant, it was not necessarily meaningful in a practical sense. Regarding Hypotheses 1 and 2, a significant, albeit small, negative effect existed across all five waves of data. Further, the effect size was similar, whether social support predicted depression or depression predicted social support, such that neither variable was a stronger predictor than the other. As such, results provide support for both Coyne's (1976b) interactional theory of depression (i.e., depression predicts social support) and Lewinsohn's (1974) behavioral theory of depression (i.e., social skills deficit contributes to decreased social support, which predicts depression). The present study's findings also provide support for Coyne's proposed reciprocal relation between depression and social support (i.e., depression predicts poorer social support, which in turn predicts worse depression), while also providing evidence for a negatively reinforcing feedback loop between social support and depression. Of note, this negative reciprocal relation between depression and social support and conversely, social support and depression, although small, compounds over time.

Results show that when women who have multiple stressors and risk factors, including justice involvement and a history of substance use problems, report depression, they are likely to have poorer perceived social support in the future, which will in turn lead to worsened depression, and so on, over time. The same goes for social support predicting depression; a perceived lack of social support will likely lead to depression, which will predict an increase in perceived lack of social support, which will predict even worse depression, etc. In sum, those who reported higher depression scores and a perceived lack of social support continued to get worse over time. Conversely, those who reported lower depression scores and higher perceived social support continued to report improved depression and more social support over time.

One possible explanation for the negatively reinforcing feedback loop, is that this population of women may be faced with a lack of resources and treatment barriers that may decrease the likelihood of gaining access to an intervention that might interrupt the downward spiral. Cole and Milstead (1989) did not find this negative feedback loop among a sample of middle-class, Caucasian undergraduate students, perhaps because that population likely had greater access to resources and treatment. Additionally, Cole and Milstead's sample was most likely not consistently exposed to contextual risk factors, such as poverty, community violence, criminal justice histories that may hinder employment possibilities, and lack of stable housing faced by many members of the present study's sample. Those and other contextual risk factors experienced by the present sample may create a consistently stressful environment that perpetuates risk for depression. Without access to psychoeducation and interventions to buffer against or treat depression or bolster social support, similar populations remain at risk for increasingly worse depression and social support via the mutually reinforcing negative feedback loop.

Another factor that may impact the reciprocal relation between social support and depression, is type of social support. The present study did not explore the type of social support reported by women in the study. Future research may benefit from examining which types of social support, such as emotional support or instrumental assistance (i.e., informational and/or tangible support; Semmer et al., 2008; Thoits, 2011), were associated with different outcomes (Illangasekare et al., 2014). Additionally, the research literature has indicated that justice-involved individuals often lack positive social support and are at increased risk of returning to negative sources of social support (Wolff et al., 2013; e.g., social networks involved in substance use and illegal activities; Salina et al., 2011). Conversely, research has demonstrated that

abstinent social support is associated with improved psychiatric and abstinence outcomes among individuals with histories of substance misuse (Groh et al., 2007; Majer et al., 2008; Majer et al., 2013; Majer et al., 2016). Future studies may wish to explore characteristics of reported social networks (e.g., abstinent vs. non-abstinent, involved in illegal activities, etc.) to help determine the impact various compositions of social networks may have on one's depression/social support trajectory.

While the results supported the potential negative trajectory for which this vulnerable population is at risk, it is important to note that the upward trajectory (i.e., those who report low depression scores and higher perceived social support tend to continue to report improved depression scores and higher social support) was also supported and demonstrates the resiliency of this population. Despite the number of socioenvironmental stressors that may increase the risk of developing depression for this population, those who report doing well, do better over time, relative to depression and perceived social support.

Although past research has demonstrated the positive effect Oxford House recovery homes tend to have on social support, mental health, employment, income, and abstinence outcomes (Groh et al., 2007, Groh et al., 2008; Jason et al., 2007; Jason, Olsen, & Harvey, 2015; Majer et al., 2008), the present study did not find an association between the Oxford House condition and depression. One possible explanation for this lack of support for Hypothesis 3 (Oxford House will predict change in depression) is that Oxford House residents receive the most benefit from a stay of six months or more (Jason et al., 2007) and most participants in the present study (77.0%) lived in an Oxford House recovery home for less than six months. Participants residing in Oxford House homes may have found it difficult or impossible to pay their weekly rent, given that the present study occurred during a recession, which made finding a

job, particularly with a criminal background, especially difficult. Thus, the economic climate in which this study occurred may have contributed to participants not being able to pay rent and stay in Oxford House, thus limiting length of stay to a non-optimal dose (less than six months; Jason et al., 2007). Efforts to increase length of stay in Oxford House recovery homes may lead to improved outcomes for populations represented by the present study's sample and may be an emphasis of future research.

There were several limitations to the present study. One such limitation is that depression and social support measures may not have been sensitive enough to adequately measure the constructs they were utilized to measure in the present sample. The BDI-II, for example, only assessed current and recent depressive symptoms (day of the assessment through the previous two weeks). Depressive symptoms are often recurring (Steinert, Hofmann, Kruse, & Leichsenring, 2014), so given that only two weeks out of a 6-month time period was assessed, it is entirely possible that examiners were unable to accurately assess depression. ISEL (Brummett et al., 2006; Cohen & Hoberman, 1983; Cohen et al., 1985) was normed on Caucasian samples and may lack some cultural sensitivity. For example, one item refers to having someone who could take care of one's apartment if she was out of town. This item assumes that one has an apartment and has the means to travel out of town, which was not the case for some of the women who participated in the present study. Future studies may benefit from ensuring the use of sensitive, valid, culturally-appropriate measures of depression and social support to improve accuracy of the results.

Another study limitation is that the potential impact of social desirability bias was not assessed. Measures were administered by staff members and included items that assessed potentially socially undesirable traits/behaviors. Without administering a measure of social

desirability, the present study was unable to determine whether scores were impacted by one's desire to appear favorably to others. For example, some participants may have been more likely to endorse socially desirable traits/behaviors and deny socially undesirable ones (Tourangeau & Yan, 2007); underreporting symptoms of depression in the BDI-II is one possible manifestation of social desirability bias. A literature review conducted by Abdullah and Brown (2011) concluded that African Americans were more likely to report higher stigmatization of mental illness (i.e., were more likely to report higher public-stigma and self-stigma if they were to be diagnosed with a mental illness, were more likely to stigmatize those with mental illness and identify those with mental illness as being dangerous) than their Caucasian counterparts. Endorsing a mental health problem, such as depression, may be associated with stigma (e.g., public-stigma) and may thus be considered socially undesirable. Therefore, underreporting depression may decrease the likelihood that someone would be associated with socially undesirable traits/behaviors. Average depression scores tended to hover in the minimal depression range across waves, which may be explained by underreported symptoms, or due to a measure that potentially lacks sensitivity, as mentioned above.

Generalizability is another limitation of the present study. The findings of the present study may not be generalizable beyond similar populations of African American women who are in recovery from substance use problems and have criminal justice histories. Half of the sample had exposure to living in Oxford House recovery homes, which makes this sample particularly unique, and that experience may limit generalizability to populations who have not had similar exposure. However, given that average length of stay in Oxford House was shorter than the optimal six months, participants may not have stayed in long enough to have been impacted by the sober living environments enough to make them significantly different than women of

similar characteristics. Thus, although limited generalizability of findings is a consideration, it may not be a major limitation.

The relation between depression and social support among ethnic minority female populations with various risk factors is an understudied area of research. Future research is needed to further elucidate these relations and identify efficacious interventions. Future studies may benefit from utilizing more sensitive, culturally-appropriate measures, assessing for social desirability and/or taking steps to reduce the likelihood of social desirability bias. Additionally, future researchers may wish to use larger sample sizes to increase power in the studies. Another reason to conduct further research in this area is to explore the possibility that a third, unknown variable may, at least in part, be contributing to the relation between social support and depression. The present study examined the impact of recovery housing and examined some demographic variables; however, the exploration of additional factors (e.g., mental health diagnoses, previous mental health treatment, social skills, social network characteristics, and types of social support accessed/preferred) may help to further elucidate these relations.

In sum, the present study found a negative, reciprocal relation between perceived social support and depression among a predominantly African American sample of women with criminal justice histories in recovery from substance use problems. Thus, perceived social support was predictive of future depression and depression was predictive of future social support in a mutually-reinforcing feedback loop. The effect sizes were small, yet significant, and relatively equal between variables, thus, neither social support nor depression was identified as the stronger predictor variable. Of note, effects were compounded over time, such that those who got better over time (lower depression, higher perceived social support), continued to get

better, while those who got worse (higher depression, lower perceived social support), continued to get worse.

Results emphasize the need for improved policies and effective prevention and intervention programs for female populations, especially African American women, with multiple risk factors, including substance use and criminal justice histories. The present study's findings of a mutually-reinforcing relation between depression and social support highlight the importance of effective strategies to interrupt the downward spiral and promote a more positive trajectory. Interventions that provide psychoeducation, possibly provided by peer educators (Conner, McKinnon, Ward, Reynolds III, & Brown, 2015), may help reduce stigma and promote help-seeking behaviors and treatment engagement (Campbell et al., 2016; Lucksted et al., 2016), which may be particularly helpful for African American women. Involvement in interventions, such as group-based treatment (e.g., behavioral activation, mindfulness-based therapy, and cognitive-behavioral therapy) and peer support for depression may help reduce symptoms of depression (Chan, Sun, Tam, Tsoi, & Wong, 2017; Pfeiffer, Heisler, Piette, Rogers, & Valenstein, 2011; Sundquist et al., 2015). Participation in 12-step mutual support groups may help increase positive social support (Groh et al., 2008). Changes in policy to prioritize and fund programs that promote continuity of care and successful re-entry for justice-involved women may help to increase the likelihood of engaging women in effective interventions to reduce depression and increase social support. Effective intervention programs may ultimately reduce costs associated with depression, substance abuse, and criminal recidivism by helping to promote more positive trajectories for women with multiple risk factors.

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