An Ecological Model of Transmission of Depression: Risk and Protective Factors for Mexican Immigrant Mothers and Children Living in Poverty

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LOYOLA UNIVERSITY CHICAGO

AN ECOLOGICAL MODEL OF TRANSMISSION OF DEPRESSION: RISK AND PROTECTIVE FACTORS FOR MEXICAN IMMIGRANT MOTHERS AND CHILDREN LIVING IN POVERTY

A DOCTORAL DISSERTATION SUBMITTED TO
THE FACULTY OF THE GRADUATE SCHOOL
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BY

ANNA MARIA ROS

CHICAGO, ILLINOIS

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CHAPTER ONE
INTRODUCTION

Family poverty has been found to predict a number of negative outcomes across a multitude of domains of child development, including health, education, language and cognitive development (Reiss, 2013; Yoshikawa, Aber & Beardslee, 2012). Furthermore, studies examining differing prevalence rates of mental illness depending on socioeconomic status have found that children living in poverty in the United States are between two and three times as likely to meet criteria for a psychiatric disorder when compared to their higher SES counterparts (McLaughlin et al, 2011; Reiss, 2013). Family poverty has been found to predict internalizing psychopathology risk across childhood and adolescence, and this relation is thought to operate multi-dimensionally through a number of factors associated with the experience of childhood poverty (Gilman, Kawachi, Fitzmaurice, & Buka, 2003). One factor that has been identified linking family poverty to child outcomes is maternal depression (Barker et al., 2012; Raposa, Hammen, Brennan & Najman, 2014). Maternal depression has repeatedly been implicated in negative outcomes for youth living in the context of poverty (Goodman, Rouse, Connell, Broth, Hall & Heyward, 2011; Kiernan & Huerta, 2008; Wachs, Black & Engle, 2009), and several studies have demonstrated that poverty’s effects on children are mediated by maternal depressive symptoms (Beeber & Miles, 2003; Mistry et al., 2004; Petterson & Albers, 2001). The current study examined
whether maternal depressive symptoms mediate the effect of family poverty on child depressive symptoms in a sample of 104 low-income Mexican immigrant families.

In addition to understanding mechanisms that transmit risk, researchers have underscored the demand for discovering evidence-based resilience factors for children living in poverty in order to inform prevention and intervention efforts (Yoshikawa et al., 2012). One area that may be fruitful in this pursuit is the identification of internal and external resources that increase the likelihood that individuals will experience positive outcomes in adverse contexts, termed developmental assets (Shtasel-Gottlieb, Palakshappa, Yang & Goodman, 2015). At the community level, developmental assets have been theorized to include institutional resources, defined as the quality, quantity, and diversity of organizations that provide services to members of the community (Sampson et al., 2002). The current study tested whether such community-level developmental assets (Catholic churches, mental health centers, after school programming) serve to buffer the impact of family poverty on maternal depression. Further, the moderating impact of these community-level developmental assets on the relation between maternal depression and child depression symptoms was examined. Likewise, to assess the impact of school-level developmental assets on the relation between maternal depression and child depression outcomes, the current study evaluated whether ratings of school climate act as a buffer for risk (see Fig. 1 for model).
Figure 1. Schematic of analytical model used in the current study.
CHAPTER TWO

REVIEW OF RELEVANT LITERATURE

Theories on Poverty’s Effect on Mental Health

Historically, two theories have been used to explain the relationship between poverty and the risk for development of psychopathology: social causation theory, which proposes that exposure to the conditions associated with poverty produce greater risk for the development of mental health problems, and social selection theory, which suggests that mental illness is an innate, genetic trait that affects one’s ability to maintain employment, resulting in downward mobility, unemployment, and poverty (Simmons, Braun, Charnigo, Havens & Wright, 2008). Researchers have additionally proposed a bidirectional, interactionist perspective, which suggests that individual differences in mental health affect economic outcomes, which in turn have effects on psychological well-being (Conger & Donnellan, 2007).

Although previous literature indicates support for each theory, it is likely that social causation theory may be most relevant to a study of depression in a Latinx immigrant sample in the United States. Importantly, literature on the immigrant paradox suggests that overall, Latinx immigrants to the United States are mentally healthier than both Latinx and non-Latinx US-born counterparts (Alegria et al., 2008). The process of immigration to the United States from Mexico is a multi-step, prolonged process that requires long-term commitment and resilience to adversity. Thus, applying the social selection theory to a population of individuals who were able to
immigrate to the United States may be flawed, as individuals for whom mental illness is innate and limits employment opportunities would likely have difficulty completing the necessary steps to successfully immigrate to the United States.

Apart from stated considerations regarding the application of social selection theory to first-generation immigrant groups, this theory may be scantily applicable to the study of the relation between poverty and depression. Historically, support for social selection theory comes from studies of more severe forms of mental illness, such as psychosis and substance abuse, and support for this theory is weaker for mood disorders (Simmons et al., 2008; South & Kruger, 2011). In fact, one study of depression in single mothers used structural equation modeling to analyze longitudinal data in order to test whether the data better fit with social causation or social selection theory. These authors found that the social causation theory yielded a better approximation of the data, indicating stronger support for social causation theory explaining the relationship between poverty and depressive symptoms (Simmons et al., 2008). Moreover, another study testing goodness of fit for social causation versus social selection theory in a nationally representative study of adult twin sets between 25-74 years of age found that social causation theory best explained the relationship between poverty and internalizing psychopathology (South & Kruger, 2011). Interestingly, this study used genetic modeling, which allowed researchers to test whether genetic profiles were antecedent to poverty and the development of mental illness, a finding which would support social selection theory. When researchers tested this theory, genetic profile models were non-significant, while models using environmental influences of poverty as a predictor were significant, thus supporting social causation theory. (South & Kruger, 2011). Current research on allostatic load and the psychological wear-and-tear of poverty provides a mechanism
of action for social causation theory, as pathogenic effect of poverty-related stress has a demonstrated impact on psychological well-being across the lifespan (Evans, 2016).

Moreover, social causation theory accounts for the influence of structural inequalities, which likely have a deleterious effect on children of low socio-economic status. Theories of structural poverty incorporate a discussion of economic disadvantage accounting for aspects of human capital which commonly co-occur with poverty such as education, access to healthcare, and access to nutrition (Lamont, Small, & Harding, 2010). Further, social causation theory accounts for structural conditions which contribute to social inequality, including concentrations of wealth and income, as well as the spatial segregation across classes and groups, which is especially relevant to the current sample. As a result, the current study explored a framework to examine mechanisms and buffers of risk grounded in social causation theory.

**Poverty’s Impact on Child Depression Symptoms**

Children and adolescents living in the context of poverty are more likely to be overwhelmed by stressful life events than youth who are not living in the context of poverty, and as a result, may develop symptoms of depression (McLoyd, 1990; Wadsworth, Raviv, Compas, & Connor-Smith, 2005). One natural experiment of 1420 rural children observed the effects income changes that moved families out of poverty (Costello, Compton, Keeler & Angold, 2003). The sample (aged 9 to 13 years at intake), were given annual psychiatric assessments over the span of eight years. The children were predominantly white, although roughly one quarter of the sample belonged to the Eastern Band Cherokee tribe. Halfway through the study’s data collection, a casino opening on the tribal reservation gave every man, woman and child that belonged to the
Eastern Band of Cherokee tribe an income supplement, paid every six months, that increased annually. This income supplement lifted 14% of study families out of poverty, while 53% remained poor, and 32% were never poor. During the course of this study, children that did not belong to this tribe did not experience a significant change in family income. Researchers found a significant correlation between family income and child externalizing symptoms across all children over the course of data collection. Children of Eastern Band Cherokee never poor and persistently poor families maintained a stable mean total number of psychiatric symptoms, low and high respectively, before and after the casino opened. Conversely, children whose families moved out of poverty showed a significant decrease in the mean number of externalizing symptoms after the casino opened (Costello et al., 2003). While this finding was not replicated with internalizing symptoms, this study demonstrates the clear directionality of the relation between family poverty and some child psychopathology symptoms and underscores the pathogenic effect of poverty on child psychological development.

The effect of family poverty on child depression has been demonstrated over a longer time span while controlling for numerous confounding variables. One birth cohort study found that participants who grew up in lower SES backgrounds had nearly twice the risk for major depression across childhood and adolescence compared to those from the highest SES background, independent of other childhood sociodemographic factors and their current socioeconomic status (Gilman et al, 2003). Additionally, a body of literature on poverty during infancy supports the notion that for youth, poverty during infancy can have a lasting impact on mental health (Garbarino & Stocking, 1980; Spence et al., 2008). In fact, one study found that adolescents who experienced consistent poverty below six years of age had elevated rates of depression on the
CBCL compared with adolescents that had not experienced poverty (Spence et al., 2002). This effect remained significant even when accounting for the effect of maternal psychopathology, suggesting that poverty during early childhood predicts small but significant increases in depression risk during adolescence. It may be prudent to relate these results to the “kindling” theory of depression, which posits that life stress and biological susceptibility make one more sensitized to stress and produces the episodic nature observed in most major depressive disorders (Monroe & Harkness, 2005). The context of chronic poverty during childhood does often coincide with a number of stressful life events, which may act as “kindling” and affect mental outcomes for individual across the lifespan.

Generally, family poverty is thought to impact child depression multi-dimensionally through a number of factors associated with the experience of childhood poverty (Gilman et al, 2003). For example, the context of poverty is often characterized by housing instability, poorer quality schools, exposure to environmental toxins, and violence exposure (Brooks-Gunn & Duncan, 1997). Although no list of these pathogenic variables is exhaustive, the application of ecological systems theory to the study of child development has illuminated how poverty may impact child depression through multiple pathways, including through parental functioning. Bronfenbrenner’s ecological systems theory is a foundational theory of child development, which proposes that development is influenced by a child’s interaction with multiple proximal (e.g. family) and distal (e.g. neighborhood poverty) contexts over time (Bronfenbrenner, 1979; Bronfenbrenner & Morris, 2006). Bronfenbrenner outlined these environments to include the microsystem, immediate environments, roles and relations that the child commonly interacts with (home, classroom), the mesosystem, which represents connections across contexts (e.g. family and
school), the exosystem, contexts where the child is not an active participant but that affect the child nonetheless (e.g., parent workplace schedules, gang territories), and the macrosystem, or the larger socio-cultural context (e.g., national government, cultural values) (Bronfenbrenner, 1979; Onwuegbuzie, Collins, & Frels, 2013). This model was expanded to posit that the development of a child is related to both the presence of pathogenic (harmful) and salutogenic (health-promoting) influences across multiple surroundings, influencing risk and opportunity (Garbarino, 2001). More recently, literature has referred to salutogenic influences as developmental assets, which have been defined as internal and external resources that help youth develop into healthy and successful adults in contexts of adversity (Shtasel-Gottlieb et al., 2015). Bronfenbrenner’s ecological systems theory is particularly relevant to the current investigation of family poverty’s effects on child depression given the multi-dimensional manner in which poverty impacts child development across systems and contexts.

**Poverty’s Effect on Maternal Depression**

Family poverty puts mothers at an increased risk for the development of depression, even when accounting for the influence of neighborhood poverty (Klebanov, Brooks-Gunn, & Duncan, 1994; Miech, Caspi, Moffitt, Wright, & Silva, 1999). Recent incidence studies have found that roughly one in ten women of childbearing age in the United States experiences clinical depression in a given year (Farr et al., 2010). Population-based studies suggest that low-income Latinx women are at a further heightened risk for the development of major depression (Chaudron et al., 2005). This may be because mothers living in the context of poverty report high degrees of social isolation, a paucity of available neighborhood resources, and exposure to chronic and unpredictable stressors, all of which place them at elevated risk for the development
of depression (Beeber et al., 2008; Deng et al., 2006; Goyal, Gay & Lee, 2010; Santiago, Wadsworth & Stump, 2011). In other words, social isolation creates segregation from the social structures and networks which provide the mothers with structure, feedback, material and emotional support, as well as coping resources to effectively buffer the negative effects of stress (Garbarino & Stocking, 1980; Gracia & Musitu, 2003). Social isolation is likely one of many mechanisms that operate to increase depression risk for mothers living in the context of poverty.

Another relevant contemporary study examined trends between family poverty and maternal depression between 2005-2015 using data from the National Survey on Drug Use and Health (Oh, Salas-Wright, & Vaughn, 2018). Importantly, over the course of this decade, policy changes resulted in a number of Medicaid and commercial coverage expansions through the Affordable Care Act (ACA), which granted some low-income families greater access to treatment. However, these benefits were unevenly distributed among families, and families reporting a family household income under the federal poverty line (FPL) remained more likely to be underinsured than those with higher household income (Oh et al., 2018). This study compared mothers who were classified as in poverty (reported a household income of less than 100% of the FPL) and mothers who were classified as near-poverty (reported a household income between 100-200% of the FPL). While this study found that Major Depressive Episodes (MDEs) overall decreased for near-poverty mothers over the course of the decade, mothers living in poverty did not experience a significant reduction in major depressive episodes. Further, mothers in poverty experienced disproportionately high levels of depression when compared to their counterparts (Oh et al., 2018). This study further supports a body of evidence that demonstrates that low-income mothers face heightened risk for the development of depression when compared to mothers in
higher income brackets (Chaudron et al., 2005; Farr et al., 2010). Additionally, this contribution to the literature expands on a large body of literature that broadly demonstrates the association between chronic poverty and maternal depression in diverse contexts (Beeber & Miles, 2003; Goyal et al., 2010; Rich-Edwards et al., 2006; Goyal et al., 2010; Hobfoll, Ritter, Lavin, Hulsizer, & Cameron, 1995), and highlights the nuances of risk associated for mothers living in poverty as opposed to having a household income considered near-poverty. Researchers have continued to underscore the need for testing models of risk for the development of depression in children of depressed mothers within the context of poverty in order to better understand the mechanisms of risk and resilience for these youth (Goodman et al., 2011).

**Latinx Maternal Depression in the Context of Poverty.** For Latinx immigrant families, the effects of maternal depression on child development in the context of chronic poverty is even less understood. One study which utilized data from the Mexican American Prevalence and Services Survey demonstrated that adult Latinx children of depressed mothers were at significantly higher risk for the development of substance use disorders, even when compared with adult children of mothers who themselves dealt with substance use problems (Vega & Sribney, 2011). However, the associations found in this study held only for the U.S.-born children; no association between maternal depression and substance use was found among immigrant adult children (Vega & Sribney, 2011), a finding that has been used to support the theory of the immigrant paradox, wherein foreign-born children and adults fare better in risky contexts when compared to US-born counterparts (Marks, Ejesi, & García Coll, 2014). The immigrant paradox suggests that immigrant individuals tend to be healthier than their US-born counterparts in addition to peers
country of origin, despite facing significant stress (Marks et al., 2014). These positive developmental outcomes seem to dissipate as youth acculturate. It stands to reason that perhaps a similar effect is seen with immigrant mothers, where mother may be less susceptible to depressive symptoms that U.S.-born counterparts, despite high levels of stress. It remains unclear whether, as a result, maternal depression in immigrant families may be less prevalent.

Conversely, there are a number of immigration-related factors that may place Mexican-born mothers at increased risk for the development of depressive symptoms, including the burden of acculturative stress, discrimination and separation from loved ones. Additionally, cultural norms and values regarding the family may affect the development of depression in mothers as well as the impact of maternal depression on children. *Familismo*, a Latinx value that emphasizes loyalty to and centrality of the family, highlights the role of one’s family as a source of emotional support (Calzada, Tamis-LeMonda, & Yoshikawa, 2013). This construct has been studied in the context of help-seeking behaviors among Latinx women with depression and has been linked to ambivalence in seeking treatment (Caplan & Whittlemore, 2013). The construct of *familismo* may influence maternal depression in a number of ways. While *familismo* has been linked to positive outcomes for families living in poverty, its effect on the intensity of family bonds may actually increase the negative psychological impact of familial conflict when it occurs (as cited in Calzada et al., 2013). *Familismo* could be particularly detrimental for mothers who suffer from depression and perceive that they are struggling to fulfill the role of an emotionally supportive family member, as misalignment with this cultural value could potentially exacerbate feelings of low self-esteem, ineffectiveness and inadequacy, thus increasing risk for depression symptomatology.
Maternal Depression as a Mediator of Family Income on Child Depression. Increased risk for mood disorders in children of depressed parents is a phenomenon that has been repeatedly demonstrated in a variety of social contexts (Goodman et al., 2011; Barker et al., 2012). This finding extends to the development of other internalizing and externalizing disorders in children, as well (Rutter & Silberg, 2002). Transmission of risk for the development of mood disorders in offspring of depressed parents is thought to operate, in part, genetically; one study investigating this influence found that up to 37% of children born to depressed parents will develop depression, regardless of the environment in which they grow up (Sullivan et al., 2000). However, for children who remain in the same environment as their parents, transmission of depression risk correspondingly operates through the shared environment.

Stressful life contexts that place mothers at risk of developing depression are thought to have similar negative effects on children (Goodman & Gotlib, 1999). Although studies have found that the context of poverty itself does result in children reporting subjective poverty-related stress (e.g., Wadsworth et al., 2008), many other studies have demonstrated that poverty’s deleterious effects on children are filtered through poverty’s effect on the family (Conger et al., 2010; Santiago et al., 2018). One theoretical explanation of this finding is the family stress model, which posits that the hardships and stressors that parents living in poverty experience (i.e. difficulty paying bills, unmet needs, and having to cut back on necessary expenses), tax parents psychological well-being, and consequently cause emotional distress and behavioral disturbances in parents (Conger et al., 2002; Conger et al., 2010). In fact, an extensive body of research demonstrates that parental psychological well-being has lasting repercussions for children because it is closely related to parenting behaviors (Noah & Landale, 2018; White, Roosa, Weaver,
Nair, & Murry, 2009). Consequently, children are affected by the context of poverty through poverty’s effects on parent functioning, as highlighted by ecological systems theory. Maternal depression in particular may be a powerful risk factor for the development of youth as chronic exposure to depressive affect, cognitions, and attributions may impact a child’s worldview (Garber & Martin, 2002). Further, depression disrupts parenting resources, limiting responsiveness and stimulation for children (Burt et al., 2005).

A growing body of literature has identified maternal depression as a mediator of chronic poverty’s effects on children’s adjustment (Beeber & Miles, 2003; Mistry et al., 2004; Petterson & Albers, 2001). The current study will test this mediation pathway in a sample of preadolescent, low-income, Mexican origin children and their families. This is an important contribution, as the relation between maternal depression and child mood disorders, while present at all stages of childhood, may be quite pronounced in school-aged children. The association between psychopathology in children and maternal depression has been found to be negatively correlated with age, so that effect sizes for maternal depression and child psychopathology are highest in studies with younger children (Goodman et al., 2011; Connell & Goodman, 2002). This finding has led researchers to theorize that children who are first exposed to a mother’s depression at a younger age may be more vulnerable to depression than children who are first exposed at an older age, thus indicating a period of sensitivity during elementary age and preadolescence to maternal depression (Goodman et al., 2011). A natural extension of this literature would be to highlight protective factors that may buffer the negative effects of chronic poverty on maternal depression, as well as the deleterious effects of maternal depression on child outcomes during this potentially sensitive period of pre-adolescence.
Community Assets as a Buffer for Mothers & Children

Until recently, the majority of the work on developmental assets has focused on individual (e.g. grit, executive functioning), family (e.g. positive family communication) and peer influences. However, there has been a growing trend toward recognition of the value of supportive school, neighborhood and community contexts (Youngblade et al., 2007; Schwartz, Chan, Rhodes & Scales, 2013). According to Bronfenbrenner’s ecological systems theory, as development assets may be present in multiple proximal (e.g. family) and distal (e.g. neighborhood poverty) contexts over time (Bronfenbrenner & Morris, 2006). By identifying health-promoting community assets, researchers may identify and bolster support for youth across family, school, and broader sociocultural contexts that children inhabit (Garcia-Coll et al., 1996; Smith, Witherspoon & Wayne, 2017). Identification of community assets that serve to buffer the effects of family poverty and maternal depression on child outcomes may inform evidence-based interventions. Using ecological systems theory as a guiding framework, the current study examined whether a number of community assets identified by the current developmental assets literature buffer the impact of family poverty and maternal depression on a sample of Mexican immigrant children.

Given that children are embedded within family and cultural contexts, it is important to understand how children interact with these contexts to promote positive outcomes despite adversity associated with family poverty (Gonzales et al., 2012). While stressful life contexts place children and parents at risk for the development of psychological sequelae, researchers have identified a number of constructs thought to buffer the relation between risk and psychopathol-
ogy. In their review of the literature on neighborhood resiliency constructs, Sampson and colleagues (2002) outlined four principal categories of neighborhood-level developmental assets that are thought to buffer the relation between risk and negative outcomes. Among these developmental assets, authors highlighted the influence of *institutional resources*, defined as the quality, quantity, and diversity of organizations that provide services to members of the community (Sampson et al., 2002). Other categories of assets included social ties and connections, norms and collections, and routine activities (Sampson et al., 2002). In an update to this review, Mowbray and colleagues (2007) proposed that these Sampson’s four developmental assets better fit into three developmental asset domains. Authors categorized the first of these domains as *social capital resources*, such as the frequency and nature of social interactions between neighbors. Second was the *number, nature, mission of, and access to organizations and agencies* that serve community members, such as schools, community mental health centers, and faith-based social service agencies (Mowbray et al., 2007). Lastly, authors outlined *economic resources* including unemployment rates, family income and assets, and housing availability as a construct that predicts community resiliency. The availability and quantity of institutional resources such as faith-based communities, community mental health centers, and schools appear across reviews of developmental assets, underscoring the theoretical importance of examining density when studying the effects of neighborhood-level developmental assets.

The continued identification of institutional resources and community organizations has led to initiatives to increase youth developmental assets with an emphasis on community infrastructure development (Benson, Scales, & Mannes, 2003; Nakkula, Foster, Mannes, & Bolstrom, 2010). Although the current positive youth development literature has led to initiatives to enrich
communities through institutions, gaps in the literature on community assets continue to exist. In fact, sparse literature exists to date on the effect of institutional resources on pre-adolescent and first-generation immigrant youth, as the majority of literature focuses on adolescent, non-immigrant youth. It is important that research begin to fill the gap in understanding of the effect of neighborhood context on pre-adolescent youth in order to bolster prevention and early intervention efforts (Aneshensel & Sucoff, 1996).

For parents living in the context of poverty, often times the burden of a lack of economic resources leads to social isolation (Cutrona, Wallace, & Wesner, 2006; Klebanov et al. 1994). This, combined with a lack of resources within the community, deprives parents of neighbor and community support that is often beneficial to parenting and promotes stress reduction for parents (Beeber et al., 2008; Delany-Brumsey, Mays & Cochran, 2014; Deng et al, 2006). Informal networks of social support that may develop through engagement with community level developmental assets is particularly relevant to the current study of depression risk in low income mothers and children, as previous literature has identified social isolation as a significant predictor of child neglect for mothers living in the context of chronic poverty (Gaudin Polansky, Kilpatrick, & Shilton, 1993). The current study aims to assess whether the density of community-level developmental assets may buffer the negative consequences of the context of poverty for both mothers and children, in part by providing informal social networks.

**Role of Mental Health Agencies as a Community Asset.** Mental health agencies are sites that provide psychological intervention services to children and adults (Donaldson, 2005). These may include behavioral health services embedded within hospital settings as well as outpatient counseling clinics. A recent survey of a nationally representative sample of adolescents
(ages 13–17) found that only 39% of adolescents with depressive disorders received mental health care at any point in their lives (Merikangas et al., 2011). This is important for families living in the context of urban poverty, as local, accessible and affordable community mental health agencies may be scattered or nonexistent (Donaldson, 2005), and moreover, individuals who require access to Spanish-language services may be further disadvantaged in terms of locating appropriate services providers (Wagstaff & Polo, 2012). Additionally, previous literature has demonstrated the relevance of both “preventative” mental health interventions (family-centered programming) as well as “treatment” programs such as mental health and rehabilitation services for reducing risk for low-income youth and families (Garbarino & Sherman, 1980). Scarcity of mental health agencies within a community likely has direct effects on the psychological well-being of residents, particularly for individuals experiencing poverty-related stress and further barriers to accessing care.

Access to mental healthcare has been shown to benefit children experiencing mental health symptoms (Birmaher & Brent, 2007). However, many children have limited access to available services, particularly low-income minority youth. One study investigating the effects of ethnicity and health insurance status on mental health service utilization found that for children identified as “in need” of an evaluation, Latinx youth received services at the lowest rate of all children (Kataoka, Zhang, & Wells, 2002). Recent literature indicates that low-income Latinx youth face often a multitude of barriers to access mental healthcare, but research has yet to identify whether the physical presence of mental health agencies in a given neighborhood buffers the effects of poverty on child depression symptoms for these youth. A recent systematic review of school-based mental health intervention access highlighted the effect of service availability on
youth depressive symptoms (Larson, Chapman, Spetz & Brindis, 2017). For youth in this study, the availability of mental-health services embedded within schools was linked to reductions in symptomatology for youth (Larson et al., 2017). It is likely that this connection between availability of school-based services and better mental health outcomes in youth is generalizable to the presence of mental health centers within the community.

Similar to the evidence on positive effects of local mental health services on youth, access to mental healthcare has been shown to benefit adults experiencing mental health symptoms (Birmaher & Brent, 2007). In fact, previous studies examining the underutilization of mental health services for adults have identified a number of barriers that contribute to the low rates in which low-income individuals of color access care. These include a lack of accessible information regarding available services, inaccessible locations, unresponsive service providers, and the reliance on alternative methods of help (Gondek et al., 2016; McKay, Stoewe, McCadam & Gonzalez, 1998). Access to staff at mental health agencies may allow mothers to access case management services that help them overcome critical service barriers including transportation and issues with healthcare literacy in order to access available services. Relevant studies on the identification and treatment of post-partum depression have highlighted that pediatricians that report working in environments with a paucity of locations that provide local mental health services to mothers use fewer methods to identify and address maternal depression (Horwitz et al., 2007). It is possible that environments with a high density of locations that provide mental health services may equip primary care physicians with the knowledge and resources to identify and refer mothers who are struggling with depression to appropriate service providers.
likely that access to such local, community-based agencies will allow these mothers to overcome barriers and access treatment once the depression has been identified.

**Role of Churches as a Community Asset.** Religiosity has functioned as a developmental asset in the extant literature in two principal ways. First, personal spirituality, or a sense of “a larger purpose” has been conceptualized as an internal developmental asset for youth (Eccles & Gootman, 2002). Further, the faith-based communities that often accompany religious institutions often provide a community network that may positively influence health and psychological wellbeing (Cardoso & Thompson, 2010; Thompson & Gurney, 2003). These communities are a major source of social support and permanency for immigrant youth and adults (Cardoso & Thompson, 2010; Hull, Kilbourne, Reece & Husaini, 2008).

Broadly, connection to religious institutions has previously been found to foster resilience in children and adolescents (Hull et al., 2008). For Latinx youth in particular, churches are thought to play an important role in the developmental infrastructure of communities, as they provide youth access to naturally occurring intergenerational mentorship relationships and opportunities for community service (Wagener, Furrow, King, Leffert, & Benson, 2003). Qualitative research suggests that for many Latinx immigrant families, involvement in church-based youth programs are a higher priority than participation in secular programming (Rodríguez, Larsen, Látková, & Mertel, 2012). This means that many Latinx immigrant parents prefer to enroll youth in church-based programming when available, and the accessibility of these programs could stand to influence youth’s enrollment in community programming. Religious participation has previously been found to positively correlate with internal developmental assets for Latinx immigrant youth (Furrow & Wagener, 2000), while the social networks and youth programming
associated with church communities have yet to be tested as a community-based development asset for these youth. Previous literature suggests that involvement in religious practices that are strongly tied to cultural traditions, which have previously been identified as a protective factor for Latinx youth whose parents engage in substance abuse (Castro et al., 2007). The role of churches, church programming, and associated social networks may serve as a culturally congruent community-based development asset for Latinx youth. Further, access to such natural mentorship relationships may serve to buffer the impact of maternal depression by exposing youth to reliable adults that may model coping and provide social support outside of the immediate family (Dunn & O’Brien, 2009).

The environment of a church community may be particularly beneficial to Latinx immigrant parents, who often face a number of challenges associated with the process of acculturation. Up to 70% of Latinx immigrants identify as Roman Catholic, and the church provides immigrants with an experience of continuity, as religious traditions foster a sense of familiarity and connection during the process of resettling (Cardoso & Thompson, 2010; Hull et al., 2008). Although overall religiosity has been linked to positive mental health outcomes for Latinx (Perl, Greely, & Gray, 2006), the extended networks provided by church communities in particular are thought to play an important role for resiliency in Latinx immigrant families (Hull et al., 2008). Immigrant parents often struggle with a variety of daily challenges, such as navigating language barriers, new social systems, cultural differences, and acculturation gaps within the family (Cardoso & Thompson, 2010; Perreira, Chapman, & Stein, 2006). Extended social networks provided by the church community are thought to connect recent immigrants with resources while providing a sense of belonging and tradition (Perreira et al., 2006). Previous literature has suggested
that neighborhoods with high densities of recent immigrants may have services that are accessible via these church-based communities, include adult education and English language classes (Cardoso & Thompson, 2010). While some literature has suggested that social workers and other social service providers should foster connections to church-based community supports (Cardoso & Thompson, 2010), there remains a paucity of investigations into the effects of churches in the community as a protective factor for parent health outcome in Latinx immigrant mothers.

**Role of After School Programming as a Community Asset.** Formal after school programs have been defined as activities that are supervised and monitored by adults, occurring outside of the school day but operating during at least part of the school year (Durlak & Weissberg, 2007). For children who are at risk for psychological sequelae due to family poverty or parent psychopathology, after school programming may serve as a buffer for negative outcomes through opportunities to connect with positive adults and peers (Durlak, Weissberg, & Pachan, 2010). Other childcare contexts outside of school include parental care, care by other relatives, neighborhood-care (also known as non-relative care), and center-based programming (Park & Zhan, 2017). Researchers have previously found that low-income children who attend formal after school programming access more learning opportunities than children who participated in other forms of day-care (Posner & Vandell, 1994). These children tend to spend less time watching television and engaging in unstructured time in the neighborhood than children in other settings, and children in after school programs had richer social experiences including more time in structured activities with adults (Posner & Vandell, 1994; Park & Zhan, 2017). It is possible that because after school programming allows youth to spend extended periods of time with adults, it acts as a fertile ground for the formation of natural mentoring relationships with adults outside
the immediate family (Hirsch et al., 2011; Schwartz, Chan, Rhodes & Scales, 2013). The after-school environment provides children with a unique opportunity to engage in informal conversations and enjoyable activities with adults, in a context with fewer academic demands than school (Rhodes & DuBois, 2008). These interactions between youth and after school staff can give rise to close bonds, and such opportunities to consistently connect with adults can result in social skill development (Eccles & Templeton, 2002).

Children and adolescents whose mothers struggle with depression may especially benefit from the after-school environment. One study found that for such youth, average hours per week spent in childcare provided by another adult buffered the relation between maternal depression and child internalizing symptoms (Lee, Halpern, Hertz-Picciotto, Martin, & Suchindran, 2006). Importantly, this study investigated any non-maternal adult childcare, not formal after school programming, and extant literature has yet to explore the role of formal after school programming on the development of depression in youth living in the context of poverty. It is likely that the Lee et al., (2006) finding may extend to youth in after school programs, as it is possible that childcare buffers the relation between maternal and child depression through routine, positive engagement with adults outside of the family may buffer the relation between maternal and child depression (Rhodes & DuBois, 2008). Currently, there is a paucity of research regarding the effects of after school programming on children’s internalizing symptomatology. Studies regarding the effects of after school programming on externalizing behavior suggest that after school programming may promote negative behavioral outcomes. These authors found that, in their sample, children in parental care were less likely to have behavioral problems than children in after school programming (Park & Zhan, 2017). This finding was unexpected, as many other studies
have demonstrated that high quality after school programs bolster children’s cognitive and behavioral development (Brecher et al., 2009; Reisner et al., 2001). Positive experiences after school have been previously found to predict socio-emotional skill development in youth (Wade, 2015). Although the literature is mixed on the effects of after school programming on externalizing behavior, it is possible that for low-income families, the presence of after school programming buffers the effect of maternal depression on youth internalizing symptoms.

As previously stated, involvement in non-parental child care has been theorized to buffer the effects of maternal depression on children by increasing exposure to a range of positive social interactions (Herba et al., 2013). Likewise, the availability of after school programming may buffer the relation between family poverty and depression in mothers by providing mothers temporary respite from the demands of supervising and structuring activities for their children (Lee et al., 2006). After school programming may provide needed assistance to mothers in the workforce for whom balancing childcare and work responsibilities is a source of stress (Lee et al., 2006). Currently, there is a large gap in the literature on the positive effects of after school programming on mothers, but it is likely that distress regarding childcare arrangements may negatively impact low-income immigrant mothers. In fact, one relevant exploratory qualitative study conducted with African immigrant women found that the emergence of depression was associated with concerns regarding management of childcare and parenting responsibilities (Sellers, Ward, & Pate, 2006). The authors of this study highlighted that for many participants, immigration resulted in the loss of extended family structures such as aunts, sisters, grandparents and cousins that had previously routinely assisted with caregiving responsibilities (Sellers et al., 2006). Participants reported increases in depressive symptoms in response to the loss of such
supportive extended family networks. While this study utilized subjective reports, it remains valuable in terms of understanding how after school programming may buffer the effects of family poverty on depression for immigrant mothers. It is possible that the after school environment may be particularly beneficial for low income Latinx mothers struggling with depression, as previous studies examining the role of social support and social emotional development in children have found that, for Latinx mothers of elementary-aged students, the school community offers unique access to a naturally occurring network of parents (Serrano-Villar, Huang, & Calzada, 2017). It is possible that after school programming functions in a similar way to offer a social network of parents and other supportive adults and may serve as a surrogate for the extended family networks that existed for immigrant parents in their countries of origin. Given that the ecological model posits that networks of social support are interactive and transactional, the integration of a child into a supportive after school program, could benefit the family in ways beyond the social support that may be extended to recent immigrant parents (Garbarino, 1977).

**School Climate as a Buffer for Child Depression.** School climate refers to patterns of experiences of students, parents and school personnel (National School Climate Council, 2007). School climate reflects the organization’s values, norms, organizational structures, learning practices and goals. Positive school climate is characterized by a climate that fosters youth development and supports youth in engagement with families and educators to achieve learning goals. Research demonstrates that positive school climate has been found to predict positive self-esteem, mitigate undesirable outcomes of self-criticism, and support emotional and psychological wellbeing for children (Thapa, Cohen, Guffey & Higgins-D’Alessandro, 2013; Shocet et al., 2006). Positive school climate’s beneficial impact on child outcomes differs depending on the
context, and has been previously found to mitigate the negative impact of the socioeconomic context on academic success (Astor, Benbenisty, & Estrada, 2009). Previous literature has demonstrated that positive school climate serves as a protective factor to buffer against the impact of poverty on child development and fosters positive youth development within as well as beyond the school context (Ortega, Sanchez & Viejo, 2011).

Broad domains of positive school climate have found to predict favorable outcomes for diverse youth over time, including prioritizing safety, relationships building, and maintenance of a quality institutional environment (Thapa et al., 2013). In particular, safe, participatory and responsive school environments are thought to best support students’ social emotional development (Thapa et al., 2013). Although these general measures of positive school climate have been found to foster resiliency in youth, few studies have examined the facets of positive school climate most beneficial for the mental health of first-generation Mexican American youth. One particular longitudinal study that examined factors that relate to academic competence from elementary to middle school Mexican-origin fifth grade students (50% boys; $M_{age} = 10.86$ years) found that school belonging (i.e., social and emotional connectedness to school) predicted greater academic competence over time (Hernández, Robins, Widaman & Conger, 2016). Although the outcome of this study was not symptoms but academic competency, the findings underscore that school belonging may be particularly relevant for the children of low-income Mexican immigrant families. Thus, positive school climate should be investigated as a potential buffer for the negative effects of maternal depression on child depression within the context of family poverty.

Another study that illuminates the potential role of school climate as a buffer for the impact of maternal depression in this sample investigated differences across youth’s perceptions of
positive school climate. This study found that found that Latinx youth varied in their responses when compared to White and Asian American youth (Schneider & Duran, 2010). Specifically, the authors found that for Latinx students only, personal relationships with teachers were viewed as more important than teachers’ ability to model positive behaviors, suggesting that relationship building may be a more important domain of school climate for these youth (Schneider & Duran, 2010). This indicates that for Latinx students, developing positive relationships with teachers is more subjectively valuable than how those teachers engage in modeling behaviors, and perhaps this suggests that Latinx youth depend on the relational aspects of positive school climate. By contextualizing these findings within other literature that indicates that time spent building relationships with adults may be outside the family may benefit youth whose mothers experience depression (Schwartz et al., 2013; Eccles & Templeton, 2002), it is possible that high quality relationships between teachers and youth (positive school climate) may be a particularly relevant developmental asset for Latinx children whose mothers experience maternal depression on depression outcomes for these youth.

**Utility of Geographical Information Systems Mapping Methodology**

In order to test whether the existence of community assets buffer the effects of poverty and maternal depression for families, scholars have called upon mixed-methods approaches to explore new models to reflect the way children interact across multiple settings (e.g., home, school and community; Bronfenbrenner & Morris, 2006; Wilson, 2016). Geographical information systems (GIS) is a form of technology that allows researchers to aggregate, analyze, map, and present data on spatial relationships (Wilson, 2016). While disciplines including environmental science, sociology, archaeology, public health, and business have espoused GIS mapping
as a vital research instrument, it has been less readily adopted in the fields of clinical psychology and social work (Hillier, 2007). Authors have commented on the potential for integration of this methodology into social science research, as GIS technology naturally lends itself to studies that test ecological systems theory, as it allows for streamlined and objective analyses of how neighborhood context affects individual outcomes (Hillier, 2007). Further, GIS allows for clear documentation of disparity by providing informative and commanding visual displays of data, which may demonstrate patterns more difficult to convey in a conventional data table (Hillier, 2007).

Public health research has enthusiastically utilized geographical information systems technology to investigate patterns of health care use in order to better support communities with historically restricted access to care (McLafferty, 2003). GIS allows researchers to identify availability of providers in an area and use the technology to identify patterns of use and availability of appropriate care and has illuminated numerous associations between health and spatial layout (McLafferty, 2003). The results from analyzing these asset maps may provide policy makers with useful substantiation for future planning and expansion of programs in underserved areas of Chicago and constitutes a critical step to informing efficient social service delivery.

**Model Relevance for Latinx Immigrant Families**

Although the proposed model is relevant to families living in poverty across races and ethnicities, it is appropriate to test this model with Latinx families due to the increased risk these families have for poverty and depression. Latinx youth in the United States are particularly vulnerable to the impacts of poverty, as they are three times more likely than their Caucasian counterparts to live in poverty (National Center for Children in Poverty, 2002). Recent statistics have revealed that 64 percent of Hispanic children in the United States between the ages of six and
eleven live in low-income families, defined by a family income of less than 200 percent of the poverty threshold as determined by the U.S. Census Bureau (Jiang, Ekono, & Skinner, 2015). For Latinx immigrant mothers and children, high degrees of poverty pose a threat to positive mental health outcomes.

The deleterious effects of poverty may be more pronounced for Mexican immigrant mothers, as this demographic face an accumulation of stressors that put them at risk for poor mental health outcomes, including acculturation and migration stress (Heilemann, Coffey-Love, & Frutos, 2004). For instance, recent immigration policies have created a discriminatory and hostile climate for many Latinx immigrants, which may impact the mental health of these individuals, regardless of documentation status (Torres, Santiago, Walts & Richards, 2018). Further, the experiences of racial discrimination and traumatic migration experiences have been found to exacerbate the effects of poverty on maternal depression (Becares, Nazroo & Kelly, 2015; White, Roosa, Weaver, & Nair, 2009). Likewise, there may be relevant differences in the help-seeking behaviors in which Latinx immigrant mothers engage, as White women with clinical depression are significantly more likely to use mental health services than their Latinx counterparts, (Goodman et al., 1997). Further, Latinx immigrant mothers report high degrees of social isolation, which may further place them at risk for the development of psychopathology. Testing this model with a sample of Latinx mothers may illuminate community level assets that allow Latinx immigrant parents to thrive within an otherwise pathogenic context.

In addition to risks for mothers in the context of poverty, overrepresentation of Latinx youth living in poverty represents an increased depression risk for these youth, and in fact, Latinx youth experience depression at elevated rates. Generally, Latinx adolescents are known to
exhibit higher rates of suicidal thoughts, depression, and anxiety symptoms and greater rates of high school dropout than white adolescents (Kataoka, Zhang, & Wells, 2002; McLaughlin, Hilt, & Nolen-Hoeksema, 2007; Merikangas et al., 2010). Further, Latinx adolescents have been found to have the highest rates of suicide ideation (26 %) and attempts (15.6 %) when compared to their U.S. peers in 2013 (Kann et al., 2013). Interestingly, risk for depression in these youth seems to be connected to country of origin, Latinx adolescents born in the United States have been found to have higher rates of suicidal ideation and suicide attempts when compared with adolescent Latinx immigrants (Borges, Orozco, Rafful, Miller & Breslau, 2012). Because of this increased risk, it is important to investigate community assets that may buffer this risk for Latinx youth.

Finally, it is important to highlight the relevance this methodology has to work with refugee and immigrant populations. A recent study undertaken in London used GIS mapping of mental health centers to identify utilization of services. This study found that many groups were excluded from accessing mental health services, including minorities and groups with special needs (Foley & Platzer, 2007). Researchers have identified a gap in studies that utilize GIS to assess service availability for vulnerable immigrant and refugee populations in the United States (McLafferty, 2003). Currently there are a dearth of studies examining the spatial availability of community mental health centers that cater to the needs of Mexican immigrant parents and children, and this study would help to close that gap.
Limitations of Previous Research

The literature on ecological systems theory is generally quite vast and includes a number of relevant contributions. Still, this literature is not without limitations. One limitation of previous research is that the vast majority of studies that have used GIS methodology to examine health-promoting variables for youth have done so without taking into account parent functioning. Understanding how families as a whole benefit from community assets represents an area of research that requires increased attention, as youth exist within the family context. Another limitation of previous literature is that limited attention has been placed on adult outcomes when investigating the role of community assets like after school programming, as the majority of these studies focus solely on youth outcomes. The current study would contribute to this literature by examining the effects of community asset density on adult caregivers.

Moreover, the current research on developmental assets focuses to a large degree on personal internal assets, such as self-efficacy. While these internal assets are important to consider, it is important to identify developmental assets at the community level in order to benefit individuals who may experience deficits in those domains on an internal level. Current research on geospatial community variable density in social sciences has largely focused on proposed pathogenic density variables, such as density of alcohol establishments and violent crime within a defined radius (Masi, Hawkley, Piotrowski & Pickett, 2007; Toomey et al., 2013). The current would expand on this body of literature by exploring how ecological salutogenic variables may influence child development and serve to buffer the deleterious effects of poverty on mothers and youth.
Implications of the Current Study

Although the direct links between family poverty and child mental health have been established, the interplay among variables such as community asset density, school climate, and maternal depression, have been studied to a lesser extent. There are currently gaps in the research regarding exactly how maternal depression may affect family resilience factors in the context of poverty, as well as the influence of community asset density on children’s ability to cope with stressors. The study examined how all of these factors interact for Mexican immigrant families living in the context of urban poverty. Further, this research investigated how the density and availability of community assets can buffer the deleterious effects of family poverty on mothers. Although use and utilization of such services is not within the scope of this project, this research strives to inform policy on publicly available community assets as critical resources for buffering the impact of depression in children and families.

Specific Aims & Hypotheses

Specific Aim 1

To assess whether maternal depression mediates the relation between family poverty and depression symptoms in children. (Fig. 1)

Hypothesis 1a. High levels of family poverty (assessed using an income-to-needs ratio) will result in high maternal depression, which will result in high levels of self-reported depression symptoms in children.

Specific Aim 2

To examine whether Catholic Churches moderate the relation between family poverty, depression symptoms in Mexican-origin mothers, and depression symptoms in children. (Fig. 1)
**Hypothesis 2a.** The proximity of high numbers of Catholic Churches will buffer the relation between family poverty (assessed using an income-to-needs ratio) and self-reported depression symptoms in Mexican-origin mothers.

**Hypothesis 2b.** The proximity of high numbers of Catholic Churches will buffer the relation between self-reported depression symptoms in Mexican-origin mothers and self-reported depression symptoms in children.

**Specific Aim 3**

To examine whether mental health centers moderate the relation between family poverty, depression symptoms in Mexican-origin mothers, and depression symptoms in children. (Fig. 1)

**Hypothesis 3a.** The proximity of high numbers of mental health centers will buffer the relation between family poverty (assessed using an income-to-needs ratio) and self-reported depression symptoms in Mexican-origin mothers.

**Hypothesis 3b.** The proximity of high numbers of mental health centers will buffer the relation between self-reported depression symptoms in Mexican-origin mothers and self-reported depression symptoms in children.

**Specific Aim 4**

To examine whether after school programs moderate the relation between family poverty, depression symptoms in Mexican-origin mothers, and depression symptoms in children. (Fig. 1)

**Hypothesis 4a.** The proximity of high numbers of after school programs will buffer the relation between family poverty (assessed using an income-to-needs ratio) and self-reported depression symptoms in Mexican-origin mothers.
Hypothesis 4b. The proximity of high numbers of after school programs will buffer the relation between self-reported depression symptoms in Mexican-origin mothers and self-reported depression symptoms in children.

Specific Aim 5

To examine whether positive school climate moderates the relation between maternal depression and depression symptoms in first-generation Mexican-origin children. (Fig. 1)

Hypothesis 5a. High rates of positive school climate will buffer the relation between maternal depression and self-reported depression symptoms in children.

Specific Aim 6

To test a moderated mediation model that examines whether community assets moderate the mediating relation between family poverty, maternal depression and child depression symptoms in first-generation Mexican-origin children. (Fig. 1)

Hypothesis 6a. High rates of community assets will moderate the mediating relation between family poverty, maternal depression and child depression symptoms in first-generation Mexican-origin children.
CHAPTER THREE

RESEARCH METHODS

Design Overview

This study consisted of secondary data analyses using data from a previous study entitled: “Protective Processes among Immigrant Families: The Impact of Family Coping on Mexican-Origin Children” led by Dr. Catherine DeCarlo Santiago (the project sponsor). This study utilized questionnaire data in order to assess demographic information, family poverty and child and parent depression at three time-points spaced six months apart. Aims one through six were addressed by using questionnaire measures (to assess depression symptoms in children, family income and household size, and maternal depression) as well as geocoded neighborhood-level assets, and publicly available, geocoded data on school climate.

Participants and Recruitment

Data for the current study were originally collected for a longitudinal study conducted with 104 families with the following criteria: 1) at least one child between the ages of six and ten years; 2) at least one Mexican-origin immigrant parent; and 3) family income at or below 150% of the federal poverty line. Families were recruited from community agencies, local schools, and churches in the Chicagoland area. Families were encouraged to engage two caregivers and identify the caregiver that spent most time with the child as the “primary caregiver”. At Time 1, 104 children and primary caregivers participated, and 72 secondary caregivers participated. At Time
2, 99 children and primary caregivers participated and 67 secondary caregivers participated. Finally, at Time 3, 97 children and primary caregivers and 61 secondary caregivers participated. 97.9% of primary caregivers were mothers, 1.1% (1 participant) was a father, and 1.1% (1 participant) was an uncle. Due to the stated aims, this study only included the 102 families that identified the child’s mother as the primary caregiver. As inclusion criteria stated, all families included at least one Mexican-origin immigrant parent, and within the sample all primary caregivers (100%) and most secondary caregivers (97%) identified as Latinx. Of these families, the vast majority (91.2%) of mothers reported immigrating from Mexico; other countries of origin included Guatemala, (1%), Uruguay (1%), and 6.9% of caregivers were born in the United States. Caregivers additionally provided demographics on the child participating in the study. At Time 1, 60.6% of children were female with an average age of 8.39 years. The vast majority of children in this sample (96.2%) were born in the U.S. while three (2.9%) immigrated from Mexico. 96.2% of children identified as Latinx/Hispanic, 1.9% as African American and Latinx, and 1.0% as Caucasian and Latinx. Of note, child country of origin and race/ethnicity data were missing for one participant.

With regard to marital status, the majority of the primary caregivers were married (61.1%), followed by separated (13.7%), single (11.6%), cohabitating (8.4%), divorced (3.2%), and in a relationship (1.1%). 66.7% of secondary caregivers were married, 22.2% were single, and 11.1% in a relationship. Regarding the primary caregiver’s educational attainment, 34.7% did not finish high school, 34.7% graduated high school or obtained a GED, 1.1% had a training certificate, 15.8% pursued some college, but did not receive a degree, 6.3% earned an associate’s
degree, 9.5% earned a college degree, 2.1% had a Master’s or Ph.D., and 2.1% are currently attending college or GED school. For secondary caregivers, 11.1% graduated high school or received a GED, 11.1% had a training certificate, 22.2% attended some college, but did not receive a degree, 22.2% had a college degree, and 33.3% were currently attending college or GED school. Of note, marital status and educational data were missing for one participant. The average family income reported at baseline was $1,806.53 for an average of 3.98 people.

**Procedure**

Data collection for this longitudinal study began in July of 2013. Across the three time-points, families completed questionnaire measures and observational interaction tasks. Measures included demographic characteristics, child depression, and maternal depression. The research assistants visited family homes every six to nine months and families completed the measures and observational tasks during the visit at their home. Each family was compensated for their participation in the study; they were given a $100 Target gift card for every visit they completed. ArcGIS was used in order to geocode family homes and neighborhood-level developmental assets for the 99 families that resided within Chicago city limits at Time 1. Families living outside of the Chicago city limits were excluded from mediations and moderations in the current study (n = 5).

**Measures**

**Demographics**

Parents reported on demographic information which included child gender, child age, parent(s) the child lives with, mother and father educational attainment, mother and father employment information, monthly household income, and race/ethnicity of the child and the parents.
Socioeconomic Status

Socioeconomic status was determined using questionnaire data on household pretax income as well as number of individuals supported by the household income. An income-to-needs ratio was calculated by comparing reported family income at Time 1 to federal guidelines for poverty for families of the same size for the year 2013, when the first timepoint of data collection took place.

Maternal Depression

Maternal depression was assessed using the Brief Symptom Inventory, which was normed for individuals 13 and older. This 53-item measure assesses common psychological symptoms that are typical for mood disorders, as well as other psychological disorders. Participants were asked to rate the frequency of certain emotions and cognitions on a scale from 0 (Not at all) to 4 (Extremely). An example item that would load on the depression symptom dimension is, “Feeling hopeless about the future”. This study used the sum depression scale scores from mothers’ report at Time 2 of data collection, Cronbach’s alpha in the present sample was .88 for the depression scale at Time 2.

School Climate Survey Data

Publicly available data from the State Board of Education was examined to assess key measures of school organizational culture for each family’s neighborhood school. Surveys administered to teachers and students were made publicly available to provide school staff and other stakeholders with a basis for discussion of school climate entitled CPS My School, My Voice 2013. This includes the “5Essentials” of school climate: effective leadership, supportive environment, involved families, ambitious instruction and collaborative teachers. These data were obtained from [https://cps.5-essentials.org/2013/](https://cps.5-essentials.org/2013/). Schools were rated on overall quality by
the education board based on 26 national assessments of growth and attainment in academic domains, school attendance and school climate. Rankings range from 3 to 1+, with 2+ indicating average performance and 1+ indicating a “well-organized school.” Using GIS mapping, these overall rankings of school climate data were imputed and linked to participant home addresses.

**Community-Level Assets**

Data on community assets was obtained using multiple publicly available data sets. Because a majority (70%) of Mexican American immigrants identify as Roman Catholic, the current study only included Catholic Parishes. A comprehensive list of Catholic Parishes in Chicago was obtained using the Archdiocese parish directory available at [https://www.arch-chicago.org/parish-map](https://www.arch-chicago.org/parish-map). Data on public mental health centers was obtained using data from the City of Chicago Data Portal, available at [https://data.cityofchicago.org/Health-Human-Services/Chicago-Department-of-Public-Health-Mental-Health-/g7ng-5vwp](https://data.cityofchicago.org/Health-Human-Services/Chicago-Department-of-Public-Health-Mental-Health-/g7ng-5vwp). Additionally, data on available private mental health services was obtained from the National Directory of Mental Health Facilities at [https://www.samhsa.gov/data/sites/default/files/2015_National_Directory_of_Mental_Health_Treatment_Facilities.pdf](https://www.samhsa.gov/data/sites/default/files/2015_National_Directory_of_Mental_Health_Treatment_Facilities.pdf). Finally, data on after school programming was obtained by accessing data from the City of Chicago Data Portal, available at [https://data.cityofchicago.org/Health-Human-Services/Family-and-Support-Services-Delegate-Agencies/jmw7-ijg5](https://data.cityofchicago.org/Health-Human-Services/Family-and-Support-Services-Delegate-Agencies/jmw7-ijg5), on the locations of after school programming provided by the Chicago Department of Family and Support Services, the Chicago Park District, and the Chicago Public Library.
Using publicly available data on churches, after school programming, and mental health agencies, community-level assets were aggregated using ArcGIS geographical information systems software. Further, mental health agencies and churches were reviewed and coded for availability of Spanish language services. Geographic information systems (GIS) refers to a system of procedures and computer software designed to capture, manage, manipulate, analyze, and exhibit spatially referenced data for solving complex problems (Mowbray et al., 2007). Participant homes were mapped using ArcGIS, a mapping software. Next, using the Points-In-Polygon Analysis tool within ArcGIS’s Hawth's Tools extension, the block group shapefile with the half-mile buffers were joined around each participant’s address. These joined shapefiles were used to calculate community asset density within half-mile perimeter communities. We defined *walkable community* as the area within a half-mile of the study participant's address, as a half-mile has been considered to be a reasonable walkable distance by several studies (Agrawal, Schlossberg, & Irvin, 2008; Brusilovskiy & Salzer, 2012). Density variables were calculated for Catholic churches and mental health centers that provide Spanish language services, as well.

Additionally, in order to better characterize “neighborhood context”, community assets were grouped by larger *community areas* using neighborhood areas developed by the Social Science Research Committee at the University of Chicago, which were further categorized into community areas that encompass groups of neighborhoods using the City of Chicago Data Portal boundaries of Chicago Community Areas, such as the Far North Side. These *community areas* represent areas that are tied to urban planning initiatives by the Department of Planning and Development of the City of Chicago, who defined these boundaries as a tool to oversee land use
policy, business and real estate development, historic preservation, accessible waterfronts, walkable neighborhoods, and other community initiatives (Chicago.gov, 2019). For the purposes of the current project, density variables for all GIS mapped community assets were additionally calculated by *community area* to represent the larger urban community context of groups of neighborhoods.

**Child Depression (self-report)**

Child symptoms of depression were assessed using the Child Depression Inventory (CDI; Kovacs, 1978). The CDI is a 27-item measure that assesses the presence and severity of depressive symptoms in children. Children were asked to report which sentence best described their thoughts and feelings in the past two weeks out of three possible sentences. A sample prompt from the CDI is: I do most things O.K; I do many things wrong; I do everything wrong. The current study utilized sum depression scores from Time 1 and 3, and Cronbach’s alphas in the present sample were .79 and .78, respectively.

**Child Depression (parent-report)**

Child symptoms of depression were additionally assessed using the Child Behavior Checklist (School-Age) (CBCL; Achenbach & Rescorla, 2001). The CBCL is a 112-item measure that assesses the presence and severity of depressive symptoms in children through the DSM-oriented affective problems score. Parents were asked to report children’s symptoms using a Likert scale (0 = Not True, 1 = Somewhat or Sometimes True, 2 = Very True or Often True). A sample prompt from the DSM oriented affective problems scale is: “Feels worthless or inferior”. The current study utilized sum of the DSM-oriented affective problems score from Time 1 and 3. Cronbach’s alphas in the present sample were .70 for Time 1, and .65 for Time 3.
Analytic Strategy

Preliminary Analyses

Preliminary analyses included examining descriptive statistics and correlations as well as checking data for skewness, kurtosis, or extreme outliers. Additionally, demographic variables such as gender and age were explored in order to determine if they were related to the primary variables included in this study and whether they needed to be controlled for in the present analyses. Differences across neighborhoods were examined using ANOVAs in order to better understand the availability of assets across communities as well as effect of neighborhood context broadly on symptoms. Maps were generated to demonstrate density of community assets across neighborhoods (Figures 2-7).

Figure 2. Schematic of density of Catholic parishes. ArcGISPro was used to spatially join Chicago Catholic parishes to polygons around 0.5 miles of participating family homes.
Figure 3. Schematic of density of Catholic parishes that provide Spanish services. ArcGISPro was used to spatially join Chicago Catholic parishes to polygons around 0.5 miles of participating family homes.

Figure 4. Schematic of density of mental health centers. ArcGISPro was used to spatially join mental health centers to polygons around 0.5 miles of participating family homes.
Figure 5. Schematic of density of mental health centers that provide Spanish outpatient services. ArcGISPro was used to spatially join mental health centers to polygons around 0.5 miles of participating family homes.

Figure 6. Schematic of density of after school programs. ArcGISPro was used to spatially join after school programs to polygons around 0.5 miles of participating family homes.
Figure 7. Schematic of participant homes across CPS boundaries. ArcGISPro was used to spatially join participating family homes to CPS boundaries. Data from CPS 5essentials was used to assess school climate.

**Primary Analyses**

Longitudinal multiple regression analyses were used to evaluate the hypotheses of the current study. PROCESS (Hayes, 2017) was used to test mediation (Specific Aim 1), moderation, (Specific Aims 2, 3, 4 & 5) and moderated mediation (Specific Aim 6). Indirect effects were tested using bootstrapping procedure, which generated an empirically derived representation of the sampling distribution of the indirect effect (Hayes, 2017). Unstandardized indirect effects were computed for each of 10,000 bootstrapped samples with a 95% confidence interval. All analyses controlled for prior levels of child symptoms (Time 1).

**Specific Aim 1, Hypothesis 1a.** To assess whether maternal depression mediates the relation between family poverty and depression symptoms in children, mediation was used (Model
This included Time 1 income-to-needs, Time 2 maternal depression, and Time 3 child report of depression.

**Specific Aim 2, Hypothesis 2a.** To examine whether Catholic Church density moderates the relation between family poverty and depression symptoms in Mexican-origin mothers, moderation was used (Model #1; Hayes, 2017). This included Time 1 income-to-needs, Time 2 maternal depression, and GIS mapped church density. Analyses were conducted with all parishes, and subsequently repeated using only parishes that offer Spanish language services.

**Specific Aim 2, Hypothesis 2b.** To examine whether Catholic Church density moderates the relation between depression symptoms in Mexican-origin mothers and depression symptoms in children, moderation was used (Model #1; Hayes, 2017). This included Time 2 maternal depression, Time 3 child depression, and GIS mapped Catholic church density. Analyses were conducted with all parishes as well as with only parishes that offer Spanish language services.

**Specific Aim 3, Hypothesis 3a.** To examine whether mental health center density moderates the relation between family poverty and depression symptoms in Mexican-origin mothers, moderation was used (Model #1; Hayes, 2017). This included Time 1 income-to-needs, Time 2 maternal depression, and GIS mapped mental health center density. Analyses were conducted with all mental health centers as well as with only mental health centers that offer Spanish speaking outpatient services.

**Specific Aim 3, Hypothesis 3b.** To examine whether mental health center density moderates the relation between depression symptoms in Mexican-origin mothers and depression symptoms in children, moderation was used (Model #1; Hayes, 2017). This included Time 2 ma-
ternal depression, Time 3 child depression, and GIS mapped church density. Analyses were conducted with all mental health centers as well as with only mental health centers that offer Spanish speaking outpatient services.

**Specific Aim 4, Hypothesis 4a.** To examine whether after school programming density moderates the relation between family poverty and depression symptoms in Mexican-origin mothers, moderation was used (Model #1; Hayes, 2017). This included Time 1 income-to-needs, Time 2 maternal depression, and GIS mapped after school programming density.

**Specific Aim 4, Hypothesis 4b.** To examine whether after school programming density moderates the relation between depression symptoms in Mexican-origin mothers and depression symptoms in children, moderation was used (Model #1; Hayes, 2017). This included Time 2 maternal depression, Time 3 child depression, and GIS mapped after school programming density.

**Specific Aim 5, Hypothesis 5a.** To examine whether positive school environment moderates the relation between maternal depression and depression symptoms in first-generation Mexican-origin children, moderation was used (Model #1; Hayes, 2017). This included Time 2 maternal depression, GIS mapped Chicago Public Schools school climate data, and Time 3 child report of depression. Recruitment source information was used to code children who were known to attend parochial schools, and analyses were conducted both with and without these children.

**Specific Aim 6, Hypothesis 6a.** To examine whether each community developmental asset moderates the mediating relation between family poverty, maternal depression and child depression symptoms in first-generation Mexican-origin children, seven moderated mediations (Hayes Model #7 & Model #14; Hayes, 2017) were run. These included Time 1 income-to-needs, Time 2 maternal depression, GIS mapped community assets (Spanish parish services,
Spanish outpatient mental health centers, after school programming, and school climate) and Time 3 child report of depression symptoms.

**Power Analysis**

A power analysis was conducted using G*Power 3 (Faul, Erdfelder, Lang, & Buchner, 2007) to determine power for the proposed analyses. With an estimated sample size of 99, the moderations were adequately powered (.94) to detect a medium effect but were underpowered to detect a small effect (0.22). Similarly, the moderated mediation was adequately powered to detect a medium effect (.90).
CHAPTER FOUR

RESULTS

Preliminary Analyses

All independent and dependent variables were tested for skewness. Results indicated that income-to-needs, maternal depression, and child depression were not highly skewed. Specifically, baseline skewness values of income-to-needs, maternal depression, and child depression ranged from 0.70 to 1.98. All variables were also tested for kurtosis. Results revealed that income-to-needs, maternal depression, and child depression were not highly platykurtic or lepto-kurtic. Kurtosis values for the baseline variables of income-to-needs, maternal depression, and child depression ranged from 0.28 to 4.63. Thus, it was not necessary to transform these variables.

Prior to conducting analyses, missing data analyses were conducted in order to examine whether individuals with missing maternal depression data at Time 2 differed from individuals who were not missing data. Out of the sample of 104 families, 7 had missing maternal depression data at time 2. T-tests indicated that these participants did not differ significantly from participants with complete data on baseline (Time 1) levels of child self-report depression ($t = -1.08, p = .129$), primary caregiver report child depression ($t = 1.20, p = .148$), or maternal depression ($t = - .51, p = .315$). Demographic variables for individuals with maternal depression data missing at
Time 2 did not differ significantly from participants with complete data on child gender ($\chi^2 = 0.31, p = 0.677$), child age ($t = -0.11, p = 0.906$), or income-to-needs ($t = -0.06, p = 0.135$). These missing data analyses were repeated for families missing child depression data at Time 3, and those were similarly non-significant. Descriptive statistics and correlations for variables included in this study’s primary baseline analyses can be found in Table 1. Preliminary analyses included an examination of the degree of association between income-to-needs, maternal depression, child depression, and community asset density variables. Correlations revealed that family income-to-needs was significantly related to parent report of child depression at Time 1 ($r = -0.23, p = 0.021$) and parent report of child depression at Time 3 ($r = -0.34, p = 0.001$). Additionally, parent self-reported depression at Time 2 was significantly related to parent report of child depression at Time 1 ($r = 0.39, p < 0.001$) and Time 3 ($r = 0.27, p = 0.009$). In the current sample, 25.8% of parents reported depression symptoms above the clinical cutoff for the BSI depression scale (Cents et al., 2013).
In order to examine differences among families on key variables, family homes at Time 1 were mapped onto a map of the 77 neighborhoods that encompass the city of Chicago. These were developed by the Social Science Research Committee at the University of Chicago. The distribution of these families across neighborhoods is presented in Table 2, and the map of family homes across neighborhoods is presented in Figure 5.1. These neighborhoods were further categorized into community areas that encompass groups of neighborhoods, which is also presented in Table 2.
Table 2. Participant Homes Across Neighborhoods

<table>
<thead>
<tr>
<th>Community Area</th>
<th>Frequency</th>
<th>%</th>
<th>Neighborhood</th>
<th>Frequency</th>
<th>%</th>
</tr>
</thead>
<tbody>
<tr>
<td>West Side</td>
<td>29</td>
<td>27%</td>
<td>Little Village</td>
<td>13</td>
<td>14%</td>
</tr>
<tr>
<td></td>
<td></td>
<td></td>
<td>Forest Park</td>
<td>9</td>
<td>7.6%</td>
</tr>
<tr>
<td></td>
<td></td>
<td></td>
<td>Hawthorne Park</td>
<td>6</td>
<td>5.8%</td>
</tr>
<tr>
<td></td>
<td></td>
<td></td>
<td>Austin</td>
<td>1</td>
<td>1.0%</td>
</tr>
<tr>
<td></td>
<td></td>
<td></td>
<td>West Town</td>
<td>1</td>
<td>1.0%</td>
</tr>
<tr>
<td>Northwest Side</td>
<td>27</td>
<td>26%</td>
<td>Belmonte Ogden</td>
<td>16</td>
<td>15.4%</td>
</tr>
<tr>
<td></td>
<td></td>
<td></td>
<td>Foremost</td>
<td>0</td>
<td>0.7%</td>
</tr>
<tr>
<td></td>
<td></td>
<td></td>
<td>Portage Park</td>
<td>3</td>
<td>1.0%</td>
</tr>
<tr>
<td>Southwest Side</td>
<td>26</td>
<td>25%</td>
<td>West Lawn</td>
<td>9</td>
<td>8.7%</td>
</tr>
<tr>
<td></td>
<td></td>
<td></td>
<td>Chicago Lawn</td>
<td>4</td>
<td>3.8%</td>
</tr>
<tr>
<td></td>
<td></td>
<td></td>
<td>Gage Park</td>
<td>3</td>
<td>2.9%</td>
</tr>
<tr>
<td></td>
<td></td>
<td></td>
<td>McKinley Park</td>
<td>3</td>
<td>2.9%</td>
</tr>
<tr>
<td></td>
<td></td>
<td></td>
<td>Brighton Park</td>
<td>2</td>
<td>1.9%</td>
</tr>
<tr>
<td></td>
<td></td>
<td></td>
<td>Clearing</td>
<td>2</td>
<td>1.9%</td>
</tr>
<tr>
<td></td>
<td></td>
<td></td>
<td>Ashland Heights</td>
<td>1</td>
<td>1.0%</td>
</tr>
<tr>
<td></td>
<td></td>
<td></td>
<td>West Bluffton</td>
<td>1</td>
<td>1.0%</td>
</tr>
<tr>
<td></td>
<td></td>
<td></td>
<td>New City</td>
<td>1</td>
<td>1.0%</td>
</tr>
<tr>
<td>Far North Side</td>
<td>12</td>
<td>11%</td>
<td>Adams Park</td>
<td>5</td>
<td>7.6%</td>
</tr>
<tr>
<td></td>
<td></td>
<td></td>
<td>West Ridge</td>
<td>3</td>
<td>2.9%</td>
</tr>
<tr>
<td></td>
<td></td>
<td></td>
<td>Lincoln Square</td>
<td>1</td>
<td>1.0%</td>
</tr>
<tr>
<td>Far Southwest</td>
<td>3</td>
<td>2.9%</td>
<td>Ashland</td>
<td>3</td>
<td>2.9%</td>
</tr>
<tr>
<td>North Side</td>
<td>2</td>
<td>1.9%</td>
<td>Logan Square</td>
<td>1</td>
<td>1.0%</td>
</tr>
<tr>
<td></td>
<td></td>
<td></td>
<td>Arvada</td>
<td>1</td>
<td>1.0%</td>
</tr>
<tr>
<td>N/A – Suburbs</td>
<td>5</td>
<td>0.8%</td>
<td>Eisenhower, Green, Del Plano</td>
<td>5</td>
<td>4.8%</td>
</tr>
</tbody>
</table>

Notably, participants lived most frequently on the West (27.9%), Northwest (26%), and Southwest Sides (25%). Families additionally lived on the Far North (11.5%), Far Southwest (2.9%), and North (1.9%) Sides, with 4.8% of families living in various suburbs.
Figure 8. Schematic of participant homes across Chicago neighborhoods. ArcGISPro was used to spatially join participating family homes to Chicago neighborhood boundaries.

Figure 9. Schematic of participant homes across Chicago community areas (i.e. West Side, Southwest Side, etc.). ArcGISPro was used to spatially join participating family homes to Chicago community area boundaries.
One-way analysis of variance (ANOVAs) were conducted comparing the four most frequent community areas: The West side (N=29), the Northwest side (N=27), the Southwest side (N=26), and the Far North side (N=12). These results were probed using a Tukey’s HSD post-hoc test, and analyses revealed that there was no main effect of community area on afterschool programming density, school climate survey, child self-report of depression at any time-point, parent report of depression, or parent report of child depression at Time 1 and Time 3. However, analyses revealed significant main effects of community area on Catholic church density, $F(3,90)=2.44, p = .070$, such that the Far North side ($M = 0.50$) had significantly lower density of English Catholic parish services when compared to the Northwest side ($M = 0.96$), Southwest side ($M = 1.04$) and the West side ($M = 1.13$).

Note: superscripts denote significant differences across groups.

Figure 10. Graph demonstrating significant main effects of community area on English parish density, such that the Far North side ($M = 0.50$) had significantly lower density of English Catholic parish services when compared to the Northwest side ($M = 0.96$), Southwest side ($M = 1.04$) and the West side ($M = 1.13$).
Additionally, analyses revealed significant main effects of community area on Spanish parish density, $F(3,90)=6.05, p = .001$, such that the Far North side ($M = 0.16$) had significantly lower density of Spanish services when compared to the Northwest side ($M = 0.70$), Southwest side ($M = 1.04$) and the West side ($M = 1.07$).

![Graph demonstrating significant main effects of community area on Spanish parish density](image)

Note: superscripts denote significant differences across groups.

Figure 11. Graph demonstrating significant main effects of community area on Spanish parish density, such that the Far North side ($M = 0.16$) had significantly lower density of Spanish services when compared to the Northwest side ($M = 0.70$), Southwest side ($M = 1.04$) and the West side ($M = 1.07$).

Further, significant main effects of community area on mental health center density were found, $F(3,90)=7.34, p < .001$, such that the West side ($M = 0.89$) had significantly higher density of mental health centers when compared to the Northwest side ($M = 0.04$) and the Southwest side ($M = 0.08$).
Note: superscripts denote significant differences across groups.

Figure 12. Graph demonstrating significant main effects of community area on mental health density, such that the West side ($M = 0.89$) had significantly higher density of mental health centers when compared to the Northwest side ($M = 0.04$) and the Southwest side ($M = 0.08$). The Far North side was not significantly different from any group ($M = 0.58$).

Finally, significant main effects of community area on Spanish outpatient mental health service density were found, $F(3,90)=9.81, p < .001$, such that the West side ($M = 0.59$) had a significantly higher density of mental health centers that offer Spanish outpatient services when compared to the Northwest side ($M = 0.04$), the Southwest side ($M = 0.04$), and the Far North side ($M = 0.00$).
Note: superscripts denote significant differences across groups.

Figure 13. Graph demonstrating significant main effects of community area on Spanish outpatient mental health service density, such that the West side ($M = 0.59$) had significantly higher density of centers that offer Spanish outpatient services when compared to the Northwest side ($M = 0.04$), the Southwest side ($M = 0.04$), and the Far North side ($M = 0.00$).

In addition to these significant differences, several marginally significant differences were found. Notably, trends for income-to-needs indicated that there was a marginally significant main effect of community area on socioeconomic status, $F(3,88)=2.32, p = .080$, such that families on the Northwest side ($M = 0.71$) reported marginally lower income-to-needs when compared to families on the Southwest side ($M = 1.01$). Trends for all Catholic parish density demonstrated marginal differences in density across community areas, $F(3,88)=2.44, p = .070$, such that the West side ($M = 1.14$) and Southwest side ($M = 1.19$) reported higher density than the far North side ($M = 0.50$). Please see Table 3 for summary of these analyses.
Table 3. Analysis of Variance in Asset Density, School Climate, Family Income-to-Needs, and Symptoms Across Neighborhoods

<table>
<thead>
<tr>
<th></th>
<th>M (SD)</th>
<th>F</th>
<th>(\eta^2)</th>
</tr>
</thead>
<tbody>
<tr>
<td><strong>Income-to-Needs</strong></td>
<td></td>
<td></td>
<td></td>
</tr>
<tr>
<td>West Side</td>
<td>.01±</td>
<td>.081</td>
<td></td>
</tr>
<tr>
<td>Northwest Side</td>
<td>.71 (.41)</td>
<td></td>
<td></td>
</tr>
<tr>
<td>Southwest Side</td>
<td>1.01 (.38)</td>
<td></td>
<td></td>
</tr>
<tr>
<td>Far North Side</td>
<td>.94 (.38)</td>
<td></td>
<td></td>
</tr>
<tr>
<td><strong>Maternal Depression Self-Report (T1)</strong></td>
<td>3.5 (4.88)</td>
<td>.50 .023</td>
<td></td>
</tr>
<tr>
<td>West Side</td>
<td>3.11 (4.10)</td>
<td></td>
<td></td>
</tr>
<tr>
<td>Northwest Side</td>
<td>1.68 (3.53)</td>
<td></td>
<td></td>
</tr>
<tr>
<td>Southwest Side</td>
<td>3.17 (2.58)</td>
<td></td>
<td></td>
</tr>
<tr>
<td>Far North Side</td>
<td>2.00 (2.15)</td>
<td></td>
<td></td>
</tr>
<tr>
<td>Child Depression Self Report (T1)</td>
<td>1.19 .066</td>
<td>51 .039</td>
<td></td>
</tr>
<tr>
<td>West Side</td>
<td>9.78 (4.41)</td>
<td></td>
<td></td>
</tr>
<tr>
<td>Northwest Side</td>
<td>11.96 (6.54)</td>
<td></td>
<td></td>
</tr>
<tr>
<td>Southwest Side</td>
<td>11.08 (6.08)</td>
<td></td>
<td></td>
</tr>
<tr>
<td>Far North Side</td>
<td>12.17 (4.73)</td>
<td></td>
<td></td>
</tr>
<tr>
<td><strong>Child Depression Parent Report (T1)</strong></td>
<td>3.00 (2.70)</td>
<td></td>
<td></td>
</tr>
<tr>
<td>West Side</td>
<td>2.00 (2.67)</td>
<td></td>
<td></td>
</tr>
<tr>
<td>Southwest Side</td>
<td>1.88 (2.29)</td>
<td></td>
<td></td>
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<tr>
<td><strong>Parochial School</strong></td>
<td>3.82***</td>
<td>.249</td>
<td></td>
</tr>
<tr>
<td>West Side</td>
<td>34 (.48)</td>
<td></td>
<td></td>
</tr>
<tr>
<td>Northwest Side</td>
<td>0.00 (.00)</td>
<td></td>
<td></td>
</tr>
<tr>
<td>Southwest Side</td>
<td>0.50 (.51)</td>
<td></td>
<td></td>
</tr>
<tr>
<td>Far North Side</td>
<td>0.00 (.00)</td>
<td></td>
<td></td>
</tr>
<tr>
<td><strong>Spanish Church Density</strong></td>
<td>3.56***</td>
<td>.168</td>
<td></td>
</tr>
<tr>
<td>West Side</td>
<td>1.07 (.75)</td>
<td></td>
<td></td>
</tr>
<tr>
<td>Northwest Side</td>
<td>0.70 (.54)</td>
<td></td>
<td></td>
</tr>
<tr>
<td>Southwest Side</td>
<td>1.04 (.82)</td>
<td></td>
<td></td>
</tr>
<tr>
<td>Far North Side</td>
<td>0.16 (.38)</td>
<td></td>
<td></td>
</tr>
<tr>
<td><strong>All Church Density</strong></td>
<td>3.41***</td>
<td>.075</td>
<td></td>
</tr>
<tr>
<td>West Side</td>
<td>1.13 (.74)</td>
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<tr>
<td>Northwest Side</td>
<td>0.96 (.65)</td>
<td></td>
<td></td>
</tr>
<tr>
<td>Southwest Side</td>
<td>1.04 (.82)</td>
<td></td>
<td></td>
</tr>
<tr>
<td>Far North Side</td>
<td>0.16 (.38)</td>
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<tr>
<td><strong>Spanish Mental Health Center Density</strong></td>
<td>6.36***</td>
<td>.246</td>
<td></td>
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<tr>
<td>West Side</td>
<td>59 (.78)</td>
<td></td>
<td></td>
</tr>
<tr>
<td>Northwest Side</td>
<td>0.04 (.19)</td>
<td></td>
<td></td>
</tr>
<tr>
<td>Southwest Side</td>
<td>0.04 (.19)</td>
<td></td>
<td></td>
</tr>
<tr>
<td>Far North Side</td>
<td>0.00 (.00)</td>
<td></td>
<td></td>
</tr>
<tr>
<td><strong>Mental Health Center Density</strong></td>
<td>3.05***</td>
<td>.197</td>
<td></td>
</tr>
<tr>
<td>West Side</td>
<td>89 (1.26)</td>
<td></td>
<td></td>
</tr>
<tr>
<td>Northwest Side</td>
<td>0.04 (.19)</td>
<td></td>
<td></td>
</tr>
<tr>
<td>Southwest Side</td>
<td>0.08 (.27)</td>
<td></td>
<td></td>
</tr>
<tr>
<td>Far North Side</td>
<td>0.00 (.00)</td>
<td></td>
<td></td>
</tr>
<tr>
<td><strong>After School Program Density</strong></td>
<td>.88 .011</td>
<td>1.32 .042</td>
<td></td>
</tr>
<tr>
<td>West Side</td>
<td>1.72 (1.67)</td>
<td></td>
<td></td>
</tr>
<tr>
<td>Northwest Side</td>
<td>1.41 (1.50)</td>
<td></td>
<td></td>
</tr>
<tr>
<td>Southwest Side</td>
<td>1.35 (1.49)</td>
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</tr>
<tr>
<td>Far North Side</td>
<td>1.42 (1.16)</td>
<td></td>
<td></td>
</tr>
<tr>
<td>School Climate</td>
<td>3.41 (1.42)</td>
<td></td>
<td></td>
</tr>
<tr>
<td>West Side</td>
<td>3.29 (1.64)</td>
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</tr>
<tr>
<td>Northwest Side</td>
<td>2.77 (1.68)</td>
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<td></td>
</tr>
<tr>
<td>Southwest Side</td>
<td>2.58 (1.59)</td>
<td></td>
<td></td>
</tr>
</tbody>
</table>

Notes: *p<.10, *p<.05, **p<.01, ***p<.001, superscripts denote significant differences across groups.
Primary Analyses

Mediological Bootstrapping (Hypothesis 1a)

Hypothesis 1a, that the relation between income-to-needs and child depression would be mediated by maternal depression, was non-significant, ($b = -1.35, p = .260$, 95% BCa CI [-3.70, 1.0]). This hypothesis was additionally examined using the parent-reported DSM oriented depression scale of the CBCL instead of child-reported CDI, and this analysis was similarly non-significant ($b = -.005, p = .073$, 95% BCa CI [-0.18, 0.08]).

Moderation Analyses (Hypotheses 2a, 2b, 3a, 3b, 4a, 4b, and 5a)

Moderations were conducted using PROCESS to examine whether GIS community assets moderated the relation between family income-to-needs (Time 1) and depression symptoms in Mexican-origin mothers (Time 2; Model #1; Hayes, 2017). This analysis was not significant. Mental health center density was also examined as a moderator for the association between income-to-needs (Time 1) and depression symptoms (Time 2) in Mexican-origin mothers (Model #1; Hayes, 2017). Neither density of all mental health centers nor density of mental health centers that offer Spanish speaking outpatient services were significant moderators. Finally, after school programming density was examined as a moderator for the relation between income-to-needs (Time 1) and depression symptoms (Time 2) in Mexican-origin mothers (Model #1; Hayes, 2017). This analysis was non-significant (Table 4).
Table 4. Linear Model Predictors of maternal depression

Hypotheses 2a, 3a, 4a. Linear Model Predictors of maternal depression (self-report, controlling for Time 1)

<table>
<thead>
<tr>
<th>Maternal Depression</th>
<th>Coefficient (SE)</th>
<th>t-ratio</th>
</tr>
</thead>
<tbody>
<tr>
<td>Intercept</td>
<td>3.45 (0.43)</td>
<td>8.08***</td>
</tr>
<tr>
<td>Catholic Church Density</td>
<td>-0.06 (0.54)</td>
<td>-0.11</td>
</tr>
<tr>
<td>Income-to-Needs</td>
<td>-1.38 (0.98)</td>
<td>-1.41</td>
</tr>
<tr>
<td>Catholic Church Density x Income-to-Needs</td>
<td>-0.30 (1.33)</td>
<td>-0.23</td>
</tr>
</tbody>
</table>

<table>
<thead>
<tr>
<th>Maternal Depression</th>
<th>Coefficient (SE)</th>
<th>t-ratio</th>
</tr>
</thead>
<tbody>
<tr>
<td>Intercept</td>
<td>3.45 (0.43)</td>
<td>8.09***</td>
</tr>
<tr>
<td>Spanish Catholic Church Density</td>
<td>0.28 (0.58)</td>
<td>0.49</td>
</tr>
<tr>
<td>Income-to-Needs</td>
<td>-1.34 (0.99)</td>
<td>-1.36</td>
</tr>
<tr>
<td>Spanish Catholic Church Density x Income-to-Needs</td>
<td>0.12 (1.70)</td>
<td>0.07</td>
</tr>
</tbody>
</table>

<table>
<thead>
<tr>
<th>Maternal Depression</th>
<th>Coefficient (SE)</th>
<th>t-ratio</th>
</tr>
</thead>
<tbody>
<tr>
<td>Intercept</td>
<td>3.46 (0.42)</td>
<td>8.18***</td>
</tr>
<tr>
<td>Mental Health Center Density</td>
<td>0.55 (0.53)</td>
<td>1.04</td>
</tr>
<tr>
<td>Income-to-Needs</td>
<td>-1.36 (0.97)</td>
<td>-1.39</td>
</tr>
<tr>
<td>Mental Health Center Density x Income-to-Needs</td>
<td>0.98 (1.22)</td>
<td>0.81</td>
</tr>
</tbody>
</table>

<table>
<thead>
<tr>
<th>Maternal Depression</th>
<th>Coefficient (SE)</th>
<th>t-ratio</th>
</tr>
</thead>
<tbody>
<tr>
<td>Intercept</td>
<td>3.46 (0.43)</td>
<td>8.13***</td>
</tr>
<tr>
<td>Spanish Mental Health Center Density</td>
<td>0.50 (0.91)</td>
<td>0.56</td>
</tr>
<tr>
<td>Income-to-Needs</td>
<td>-1.38 (0.98)</td>
<td>-1.41</td>
</tr>
<tr>
<td>Spanish Mental Health Center Density x Income-to-Needs</td>
<td>0.42 (1.95)</td>
<td>0.22</td>
</tr>
</tbody>
</table>

<table>
<thead>
<tr>
<th>Maternal Depression</th>
<th>Coefficient (SE)</th>
<th>t-ratio</th>
</tr>
</thead>
<tbody>
<tr>
<td>Intercept</td>
<td>3.44 (0.42)</td>
<td>8.14***</td>
</tr>
<tr>
<td>After School Programming Density</td>
<td>0.42 (0.27)</td>
<td>-1.34</td>
</tr>
<tr>
<td>Income-to-Needs</td>
<td>-1.24 (0.99)</td>
<td>-1.24</td>
</tr>
<tr>
<td>After School Programming Density x Income-to-Needs</td>
<td>0.12 (0.59)</td>
<td>0.21</td>
</tr>
</tbody>
</table>

Notes: *p<.10, *p<.05, **p<.01, ***p<.001
Moderations were conducted using PROCESS to examine whether GIS mapped assets moderated the relation between Time 2 depression symptoms in Mexican-origin mothers and Time 3 depression symptoms in children (Model #1; Hayes, 2017), while controlling for child report of depression at Time 1. Neither general Catholic church density nor density of churches with Spanish services significantly moderated this association (see Table 5). This analysis was repeated using mental health centers and after school programming density as moderators of the relation between Time 2 depression symptoms in Mexican-origin mothers and Time 3 depression symptoms in children (Model #1; Hayes, 2017). These analyses were similarly non-significant.

Table 5. Linear Model Predictors of child depression (self-report)
All analyses were repeated using parent report of child depression at Time 3 and were also non-significant (Table 6). In order to examine whether positive school climate moderates the relation between Time 2 maternal depression and Time 3 depression symptoms in first-generation Mexican-origin children, moderation was used (Model #1; Hayes, 2017). Similar to previous analyses, this analysis was non-significant. Further, residuals were calculated for the both parent-reported and child-reported depression, and analyses using residuals were non-significant.

Table 6. Linear Model Predictors of child depression (parent report)

<table>
<thead>
<tr>
<th>Child Depression</th>
<th>Coefficient (SE)</th>
<th>t-ratio</th>
</tr>
</thead>
<tbody>
<tr>
<td>Intercept</td>
<td>0.85 (0.19)</td>
<td>4.51</td>
</tr>
<tr>
<td>Catholic Church Density</td>
<td>0.15 (0.24)</td>
<td>0.64</td>
</tr>
<tr>
<td>Maternal Depression (Time 2)</td>
<td>0.01 (0.04)</td>
<td>0.35</td>
</tr>
<tr>
<td>Catholic Church Density x Maternal Depression</td>
<td>0.97 (0.07)</td>
<td>13.02</td>
</tr>
</tbody>
</table>

| Intercept | -0.00 (0.19) | -0.00 |
| Spanish Catholic Church Density | 0.08 (0.25) | 0.33 |
| Maternal Depression (Time 2) | 0.01 (0.04) | 0.14 |
| Spanish Catholic Church Density x Maternal Depression | 0.04 (0.07) | 0.59 |

| Intercept | 0.01 (0.19) | 0.08 |
| Mental Health Center Density | -0.06 (0.24) | -0.26 |
| Maternal Depression (Time 2) | 0.01 (0.04) | 0.41 |
| Mental Health Center Density x Maternal Depression | -0.02 (0.04) | -0.75 |

| Intercept | 0.38 (0.28) | 2.15* |
| Spanish Mental Health Center Density | -0.02 (0.42) | -0.06 |
| Maternal Depression (Time 2) | 0.02 (0.05) | 0.44 |
| Spanish Mental Health Center Density x Maternal Depression | -0.03 (0.06) | -0.50 |

| Intercept | 0.61 (0.26) | 1.92 |
| After School Programming Density | -0.04 (0.13) | -0.31 |
| Maternal Depression (Time 2) | -0.05 (0.05) | 0.33 |
| After School Programming Density x Maternal Depression | -0.02 (0.04) | -0.63 |

| Intercept | 2.32 (0.86) | 2.55* |
| School Climate (CPS 5 Essentials) | 0.14 (0.08) | 1.67* |
| Maternal Depression (Time 2) | 0.07 (0.08) | 1.43 |
| School Climate x Income-to-Needs | 0.04 (0.02) | 1.69 |

Notes: *p<.10, **p<.05, ***p<.01, ****p<.001
Moderated Mediation (Hypothesis 6a)

Hypothesis 6a, that each community developmental asset moderates the mediating relation between income-to-needs, maternal depression and child depression symptoms in first-generation Mexican-origin children, was examined using PROCESS (Model #7 & #14; Hayes, 2017). Model 7 was used in three analyses to examine the moderating role of Spanish parishes, Spanish mental health services, and after school programming on the relation between income-to-needs and maternal depression, while Model 14 was used in four analyses to investigate the moderating role of Spanish parishes, Spanish mental health services, after school programming, and school climate on the relation between maternal depression and child depression. All analyses were non-significant. Further, these moderated mediations were repeated using parent report of child depression as the outcome variable, and those analyses were similarly non-significant.

Exploratory Analyses

Due to significant differences across neighborhood (see ANOVAs in preliminary analyses), hierarchical linear modeling (HLM) was conducted to better account for the nested data (families within community areas). HLM is an analytic technique that handles hierarchical and non-independent data structures (Bolger, Davis, & Rafaeli, 2003). In an effort to characterize families’ income-to-needs within the context of their community, families were nested within community areas in these analyses. Predictors at Level 1 and Level 2 were grand mean centered in order to improve interpretability of results (Raudenbush & Bryk, 2002). Each community asset density variable was entered separately as baseline Level 2 independent variables. Income-to-
needs and parent depression were the Level 1 independent variables, and child depression symptoms were each used as the Level 1 dependent variable. See below for an example of model equations testing a cross-level interaction:

Level 1: \[(T3 \text{ Child Depression})_{ij} = \beta_{0i} + \beta_{1i}(T1 \text{ Child Depression})_{ij} + \beta_{2i}(\text{IncometoNeeds})_{ij} + r_{ij}\]

Level 2: \[\beta_{0j} = \gamma_{00} + \gamma_{01}(\text{Catholic Churches}_j) + u_{0j}\]

\[\beta_{1j} = \gamma_{10}\]

\[\beta_{2j} = \gamma_{20} + \gamma_{21}(\text{Catholic Churches}_j)\]

HLM analyses testing the moderating effect of each community asset density variable were non-significant. However, one main effect emerged when testing income-to-needs predicting parent-reported child depressive symptoms while nested within community areas, such that higher income-to-needs was associated with fewer child depressive symptoms \((\beta = -1.05, t = -2.08, p = 0.04)\).
CHAPTER FIVE

DISCUSSION

The present study aimed to examine associations between family income-to-needs, maternal depression, child depression, and to test the protective role of community asset variables. Results indicated that family income-to-needs is related to child depression, and child depression is related to maternal depression. However, no relation between family income-to-needs and maternal depression was present in the current sample. Further, walkable community asset density was unrelated to symptoms for both mothers and children.

Poverty’s Effect on Maternal Depression

Correlations demonstrated that in this sample, significant associations existed between parent report of child depression and family income-to-needs, as well as between child depression and self-reported maternal depression. However, contrary to hypotheses, family income-to-needs was unrelated to self-reported maternal depression, and thus maternal depression did not explain the relation between family income-to-needs and child depression. This finding was unexpected, as previous literature has demonstrated a link between family poverty and depressive symptoms in mothers (Chaudron et al., 2005; Farr et al., 2010; Oh et al., 2018). One possible explanation for this finding is that this is a result of a phenomenon known as the immigrant paradox, which is the observation that immigrants tend to experience better health outcomes than their US-born counterparts despite barriers to health care use and socioeconomic disadvantage (Marks et al.,
Previous studies have found that female immigrants from Mexico demonstrate lower rates of lifetime disorders compared with women born in the United States (Viruell-Fuentes, 2007). In the current sample, roughly one quarter of mothers reported depressive symptoms within a clinically significant range. While the current sample demonstrates a higher prevalence of depression compared to rates for all mothers in the United States, which runs at roughly 10% of the population, this is much lower than reported prevalence rates among a nationally representative sample of Latinx mothers living in the United States at or below 150% of the poverty line (52.8% ; Ertel, Rich-Edwards, & Koenen, 2011). Given that the majority of mothers in the current study identified as immigrants from Mexico (91%), and the majority of Latinxs in the U.S. are US-born (67%; Batalova, Blizzard, & Bolter, 2020), this finding may support a body of prevalence literature that demonstrates that U.S. born Latinxs are at much higher risk for the development of depression when compared to immigrants born in Mexico and other Latin-American countries (Salas-Wright, Vaughn, & Goings, 2017; Vega et al., 1998).

Additionally, it is relevant to consider that inclusion criteria included income at or below 150% of the poverty line, which reduced income-to-needs variance in the sample considerably. It may be that income-to-needs was not a significant predictor of maternal depression among mothers due to the absence of a full range of income levels in the current sample. Moreover, it may be impactful to consider how income-to-needs ratios compare to experiences of poverty in mothers’ countries origin. For much of recent history, a primary motivation for migration from Mexico to the United States has been economic opportunity (Zong & Batalova, 2018), in addition to drivers such as political instability, violence and desire for family reunification (Torres et al., 2018). It is possible that for many mothers in this sample, economic inequality in their country of origin was
a driver of their immigration and serves as a comparison for poverty in the U.S. This context is relevant as quality-of-life may be relative to perhaps extreme economic inequalities that drove migration. This may serve as a mechanism of the aforementioned immigrant paradox and buffer the effects of income-to-needs on maternal depression in this sample.

**Poverty’s Impact on Child Depression Symptoms**

In the present sample, parent report of child depression was significantly correlated to family income-to-needs, while child report of depression was unrelated to income-to-needs. Further, family report of income-to-needs was marginally different across community areas. This relationship between family income-to-needs and child depression was further examined using exploratory hierarchical linear modeling, which revealed that family income-to-needs significantly predicted parent-reported child depressive symptoms when families were nested within community area. This association was in the expected direction, such that higher income-to-needs ratios were related to lower child depression symptoms as reported by parents. In other words, when families were contextualized within their community area, lower income-to-needs became a significant predictor of higher children’s depression symptoms as reported by parents. This supports a body of literature that points to poverty as a risk factor for the development and severity of depression in children (Barker et al., 2012; Gilman et al, 2003; Raposa, Hammen, Brennan & Najman, 2014). Further, this finding underscores a need to examine the impact of family income-to-needs on mothers and children within the context of neighborhood socioeconomic variables.

The discrepancies between parent and child report of child depression in the current study are important to consider. Notably, child-reported depression was unrelated to maternal self-reported depression, while maternal reported child depression was significantly related to maternal self-
report of depression. When considering how best to interpret the data given these discrepancies, it is worth noting that the presence of maternal affective symptoms has been identified as a risk factor for maternal reporting distortions (Briggs-Gowan, Carter & Shwab-Stone, 1996; Garbarino, 1989). However, more recent studies have examined whether discrepancies between mother and child report indicate that depressed mothers are unreliable reporters by assessing the predictive validity of their reports (Lewis et al., 2012). By utilizing a sample of parents with recurrent depression, authors found that parent reports of child depression symptoms at baseline significantly predicted new onset of a mood disorder in children. Of particular relevance to the current study, these authors used secondary data analyses that stratified the sample according to child age, which demonstrated that, for children under age 12, parent reports were significantly better at predicting new onset mood disorder compared to child reports of depression at baseline (Lewis et al., 2012). Authors in that study emphasized that researchers should give due consideration to parent ratings of their children's depression symptoms, regardless of whether the parent suffers with affective symptomatology (Lewis et al., 2012). These results indicate that while discrepancies should encourage cautious interpretation, the presence of maternal depression does not invalidate maternal report of child symptoms.

**Protective Effects of Community Assets on Children and Mothers**

No associations or buffering effects were found between parent or child reported depression and any form of walkable community asset density. Similarly, no associations were present between maternal reported depression and any form of walkable community asset density. This was surprising and contrary to the hypotheses of the study, which posited that the presence of these assets in the walkable vicinity of family houses would have a positive impact on mental
health. While hierarchical linear modeling revealed that the context of family poverty has effects on child depression depending on the community area for children in this sample, this relation is not explained by the density of community assets within a half-mile radius of family homes. It is possible that the half-mile “walkability” radius that has been recommended in past research is less relevant in the context of an urban environment with access to public transportation and vehicles. Additionally, given that the current study measured density and availability but not utility of the community assets, it is impossible to know whether families had awareness of or were utilizing these assets, which may impact expected effect on parent and child symptoms.

Some differences were found in terms of community asset density across community areas. No differences existed across community areas with regard to afterschool programming density, school climate, child self-report of depression, parent report of depression, or parent report of child depression. However, Spanish parish density was significantly different across community areas, with families on the far North side having significantly reduced access Spanish Catholic services when compared to families on the Southwest side and the West side. Further, the West side had significantly higher density of mental health centers when compared to the Northwest side and the Southwest side. This effect was also present for Spanish outpatient mental health service density, such that the West side had significantly more Spanish outpatient mental health services available when compared to the Northwest side, the Southwest side, and the Far North side. Although these effects were unrelated to parent and child symptoms in this sample, this information could be beneficial to policymakers and mental health providers in the city of Chicago, as the Northwest, Southwest, and Far North Side represent Spanish-language outpatient mental health service deserts for children and families, and may benefit from the establishment
of satellite clinics. This finding additionally points to the utility of ArcGIS methodology in locating the presence of mental health service deserts for special populations. Future studies may use this methodology along with survey data in which participants report on need for services in order to locate and visually represent areas of growth for policymakers.

**Limitations of the Current Study and Future Directions**

The present study had a number of limitations. First, despite the multi-method nature of this study, many significant associations were between parent-reported variables, which introduces the possibility of single-reporter bias. Future studies could utilize diagnostic interviews with children for a more robust and clinically meaningful measure of depression. Second, our sample was limited to low-income Mexican-immigrant families, which limits generalizability of the findings, and represents an important consideration when conceptualizing the broader Latinx population. Further, the sample was quite small, and due to limitations of the data, families living outside of the borders of the city of Chicago were dropped from moderations and moderated mediations using geographic density variables. In order to examine the influence of community assets on depression development in families, it would be important for future studies to recruit and utilize a larger sample size.

Additional limitations to the current study involve geographic density variables, which were obtained through publicly available data sources, including Chicago Data Portal, the National Directory of Mental Health Facilities, and the Archdiocese parish directory in order to create walkable density maps and community area density maps. The current study did not measure participants’ identification or utilization of services, which constitutes a significant limitation. Additionally, the current study excluded faith communities outside Roman Catholicism, which
may have been relevant sources of community support for some families in the study. Available data on religion in Mexican American communities demonstrates many regional differences across the United States, for example, in Texas roughly half of Mexican Americans identify as Protestant (Perl, Greeley & Grey, 2006). Additionally, of Latinos that identify as Roman Catholic, a significant percentage identify as “formerly Roman Catholic” and do not participate actively in church-based activities (Perl et al., 2006). Future studies on the effects of available community assets on mental health symptoms could benefit from the use of methodology that would capture the effects of utilization of subjective community assets on mental health symptoms, such as daily diary studies, in order to mitigate this limitation.

Of note, previous studies have used “subjective neighborhood” methodology by having children and adolescents report on variables such as social cohesion and community assets in order to characterize their own neighborhood (Aneshensel & Sucoff, 1996). Future studies may elect to have children and adolescents report on subjective availability of neighborhood community assets, utilization of said assets, and other relevant variables, such as social support within and outside of the immediate family context. Future studies may choose to involve families in the creation of maps based upon the community assets they are aware of and have utilized previously in order to capture utilization of both formal and informal community assets for each family in the sample.

School climate data was extracted from the publicly available CPS My School, My Voice 2013 Survey, and is not without limitations. Firstly, the response rate was highly variable among reporters (100% among students, 32% among superintendents). Response rates were highly variable among teachers and parents, and parent report was so low in some districts that the results
were omitted from the data set. The effects of discrepancies in response rates likely represents a significant selection bias in the data set, and thus constitutes a limitation to the current study. Additionally, the CPS My School, My Voice 2013 Survey accounted for school size in when analyzing teacher and administrator report, but school size data was not included in the publicly available data set. Thus, school size was unaccounted for in the current study, which represents another relevant limitation. Future studies accounting for school climate may consider the integration of school size data in analyses.

Additionally, the use of neighborhood poverty variables may help to disentangle the complex relationships between socioeconomic status and depression in families. Sociological theory suggests that neighborhood poverty’s effects on children are moderated by family income-to-needs (Crosnoe, 2009; Jencks and Mayer 1990). While the current study used hierarchical linear modeling to nest families within community areas when examining the effect of family income-to-needs on depression outcomes, future studies may replace family income-to-needs with geo-coded neighborhood poverty by census tract. However, this methodology may be more relevant to adolescent samples, as poverty researchers have argued that neighborhood poverty variables are more predictive of adolescent mental health outcomes than mental health outcomes of school aged-children (Aber, Gephart, Brooks-Gunn & Connell, 1997). It is additionally possible that the creation of a ratio that accounts for both neighborhood poverty and family income-to-needs may allow future studies to better capture the nature of the relationship between poverty and depression risk.

Another limitation to the current study is the measurement of walkable communities within the large urban environment of Chicago. While GIS mapping allows for the layering of
maps portraying structural barriers such as highways and rivers, it was not possible to account for these when creating the “walkability radii”, and as a result, these structural barriers were un accounted for. This is a methodological problem well-known to studies employing the ecological perspective, as selection into neighborhoods has been discussed as a limitation in a number of articles (Chung et al., 2020; Garbarino & Sherman, 1980). Beyond physical barriers, there exist invisible barriers in these contexts such as perceptions of crime in the area as well as awareness of the borders of gang territories (or turf), which may influence families’ willingness to travel freely within the walkability radii. In fact, a recent article on the influence of geography and social networks on gang violence argued that in many ways, gangs identify more strongly with neighborhoods than the typical resident, and underscored the importance of a nuanced understanding of gangs and their influence on urban neighborhood social networks (Papachristos, Hureau & Braga, 2013). The current study was unable to account for the influence of these and other invisible and structural barriers on the neighborhood context for the current sample.

Given the complexity of the development of mental health symptomatology, it is perhaps unsurprising that walkable community asset density and income-to-needs alone did not predict mental health symptoms for mothers and children. Notably, a very recent systematic review found 79 relevant studies which utilized GIS methodology in order to analyze mental healthcare data, and authors determined that only 15% of the studies published indicated “high usability”. As a result, authors argue that the use of geographical maps have limited capacity to represent complex, multi-dimensional non-geospatial information (i.e. mental health symptoms) at a high level (Chung et al., 2020). While such visualization technology has been theorized to be particu-
larly useful in approaching policy-making and targeting mental healthcare service deserts, au-
thors additionally argued, given the absence of literature indicating where the application of vis-
ual analytics with highly complex data has actually driven policy or funding decisions, that it re-
mains unclear as to whether policymakers find the use of this technology beneficial in decision
making (Chung et al., 2020). Despite theoretical links between physical neighborhoods and so-
cial networks, empirical research in the field of psychology may not benefit from the use of sta-
tistical models that capture spatial data alone, without collecting robust information on how so-
cial networks interact with geographical points of interest. Studies may choose to include
measures of adverse childhood events and poverty-related stressors in order to better elucidate
how environments may impact depression symptoms for both parents and children. Future stud-
ies should consider integrating social network research models that capture how individuals in-
teract with available community assets and how utilization may influence the development of
mental health symptomatology.
REFERENCE LIST


U.S. Census Bureau: State and County QuickFacts. Data derived from Population Estimates, American Community Survey, Census of Population and Housing, State and County Housing Unit Estimates, County Business Patterns, Nonemployer Statistics, Economic Census, Survey of Business Owners, Building Permits


VITA

Dr. Ros was born and raised in the suburbs of Chicago, Illinois. Before attending Loyola University Chicago, she attended the University of Illinois, Urbana-Champaign, where she earned a Bachelor of Science in Psychology, with Highest Distinction, in 2012, as well as a Bachelor’s degree in Spanish the same year. Since joining the Children Adapting to Stress and Adversity lab as a post-baccalaureate research assistant, Dr. Ros has been actively involved in multiple research projects including longitudinal research studies investigating stress and family coping among Mexican-origin immigrant families and a trauma-focused intervention project (Bounce Back) designed for elementary aged children. Her master’s thesis investigated the role of parental psychopathology and socioeconomic status on treatment gains for children in Bounce Back. Additional projects have included a focus group which investigated clinicians’ impressions of feasibility of dissemination of Bounce Back to Chicago Public Schools, and a preliminary evaluation of You’re Not Alone, a strengths-based, community-focused capacity building training initiative for teachers and mental health clinicians interacting with refugee children and families in the Chicagoland area.

Currently, Dr. Ros is completing her Child Clinical Psychology Internship at Stanford Children’s Hospital. She will begin a postdoctoral clinical fellowship at Children’s Health Council in August of 2020. She lives in San Mateo, California with her fiancé Ross, and her cat, Marcia.