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Washington University in St. Louis

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Impact of Parent Reported Adverse Experiences and Other Family Stressors on Child  
Development and Home Visitation Participation Among Immigrant Families

By

Fithi Andom

A dissertation presented to the Brown School of Washington University in St. Louis in  
partial fulfillment of the requirements for the degree of Doctor of Philosophy

April 2024

St. Louis, Missouri

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For Zuhar

My sun. My moon. My north star.

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*Fithi Andom*

*Washington University in St. Louis*

*April 2024*

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## **Abstract**

### **Impact of Parent Reported Adverse Experiences and Other Family Stressors on Child Development and Home Visitation Participation Among Immigrant Families**

Fithi Andom

Doctor of Philosophy in Social Work

The Brown School, Washington University in St. Louis, 2024

Professor Melissa Jonson-Reid, Chair

This dissertation examines variations in early childhood developmental and socioemotional health as well as level of participation in home visitation among recent immigrant families according to reports of adverse experiences (including poverty, intimate partner violence (IPV), and prior history of child protective services (CPS) involvement), maternal depression, and parent–child relationship measures. The period of early childhood is dependent on positive parenting to support optimum development, but parenting may be particularly sensitive to the detrimental influences of adverse experiences. Less is known about how the relationship between parenting, adverse experiences, and child development may differ for immigrant families. Home visitation has been noted as an effective means of promoting positive parenting and child development and may act as a buffer for adverse experiences and other potential strains on parenting, like maternal depression. However, research on the impact of home visitation across developmental domains is scarce with mixed results. Child outcomes may vary by the presence of specific stressors, and there is scant research related to immigrant families. To help fill these gaps, this study uses data from a nationally available home visitation program (Parents as Teachers, PAT) to understand the

relationship between family stressors (adverse experiences and maternal depression), parenting, child development, and participation in home visiting among immigrant families. A particular focus is on the potential effects of parent-reported IPV, maternal depression, and parent reports of CPS involvement. Analyses are guided by attachment theory and an ecological stress model. Data come from the PAT electronic data system, which includes data from affiliates who meet essential requirements and standards in 41 states. The sample included all families noted as recent immigrants (less than 5 years ago) according to baseline PAT assessment from 2010 to 2022 ( $N=6,130$ ). The sample size for specific aims varies because of the variation in program measures reported. This three-paper dissertation included one aim for each paper: (Paper 1) to examine the association between family stressors, parent–child interaction, maternal depression, and early childhood development among immigrants to the U.S. at enrollment in home visitation; (Paper 2) to examine the risk factors associated with family CPS involvement and home visitation engagement among immigrants enrolled in home visitation; (Paper 3) to examine the association between parent IPV, other family stressors, families’ home visiting engagement, and longer term child socioemotional development among young children in immigrant families. Paper one’s research questions were answered using multinomial logistic regression, with outcomes being whether a child was in the normal, borderline, or concerning range at baseline. Mediation analyses tested the role of parent–child attachment, maternal depression and family stress. In Paper two, I used logistic regression to derive propensity scores for CPS involvement, which were then used in a multinomial regression to predict the duration of home visitation involvement. In Paper



three, I present a path analysis to understand how baseline characteristics and home visitation participation may impact later socioemotional development outcomes.

Immigrant families in the sample had an elevated prevalence of developmental delay compared to the national rate. Children with disability, low birth weight and male gender were at high risk for developmental delay. Additionally, the quality of the parent-child relationship and maternal depression were significantly associated with early childhood socioemotional and cognitive developmental delay but not related to motor development. IPV was a significant risk for CPS involvement, along with substance abuse, teen parenthood, and parent mental illness. CPS-involved families were more likely to remain with PAT between 90 days and 1 year than shorter or longer. My findings indicate that maternal depression is a significant mediator in the relationship between early parent IPV exposure and later child socioemotional development. The mediated effect differed based on the time participating in home visiting rather than the number of visits. The findings suggest that concerns about child developmental delay among immigrants are high although the association with IPV, maternal depression, and developmental outcomes are not dissimilar to research with nonimmigrant populations. Given other literature that suggests a higher risk of trauma experiences and related mental health difficulties within certain immigrant populations, however, my findings suggest that effective response to such screening results may be particularly salient.

## Chapter 1: Introduction

Early childhood is a significant period of developmental growth and arguably the most sensitive to developmental insults related to parent–child relationships (Tran et al., 2017; Van Ee et al., 2016). Early adverse events experienced by infants, toddlers, and preschoolers may have toxic effects on their development (Herman-Smith, 2013). The long-term impact of such stressors may include internalizing problems (McEwen & McEwen, 2017; Wood & Sommers, 2011), symptoms of psychiatric disorders (Gartland et al., 2021), and physical health problems (Bair-Merritt et al., 2006). One possible mechanism for the impact of stress and trauma on child development is through attachment. Attachment theory predicts that exposure to traumatic (e.g., intimate partner violence, IPV) and other stressors (e.g., poverty) will lead to negative attachment behaviors that increase poor parent–child relationships and abusive parenting behaviors (Blakely & Dziadosz, 2015; Holmes, 2014). When this damage to attachment is frequent and persistent, it can result in short-term and long-term interpersonal, developmental, cognitive, and mental health problems for children affected (Boyce, 2014; Chiesa et al., 2018; Hornor, 2015). Such impacts may be exacerbated by maternal depression (Śliwerski et al., 2020). Much is less known, however, regarding how or if patterns differ for immigrant children, as the vast majority of the literature has focused on nonimmigrant families in the U.S..

Immigrants in the U.S. are considered to be an understudied and underserved population (Lee & Hadeed, 2009; Millett, 2016; Saechao et al., 2012). Studies have shown that immigrants are some of the most vulnerable populations with high experience of trauma, PTSD, and adverse health outcomes compared to the general population (Grant & Guerin, 2014; Shi et al., 2021). A growing body of evidence also suggests that migration-related adverse experiences may have a detrimental effect on child outcomes due to acculturation stress as well as other adverse

experiences (Anakwenze & Rasmussen, 2021; Cao et al., 2023; Cerdeña et al., 2021; Yoon et al., 2013).

The relative impact of stress and adverse experiences on families may be offset by resilience factors, positive parent–child interaction, or intervention. Home visitation research suggests that early intervention may positively impact child health, physical and psychosocial development, and cognitive outcomes among families with young children (Casillas et al., 2016; Chartier et al., 2017; Molloy et al., 2021). Despite their popularity, very little research has been done on home-visiting programs to measure their effectiveness in real-world conditions outside of randomized controlled trials (Chartier et al., 2017). Some research suggests that positive impacts are limited by other factors such as maternal depression (Jonson-Reid et al., 2018; Molina et al., 2020), IPV (Sharps et al., 2008), and program engagement over time (Hernández et al., 2019; Janczewski et al., 2019). However, relatively little work has been done to understand the participation and outcomes of immigrant families enrolled in home visitation programs (Park & Katsiaficas, 2019).

In the United States, about a quarter of children have immigrant parents (Millett, 2016). Although significant funding has been devoted to expanding the availability of home visitation for U.S. families to improve child development outcomes (HRSA, 2016), the lack of information about parenting, child development, and home visitation specific to immigrant families is concerning. It is not clear how or if adverse experiences may manifest differently for immigrant populations. Nor is it clear how participation in home visiting may moderate such associations. This dissertation aims to help fill gaps in the understanding of the impact of adverse experiences and maternal depression on child development as well as home visitation participation among immigrant families.

## **Definitions**

The following definitions are used in the present study.

### **Immigrant**

The label immigrant in the U.S. varies in definition and what it includes. It is used to describe voluntarily immigrants, refugees who come to the U.S. due to specific conflicts or persecution in their country of origin, and those who may be considered undocumented and may have experiences similar to that of either refugee (forced) or immigrant populations who migrate for economic opportunity but cannot qualify for legal entry (Akinsulure-Smith, 2017; Budiman, 2020). There may also be variations in research based on the recency of settling in the U.S. The present study relies on the definition used by the home visitation program at the time of enrollment. An immigrant family is defined as having come to the U.S. in the previous 5 years, and this definition does not differentiate by refugee or documentation status. Language spoken is used as a rough proxy for the region of origin.

### **Early Childhood and Development**

For the present study, early childhood was defined as the period from birth through age 3. Although studies may include the period up to kindergarten entry within this period, the present study is limited to the service period for Parents as Teachers (PAT) home visitation. Developmental outcomes in early childhood include cognitive and physical development as measured by the Ages and Stages Questionnaire 3 and socioemotional development as measured by the Ages and Stages SE, second edition. These measures can be given at regular intervals and are commonly used in home visitation research (Arbour et al., 2021; McKelvey et al., 2016).

### **Adverse Experiences at the Family Level**

In addition to a history of child protective services (CPS) involvement and IPV, other stressors are measured at enrollment into PAT home visitation and included as a measure of cumulative stress. These stressors include family structure, early age at parenthood, poverty, housing needs, and household dysfunctions such as substance abuse. Adverse childhood experiences have been measured in various ways and may have an independent impact on child development (Evans et al., 2013). As relevant for specific analyses, certain items called stressors by PAT were excluded from the count and served as independent variables. For Aim 1, child disability/chronic illness and low birth weight/preterm birth were excluded from the count because of the potential relationship to baseline developmental screening scores. For Aim 2, IPV is included in the cumulative stressors, but CPS is excluded and serves as a dependent and independent variable. For Aim 3, IPV is not a part of cumulative stressors as it serves as an independent variable, but CPS is included in the count.

### **Traumatic Stress**

For the present study, traumatic stress at the parent level is operationalized as parental report of IPV history at baseline and included as a separate variable in Aim 3. It was coded as a dichotomous variable (1 = yes, otherwise 0). A value of 1 indicated that parent/caregiver is a survivor of IPV per self-report, positive screening, or court proceedings. IPV includes physical, sexual, psychological violence, and economic coercion and is potentially traumatic for the adult caregiver as well as the child, either in regard to a direct threat to safety or indirectly through its impact on parenting (Lannert et al., 2014). This relationship may also be moderated by the development of maternal depression among women experiencing IPV (Holmes et al., 2017). It was not possible to ascertain if the IPV was ongoing.

## **Parenting**

Difficulties in parenting were measured according to known history with CPS as documented in PAT baseline records and measures of parent–child interaction. Although events leading to CPS reports do not always meet the definition as abusive or neglectful behavior, even unsubstantiated reports have been linked to poor health and developmental outcomes (Hussey et al., 2005; Kugler et al., 2019; Ryan et al., 2018). Parent–child interaction was also measured according to the Parenting Interaction with Children: Checklist for Observations Linked to Outcomes, which has been used in various settings (including home visitation) to measure the quality of parent–child interaction (Hughes-Belding et al., 2022).

## **Home Visiting Engagement**

Early childhood home visiting encompasses a wide range of programs, including paraprofessional models and nurse home visitation. In the present study, home visitation was limited to participation in PAT, one of the evidence-based programs recognized as eligible for funding in the Maternal Infant and Early Childhood Home Visiting legislation (HRSA, 2016). The PAT National Center (2017) developed the curriculum for the program, which features a PAT model in which certified parent educators visit parents and their children once a week, twice a month, or once every other month, depending on their needs. Because of the variation in suggested visits, engagement will be measured in two ways: total length of stay in home visitation and number of visits.

## **Organization**

The next chapter provides the background and theoretical framework for the dissertation and concludes with the rationale for the aims and overall description of the data source and sample. The three papers (one for each aim) follow next as separate chapters. The final chapter

concludes with an overall discussion of major findings, limitations, and implications for future policy, practice and research.

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## **Chapter 2: Empirical and Theoretical Background**

This chapter provides the background and theoretical framework for the dissertation research. The chapter concludes with the rationale for the aims and overall description of the data source and sample.

### **Literature Review**

About 45 million immigrants in the U.S. make up 13.7% of the population, three million of whom are refugees (Budiman, 2020). In the United States, about 1 in 4 children has immigrant parents (Millett, 2016). Asian and Latino populations comprise the majority of American children of immigrants, collectively representing 77% of immigrants to the United States (Kim, Nicodimos, et al., 2018; Passel & Cohn, 2015;). Children of immigrants may be immigrants themselves or have been born in the U.S. to immigrant parents; their status may be legal or unauthorized (Hernandez et al., 2011; Vargas, 2015). Beyond the racial/ethnic composition, within the immigrant population, there are a diverse array of subgroups related to the reason for coming to the U.S., their legal status, and other relocation-related experiences. Of all refugees and asylees resettled in the U.S. in 2007, for instance an estimated 33% were African refugees (Akinsulure-Smith, 2017). About a quarter of U.S. immigrants are undocumented, with Mexicans making up the largest group of unauthorized immigrants (Budiman, 2020).

### **Stress Among Immigrant Families**

Immigrants in the U.S. are considered to be an understudied and underserved population (Lee & Hadeed, 2009; Millett, 2016; Saechao et al., 2012). Immigrants may be some of the most vulnerable of U.S. populations, with high rates of experience of trauma, PTSD, and adverse health outcomes compared to the general population (Grant & Guerin, 2014; Shi et al., 2021). Migration-related trauma can persist, which may enhance the level of adverse childhood

experiences (ACEs) for children of immigrants (Murray, 2018; Yeh, 2003). Detrimental impacts on child outcomes have been associated with acculturation stress as well as other adverse experiences (Anakwenze & Rasmussen, 2021; Cerdeña et al., 2021; Cao et al., 2023; Yoon et al., 2013). IPV exposure alone can be associated with acute and long-term negative physiological, cognitive, and mental health outcomes in children (Cao et al., 2023).

In a systematic review of 15 studies, Timshel et al. (2017) evaluated the evidence on risks associated with family violence in immigrant families. They identified parent trauma exposure, mental health problems, substance abuse, parent–child interaction difficulties, and acculturation stress as risk factors for family violence among immigrant families. In turn, these accounted for 30%–50% child maltreatment prevalence rate. These findings are consistent with research that identified strong associations between maternal IPV, other family level stressors and involvement with child protection (Janczewski et al., 2023). Miao et al. (2018) examined the impact of acculturation stress in a sample of 182 Chinese immigrant families. They found that high levels of acculturation were negatively associated with positive parenting. Similarly, Liu et al. (2020a) studied parenting stress in a sample of 255 Chinese immigrants in New York City and found that immigrant parents with low education, low income, and unemployment were positively associated with harsh parenting and parent–child conflict. Of course, immigrant families come from a wide range of cultures and regions, making it unclear how universal such associations may be. Although a precise measure of country of origin was not available, a regional proxy is possible using languages spoken in the immigrant households.



## **Early Childhood and Early Childhood Adverse Experiences**

ACEs among young children in the U.S. are common (Crouch et al., 2019). Rates of ACEs in low and middle-income countries, where many immigrants to the U.S. originate, vary widely from less than 2% to upwards of 80% (Solberg & Peters, 2020). An extensive body of literature has recognized exposure to trauma (e.g., IPV) and other ACEs as major public health problems associated with environmental threats to emotional wellbeing for children and families with increased risk for depression, anxiety, and other long-lasting developmental and mental health issues (Alisic et al., 2014; Han & Stewart, 2014; Harding et al., 2013; McLaughlin et al., 2012). Additionally, caregivers' poor mental health (Fuentes-Balderrama et al., 2023) and emotional withdrawal (Anakwenze & Rasmussen, 2021) associated with adverse family experiences may affect parenting behaviors (Freisthler et al., 2021; Miao et al., 2018) and child behavior and developmental outcomes (Fuligni & Yoshikawa, 2014; McEwen & McEwen, 2017).

Early adversity is problematic in terms of both direct physical effects of deprivation or harm as well as problematic caregiver–child interactions that may not provide a child with the emotional and cognitive inputs for healthy brain development (Cprek et al., 2020; Jonson-Reid et al., 2018). Young children are also particularly vulnerable to environmental insults like poverty that may cooccur with other stressors (Luby et al., 2013). Up to one-third of low income families are immigrants (Segal & Mayadas, 2005). Generally, exposure to multiple adversities in early childhood is associated with worse outcomes (Liming & Grube, 2018). Although the research on immigrant populations and child development is relatively scant, some studies have found that low levels of immigrant wellbeing negatively impact parenting behavior, child safety, and developmental outcomes (Lembcke et al., 2020). In their study with Syrian refugees, for

instance, Sim et al. (2018) found that maternal psychological distress was positively associated with parenting and child psychosocial difficulties. The present study includes measures of parent-reported adversity and stress at baseline as well as the presence or absence of concerns with maternal depression.

### **Protective Factors**

Although ACEs place a child at risk of poor outcomes, the research literature has identified possible protective factors such as positive interaction between a parent and child (Luby et al., 2013; Webster, 2022). A number of researchers have suggested that supporting families through early childhood programming may promote resilience despite ACEs (Sciaraffa et al., 2018). Home visitation research indicates that early intervention may positively impact child health, physical and psychosocial development, and cognitive outcomes among families with young children (Casillas et al., 2016; Chartier et al., 2017; Molloy et al., 2021).

In 2018, Congress reauthorized \$400 million per year through the Maternal, Infant, and Early Childhood Home Visiting Program (MIECHV) to strengthen and expand programs (HRSA, 2024). The majority of these funds are earmarked for expanding access to evidence-based programs such as Parents as Teachers (PAT). Despite their popularity, home-visiting programs have received very little research to measure their effectiveness in real-world conditions outside of randomized controlled trials (Chartier et al., 2017).

Research on home visitation suggests a substantial representation of families with indicators of IPV, CPS involvement, and other stressors (Janczewski et al., 2023; Jonson-Reid et al., 2018). Less is known about the engagement and outcomes for these families. This is an important gap since some research suggests that positive impacts are limited by other factors, such as maternal depression (Jonson-Reid et al., 2018; Molina et al., 2020) and program

engagement over time (Hernández et al., 2019; Janczewski et al., 2019). Additionally, little work has been done to understand the participation of and outcomes for immigrant families enrolled in home visitation, in part due to a lack of data that identifies immigrant status (Park & Katsiaficas, 2019). The current body of literature does not adequately address how ACEs and IPV exposure may impact developmental pathways among children of immigrants (Murray, 2018; Wood Sommers, 2011). The scant available data on acculturation stress and mental health for children of immigrants reveals that family stress associated with adverse experiences and daily hardship may increase the risk of internalizing and externalizing problems in children of immigrant families (Anakwenze & Rasmussen, 2021; Cao et al., 2023; Garcia et al., 2018; Saint-Jean et al., 2008). Although ACEs and parenting have been extensively researched in Western families from high-income countries, less research has examined these relationships in immigrant families and even less is known about how early intervention can moderate these relationships.

### ***Healthy Immigrant Paradox***

Although some research suggests that immigrants have a higher likelihood of exposure to stress and adverse experiences (Vaughn et al., 2017), some prior work has also identified what is known as an *immigrant paradox* (Millet, 2016; Zhang et al., 2021). This term describes an apparent protective effect of first-generation immigrant status in regard to ACEs and health outcomes; however, much of this research has focused on self-report of adults who immigrated many years ago (Vaughn et al., 2017). Research specific to early childhood has been focused on maternal and infant health (Mendoza, 2009). A small body of work has explored maltreatment but is typically limited to Hispanic populations due to the lack of more specific immigrant categories in available data (Millett, 2016). Other work has focused narrowly on single populations (e.g., Liu et al., 2020b; Miao et al., 2018) or has combined recent immigrants with

second and third-generation families (Cardoso et al., 2014). Differences within the immigrant populations also confound such work. For example, the rate of IPV among immigrant women in the U.S. has been found to vary widely depending on the country of origin and measures used (Morrison et al., 2024). Overall, it is unclear if immigrant families may have higher or lower rates of ACEs and whether or not these experiences are associated with higher or lower rates of child development problems.

### **Theoretical Framework**

This dissertation was guided by a theoretical framework integrating aspects of both biopsychosocial theories of stress and parenting and attachment theory, informed by the import of context as illustrated by ecological frameworks.

#### **Attachment Theory**

Attachment theory provides a solid theoretical and empirical framework for understanding how child adverse experiences and exposure to trauma research may impact child outcomes through the import of family relationships (George & Solomon, 1996). Attachment theory stipulates that children's experience of relationships with a secure and positive caregiver, or lack thereof, significantly impacts their socioemotional development and ability to function throughout their lives (Bretherton, 1992). Attachment theory has three interrelated concepts: attachment style, attachment behavior, and the internal working model (Blakely & Dziadosz, 2015). Attachment style refers to the type and quality of an individual's attachment to others, classified as secure and insecure (Capaldo & Perrella, 2018). Insecure attachment is further classified into avoidant, resistant, and disorganized. For a child to be securely attached is to feel safe and secure. On the other hand, insecurely attached children constantly need safety and

security and might appear clingy, anxious, whiney, or difficult to soothe (Holmes, 2014; Blakely & Dziadosz, 2015).

Attachment behavior refers to an individual's behavior to attain or keep proximity to preferred attachment figures (Holmes, 2014). Linking the concepts of attachment style and behavior, the theory holds that through attachment bonds with caregivers, children develop internal working models, a blueprint of how they view themselves, others, and later relationships that form (Howe, 1999). The theory's application in developmental psychopathology has included a diverse range of families parenting in adversity, including families with depression, families with various trauma and maltreatment history, as well as in intervention studies with families with low social support and behavior problem children (Bretherton, 1992; Friend, 2012; Malekpour, 2007; Talley, 2018; Ziegenhain, 2004).

### ***Theory Relevance to the Current Study***

Attachment theory suggests that adversity and trauma (e.g., child maltreatment, IPV) interrupt attachment processes and parental sensitivity, thereby impacting child development. Schelbe and Geiger (2017) contended that children with a history of relational trauma have insecure attachment styles and are likely to experience various challenges in interpersonal relationships related to their psychosocial functioning. Although research on attachment and its relation to socioemotional development is more commonly reported, according to West et al. (2013), negative attachment styles predict worse cognitive outcomes. Attachment theory further stipulates that trauma-exposed children are likely to be raised in an unstable home characterized by inconsistent parenting, supervision, and discipline, which shapes their internal working model and their attachment style, which in turn may influence their negative attachment and development outcomes (Langevin et al., 2022; Narayan et al., 2021). Attachment, however, is

amenable to intervention, suggesting that home visiting models that include attention to parent–child interaction may help buffer threats to attachment or negative attachment at baseline. Many home visiting programs seek to address parent–child interaction and attachment. Attachment-based home visiting programs for early childhood thus aim to improve caregivers’ sensitivity to their children and strengthen families’ social support to change the dysfunctional interaction patterns that undermine their children’s developmental outcomes as a result of their experience of trauma (Chartier et al., 2017; Molloy et al., 2021; Moss et al., 2011; Nygren et al., 2018). In the present study, potential problems with parent–child interaction are measured by the presence of prior involvement with child protection and a direct measure of attachment (e.g., Parenting Interaction with Children: Checklist for Observations Linked to Outcomes [PICCOLO]; Hughes-Belding et al., 2022).

### **The Biopsychosocial Model of Stress**

Stress is a combination of psychological and physical reactions to complex interactions between critical events and people’s experiences, as outlined in The biopsychosocial model of stress (Bernard & Krupat, 1994). Based on this model, stress consists of three components: the external environment, the individual’s biological and psychological reactions to stress, and the interaction between the individual and the environment. According to this model, stress is triggered by an individual’s interpretation of the environment, which leads to differing mental and physical reactions. Research based on this model has explored the cognitive and health outcomes related to stressful events like premigration traumatic experiences (Rousseau et al., 2004), postmigration stressors related to acculturation (Park et al., 2014; Saechao et al., 2012; Yakushko et al., 2008); English proficiency (Lueck & Wilson, 2011; Takeuchi et al., 2007); economic struggles (Marshall et al., 2005; Mendoza et al., 2017) and social exclusion (Alegría et

al., 2017) associated with high rates of PTSD and major depression in immigrant families.

Although the present study was unable to pinpoint whether stress is premigration or postmigration, all families are recent immigrants to the U.S. (within 5 years of PAT enrollment), and a measure of current maternal depression and preexisting ACEs were available.

### ***Biological and Psychological Reactions to Stress***

Premigration adverse experiences of loss and trauma, and postmigration disadvantages such as language barrier and lack of adequate social support are associated with mental health challenges in immigrant families (Saechao et al., 2012; Sangalang et al., 2019; Sirin et al., 2013). Acculturative stress, the stress of living in a foreign culture, has been shown to increase the likelihood of mental illness, such as major depression and somatic disorders in immigrants (Bas-Sarmiento et al., 2017; Choy et al., 2021). In a systematic review of acculturation stress ( $N = 21$ ), Choy et al. (2021) found that low education, low economic status, and language proficiency issues were factors associated with increased stress and poor mental health outcomes in immigrants. Stress related to immigrant families' acculturation experiences also influences family dynamics (such as parenting and family conflict), shaping children's psychosocial adjustment and developmental outcomes (Fuligni & Yoshikawa, 2014; Miao et al., 2018; Yoo, 2019). Based on the ecological stress model and attachment theory, a chain of family processes is hypothesized to influence child safety and development as a result of stress. Stress impacts parents' emotional distress, undermines interpersonal relationships, and, in turn, compromises parenting behaviors, thereby negatively affecting children (Freisthler et al., 2021; Kim et al., 2018; Liu et al., 2020a) The present study was able to capture a range of stressors measured in prior literature but lacked a specific measure of acculturative stress.

There is ample empirical evidence of the lasting physiological impact of childhood adverse experiences across the lifespan (Barker et al., 2015; Coates, 2010; Mehta et al., 2021). Chronic stress and trauma (e.g., IPV exposure) impact children's brain development (Watters & Martin, 2021), which may cause developmental delay (Scarborough et al., 2009), learning disability (Veltman & Browne, 2001), increased cortisol levels associated with dysregulated nervous system and physiological reactivity (Alink et al., 2012), and shortening of telomere length associated with premature aging (Vincent et al., 2017). The hippocampus and amygdala (part of the brain associated with memory formation and emotional reactivity) are impacted by early childhood adverse experiences (Mehta et al., 2021). The prefrontal cortex of the brain related to higher-order executive functioning may also be compromised, which results in difficulty with emotion regulation and executive functioning (Chen & Fagundes, 2022; Dvir et al., 2014; McEwen, 2017) and threat reactivity (McLaughlin et al., 2014). The psychological dynamic of the biopsychosocial model highlights the interaction between biological and psychological aspects of the trauma-exposed child related to their cognitive, emotional, and behavioral outcomes. Watters and Martin (2021) have argued that mental health symptoms, such as PTSD, anxiety, depression, suicidality, etc., are actually the effects of early childhood adverse experiences as manifested in brain development. Although the present study was unable to measure such long-term outcomes, it is important to understand the prevalence of trauma and other adverse experiences, how and if shorter-term emotional development problems may be emerging within immigrant families, and whether these appear to be moderated by home visitation.



### *Model Relevance to the Current Study*

Because of the children's young age in the present sample, stress refers primarily to the adult context that then impacts parenting behaviors. According to the stress model, stressors (such as lack of employment, low education, low income, and single parenting), lack of social support, and perception of stressors may increase the likelihood that immigrant parents will struggle with mental health challenges (Sangalang et al., 2019); engage in harmful parenting behaviors (Liu et al., 2020a); Fuentes-Balderrama et al., 2023) affecting children's relational health and overall social wellbeing. As discussed previously, the quality of parent-child interaction influences children's attachment and relational skills, with deficits seriously impacting their overall psychosocial functioning (Afifah Ridhuan et al., 2021).

Among the various models of how stress impacts families, the double ABCX model of family stress and adaptation (McCubbin et al., 1983) makes clear that stressors accumulate over time, leading to adverse events, like depression or child maltreatment, unless there are sufficient protective buffers (e.g., self-care, social supports). Taken together, attachment theory and the biopsychosocial stress models help to deepen the understanding of the theoretical explanation for the impact of parent trauma and stress on child wellbeing and its complex outcomes on affected children across the lifespan. The double ABCX model specifically adds the dimension of a buffer. Home visitation may buffer the impact of risk and reduce the risk of poor outcomes through formal social support, referral to services, or parenting training. Further, as stated earlier, if risks do not relate to similarly poor child outcomes within an immigrant population, this may be evidence of the immigrant paradox.

It is also important to incorporate aspects of the ecological framework that remind us of the importance of a broader context (Belsky, 1984). Children exist within the settings of family,

society, and culture (Metwally et al., 2016), and their early development is shaped and impacted by positive interaction and stimulation in all these settings (Tran et al., 2017). For example, cultural contexts are unique to each immigrant community and often vary by family within communities. PAT programs are delivered somewhat differently (Lahti et al., 2019) in different regions, which might impact program outcomes. Although specific community characteristics are not available, analyses can be adjusted for clustering by service region.

### **The Present Study**

The present dissertation used electronic data from the PAT national Penelope database to explore how stress, parental trauma (i.e., IPV), parental depression and parenting–child interaction are associated with child developmental outcomes across domains among immigrant families.

#### **Study Setting: U.S. Parents as Teachers**

PAT is an evidence-based home-visiting intervention that offers parenting education and support to children from prenatal to kindergarten (PAT National Center [PATNC], 2022). PATNC (2017) developed the curriculum for the program, which features a PAT model where certified parent educators visit parents and their children once a week, twice a month, or once every other month, depending on their needs. Each visit includes the following goals: (a) education of parents about early childhood development; (b) promoting positive parent–child interactions by improving parenting practices; (c) screening for developmental delays or health concerns; (d) strengthening family protective factors to prevent child abuse and neglect and (e) encouraging daily play activities that promote children’s brain development to improve school readiness. Parent–child interaction, development-centered parenting, and family wellbeing are key elements of the PAT curriculum (Lahti et al., 2019). Cultural competency is another key

component of the PAT Foundational Training Guide (PATNC, 2017). It encourages parent educators to understand the cultures of the families they serve to provide culturally appropriate parent education and structured home visits. All programs are encouraged, though not mandated, to use the PAT electronic record system to capture all assessment and service information. As of 2023, data on more than 150,000 families across the country were included. Generally, programs that have achieved the highest rating on fidelity to the PAT model are most likely to use the national electronic records system. Data are currently provided by such programs across 41 states. Although lack of full coverage is a limitation, the participation of those programs deemed to be most compliant with the essential components of PAT allows for some assurance that findings are reflective of the complete program model. It is also one of the only known data sources on an immigrant population with a sufficient sample size for multivariate modeling.

### **Study Aims**

This three paper dissertation includes three aims and related research questions:

Aim 1: To examine the association between family stress, maternal depression, parent-child interaction, and early childhood development among immigrants to the U.S. at enrollment in home visitation. Little research is available on how stressors, ACEs and parenting challenges interact among immigrant populations (Berge et al., 2020; Dosanjh et al., 2023). It is possible that the impact of stress may be lower among immigrant families compared to existing work on nonimmigrant families due to the healthy immigrant effect (Millett, 2016), but this impact may also vary by country of origin (LaBrenz et al., 2020). Although a specific country of origin was not available, the present study created a proxy for the region of origin based on the languages spoken at home. Data for Aim 1 were limited to variables collected at the time of enrollment and baseline assessment in a PAT program. Child development in the present paper refers to

cognitive (including communication, personal-social, and problem-solving), motor (gross and fine motor) as measured by the Ages and Stages Questionnaire 3, and socioemotional development measured with the Ages and Stages SE. For Aim 1, stressors were measured as a cumulative index.

RQ 1.1: What risk factors are associated with early childhood development delay for children of immigrants?

RQ 1.2. Are high levels of family stress associated with delays in child development controlling for other family demographics? Is the relationship moderated by parent–child interaction?

RQ 1.3: Is the effect of family stress on child development mediated by maternal depression and parent–child attachment?

Aim 2: To examine the risk factors associated with family child protective service (CPS) involvement and home visitation engagement among immigrants enrolled in home visitation. Prior research indicates that CPS involvement among families enrolled in home visitation is associated with the presence of a number of other stressors (Janczewski et al., 2023). Relatively little data is available on home visitation among CPS-involved families (Lee et al., 2018). Some data suggests that home visitation outcomes for the CPS-involved population may be limited by maternal depression (Jonson-Reid et al., 2018). No known data is available on factors associated with CPS involvement among immigrant families enrolled in home visitation.

RQ 2.1: What risk factors are associated with an immigrant family’s history of family CPS involvement?

RQ 2.2: Do families with a history of CPS involvement have differing levels of home visitation engagement?

Aim 3: To examine the association between parent IPV, other family stressors, families' home visiting engagement, and child socioemotional development among young children in immigrant families. Research suggests that IPV in the U.S. is common, though the prevalence among immigrant populations is less clear (Breiding et al., 2014; Morrison et al., 2024). Exposure to trauma may disrupt attachment and be particularly salient for children's socioemotional development (Treat et al., 2019). Exposure to trauma and other stressors may be buffered by participation in home visitation (McKelvey & Fitzgerald, 2020). However, some research suggests IPV may limit home visiting participation (Sharps et al., 2008). It is unclear how these relationships may hold for immigrant families.

RQ 3.1: Is parent IPV experience associated with level of maternal depression and child socioemotional development?

RQ 3.2: Is the association between parent IPV experience and child socioemotional development mediated by maternal depression?

RQ 3.3: Is the effect of IPV on child socioemotional development via maternal depression moderated by the number of home visits completed?

RQ 3.4: To what extent does the effect of IPV on child socioemotional development via maternal depression differ depending on different levels of home visiting?

### **Ethical Procedures**

#### **Data Access and Confidentiality**

This analysis uses longitudinal administrative data files from the Parent as Teachers (PAT) home visiting program electronic records system, Penelope. The data application was submitted to the PATNC and approved. Arrangements have been made for the secure and appropriate transfer of data files using the university Enterprise level Box system. Per PATNC's

approval, all the data files were received as of September 08, 2023, with a user license for my completion and publication of the dissertation. There was no potentially identifying information in the data files, and this, along with attention to adequate aggregation of all findings, assures confidentiality. To ensure data protection, data files were not used on any other computer than on the standalone, password-protected computer.

### **Human Subjects Review**

This dissertation used deidentified secondary data from a national data set and qualified for exempt from human subjects review status. The final study exemption was obtained from Washington University's Human Subjects Review Committee (#202311079).

### **Overall Sample and Data Cleaning**

The dissertation included data analyses from a large sample of immigrant households participating in PAT to examine early childhood outcomes and home visitation participation. Study participants were selected using a nonprobability sampling method based on their immigration status (within the past 5 years of PAT service enrollment), as noted in the PAT electronic data system. The base sample for this study included 6130 immigrant families who received home visits from a PAT home visiting program across 41 states from 2010–2022. In addition to racial/ethnic designations, linguistic groups were used to identify regions of origin of immigrant families within the sample group. Table 1 presents descriptive information before data cleaning for analyses according to whether the data came from the family, mother, or child files.

**Table 1***Sample Descriptive Statistics Prior to Data Cleaning*

	<i>n</i>	Valid % or Mean ( <i>SD</i> )
<b>Family File (N=6130)</b>		
Potential parenting challenges		
Teen parent household	654	10.7%
First time parent	1805	29.5%
Adoptive Parent	13	0.2%
Kin caregiver	98	1.6%
No High school diploma or GED	2509	40.9%
English second language	4348	70.9%
Low income household	4947	80.7%
Single parent household	1149	18.7%
Insecure housing	574	9.4%
Multiple children under age 6 <sup>a</sup>	1359	22.2%
Child disability	564	9.2%
Low birthweight/preterm	188	3.1%
Child behavior concerns	114	1.9%
Child achievement concerns	233	3.8%
Parent disability	241	3.9%
Parent mental illness	357	5.8%
Parent substance abuse	129	2.1%
Parent IPV	320	5.2%
Parent CPS involvement	126	2.1%
Death in family	179	2.9%
Families with 4 or more challenges <sup>b</sup>	2457	40.1%
<b>Family Program Participation</b>		
Family prenatal at program enrollment	962	15.7%
Family total visits	26.4	26.4(25.8)
Months enrolled in home visiting program	21.20	21.20(18.05)
Average monthly visits	1.4	1.4(1.14)
Family Structure		
Care-givers in the family	--	1(0.57)
Family members	3	3(1.00)
Urbanicity of Residence		
Urban	3602	59.3%
Rural	670	11%
Suburb	1809	29.7%
<b>Immigrant native region based on language</b>		
Europe	57	0.9%
Middle East	377	6.3%
South/East Asia	452	7.5%
Sub-Saharan Africa	154	2.6%

Latin America	3974	66%
Other (unknown)	1001	16.6%
<b>Maternal Information File (N=4039)</b>		
Self-report Race		
White	2287	56.6%
Black	384	9.5%
Asian	469	11.6%
Declined to report	342	8.5%
More than one race	200	4.9%
Self-report Ethnicity		
Hispanic or Latino	2701	66.9%
Education level		
Associate/Bachelor's degree or higher	1003	22.5%
Some college/technical training	594	13.3%
HS diploma/GED	1083	24.3%
Less than HS diploma	1779	39.9%
Child File (N=6240 prior to selecting 1 child per family)		
Child Sex		
Female	2918	46.7%
Male	3289	52.7%
Prenatal at data entry	24	0.4%
Child age in months	--	21.9(16.83)

*Note.* <sup>a</sup>Only children under age 3 would have PAT child data. <sup>b</sup> The cumulative risk cutoff (4+) was calculated based on ACEs Aware (2020). In some papers, the total number of categories omitted specific categories that served as specific outcomes or independent or moderator variables, as noted in specific papers/chapters.

Although PAT is not a means-tested program, of the primary caregivers enrolled in home visiting services, 80.7% were low-income. The average period of family enrollment in the program was about 21 months. About 71% were identified as having English as a second language. According to the language spoken in the home, the vast majority of immigrant families were from Latin America. At enrollment, slightly over 9% were aware their child had a specific disability or chronic illness, and slightly less than 2% noted child behavioral concerns. Parenting challenges were common, with slightly over 40% having four or more noted.

Initial data cleaning was performed in Excel, and data linkage was performed using SAS 9.4. Household demographic data, maternal depression, parent attachment, and young children's developmental outcomes were merged at the immigrant household level first. In 336 households,



information on more than one child under age three was collected. One child was randomly selected per family to allow analyses at the child per household level.

PAT allows some variability regarding screening instruments for parents and parenting, and child development instruments are not given before 2 months of age. Parent educators collected indicators for child development and family-related factors in collaboration with parents or caregivers. Table 2 provides sample size and corresponding differences in state participation by outcomes (program participation and child development) as well as moderators and mediators for specific analyses.

**Table 2**

*Study Sample Size by Outcome or Moderator//Mediator*

Indicators/Instrument	<i>N</i>		
	Household	States	Program sites
Program participation	6130	41	374
Child-level outcomes			
ASQ3	5011	40	344
ASQ-SE2	4726	40	329
Moderators/mediators			
PICCOLO	1463	28	146
EPDS	1714	26	155

The Ages and Stages Questionnaire—Third Edition (ASQ3) and the ASQ Social Emotional—Second Edition (ASQ-SE2) were applied to children aged 2–60 months. The PICCOLO assessment was applied to children aged 10–79 months and is therefore missing in all cases exiting the program prior to the applicable age not just according to the program. Edinburgh Postnatal Depression Scale (EPDS) was administered to 1714 mothers within 90 days after program enrollment and repeated annually thereafter. Thus, sample sizes vary in subsequent chapters based on the outcome and moderator/mediator variables included.

### Significance of the Study

The present study addresses a pressing public health issue of how early childhood adverse experiences impact developmental outcomes and persistence in home visitation in immigrant families. Given the high prevalence of trauma among refugee and immigrant populations in the U.S. (Cerdeña et al., 2021; Sangalang & Vang, 2017), as well as the significant number of immigrants in the U.S., understanding the effect of IPV and family stress on parenting and associated child outcomes is critical for developing culturally responsive and effective early prevention and intervention strategies. PAT is one of the home visitation models considered evidence-based, voluntary, and offered in all U.S. states and territories. Economic diversity within the sample is allowed because the program is not means-tested. Because particular risk factors do not gate participation, families may engage with lower or higher levels of risk. Such research is valuable because developing culturally responsive early interventions that consider the unique stressors for immigrants in addition to the general stressors experienced by all parents requires further understanding of the role of adverse family experiences on children's psychosocial and developmental outcomes for the immigrant population.

The study also adds to the literature on home visitation and outcomes, as prior work is scant specific to the immigrant population. The present study allows exploration of potential moderators of home visitation or child outcomes in prior work, including IPV and CPS involvement. Paper 2 focuses specifically on prior CPS involvement and how that may impact engagement in home visiting. Paper 3 specifically focuses on socioemotional health. Early IPV exposure is linked to negative cognitive, developmental, and child mental health outcomes (Gartland et al., 2021; Gibson et al., 2015; Wood & Sommers, 2011). There has been increasing interest in the impact and possible means of intervention related to IPV in home visitation, but

this research has not focused on immigrant families. With this study, I hope to benefit immigrant families by producing empirical evidence that can inform early screening, treatment/referral, and prevention interventions with families with high ACEs or trauma histories. The partner agency PATNC agreed to the present study due to interest in how results may be used to improve their home visiting services.

### **Overall Assumptions and Limitations**

I assumed that home-visiting participants answered all the PAT assessment questions honestly and that the nonmissing data entered by the home visitation program is valid and reliable. I also assumed the study sample consisted of refugees and immigrants, but no indicator of refugee status was available. Considering the diversity of identities, cultures, and nationalities in a sample group as refugees/immigrants, it is important to recognize the study sample has unaccounted for heterogeneity. However, an analysis of premigration trauma, current stress, and mental health between refugees and immigrants in the U.S. conducted by Sangalang et al. (2019) revealed that there is a similarity in the trauma exposure and psychosocial outcomes for both refugee and immigrant populations. Although attempts to disaggregate results by factors such as language groups were made, it is impossible to identify the country of origin or reason for immigration accurately.

Although the present sample is the largest exploration of stress and child outcomes among immigrant populations in the U.S., not all PAT programs report to the Penelope system; it is not possible to determine how similar or different immigrants enrolled in nonreporting programs are. Further, PAT is not the only home visitation program considered evidence-based and funded by MIECHV funds. No known data set allows for a comparison of how family characteristics differ across home visitation programs other than variations in the eligibility

criteria. Although the Penelope dataset contains information to explore theoretically connected conditions and program engagement among immigrants, programs vary in regard to the timing and use of some of the measures in the present study. Attempts are made to examine how data are missing by program ID; however, there may also be local processes for how or when specific measures are used outside the major instruments required for high-fidelity programs. Subsamples are compared according to demographic and other baseline characteristics to explore how generalizable these subgroups are, but systematic differences cannot be ruled out. Finally, no measure of the relationship between home visitors and families is available. Some research suggests that this matters in regard to engagement in home visitation (Burrell et al., 2018; Ramakrishnan et al., 2022). Future research will be necessary to explore cultural competency issues and relational factors for immigrant families involved in home visitation.

### **Conclusion**

As home visiting has become more prevalent and better funded over the past decade, understanding if immigrant populations experience similar relationships between stressors and parenting, as well as whether participation in home visiting programs helps offset potential threats to positive parenting, may offer insight into potential areas for improvement that can benefit future participants. The study of stress and traumatic stress, its impact, and how it presents in people who experience it, particularly with refugee and immigrant families enrolled in home visiting services, is lacking. In addition, there is a lack of intervention research that examines the moderating role of early childhood interventions on the impact of parent trauma through parenting. Hence, understanding the specific mechanisms through which adverse experiences affect child outcomes in immigrant families participating in home visitation is significant. It was also anticipated that the present analyses could be a starting place for a more

in-depth exploration of stress, parenting, and child development among specific immigrant populations.

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### **Chapter 3: Prevalence and Determinants of Early Childhood Developmental Delay in Children of Immigrants in the U.S**

#### **Abstract**

In this paper, the prevalence of and risks for developmental delay in children of immigrants among families enrolled in home visitation is explored. Guided by attachment theory and the ecological model of family stress, the study investigated the moderating role of the quality of the parent–child relationship in the association between family stress and children’s cognitive and socioemotional development. Attachment and maternal depression were examined as potential mediators. Using secondary data gathered during PAT home visiting program for immigrant households with non-missing child outcome information ( $N= 4950$ , 66% Hispanic), bivariate and multinomial logit and structural equation models were used. Results revealed approximately 30% of children of immigrants in the sample had at least one developmental delay by domain. Delay prevalence varied significantly according to maternal depression level, the quality of parent-child relationship, and child gender. High family stress (four or more stressors) was significantly associated with an increased rate of socioemotional delay. A multiple mediator path analysis revealed that the effects of family stressors were not mediated by parent–child attachment or maternal depression. These findings highlight the need for a heightened focus on services that may ameliorate early delays, as well as the need to engage immigrant families in services as early as possible.

## Introduction

Robust empirical evidence finds that early adverse experiences are associated with adverse childhood health outcomes, including developmental delay, behavior problems, and poor overall health (Oh et al., 2018; Crouch et al., 2019; Campbell et al., 2016). A review of studies ( $N = 14$ ) on adverse childhood experiences (ACEs) in low- and middle-income countries was conducted by Solberg and Peters (2020), which indicated an increase in ACEs was associated with greater risky behavior and adverse health outcomes across all countries, with ACE prevalence ranging from 1.9% to 80%. Despite the solid empirical evidence that indicates exposure to four or more adverse experiences increases the risk of negative physical health by 4 to 12 times (Hughes et al., 2017; Petrucci et al., 2019), the available data is primarily based on white samples from high-income countries, limiting its generalizability to ethnic minorities and immigrant populations in the U.S..

About 19% of the children from low and middle-income countries are delayed in development or are disabled (Wondmagegn et al., 2024), and between 16% and 17% of the U.S. children have a documented disability, both behavioral and developmental (Zablotsky et al., 2019). The association between adverse family experiences and poor child outcomes is well documented (Cprek et al., 2020; Haynes et al., 2020; Marie-Mitchell & Kostolansky, 2019). Little is known, however, about the effects of current family stress on child development in immigrant populations, notwithstanding 1 in 4 U.S. children has immigrant parents (Millett, 2016). Research on home visiting has also lacked focus on immigrant families. Understanding whether the baseline level of developmental concern for immigrant families involved in home visitation is higher or lower than the general population may better inform proactive service engagement strategies. When a child is not able to achieve developmental milestones by the

expected age, the child is considered to be experiencing a developmental delay (Martin-Herz et al., 2012). Nor is it clear how or if parent–child attachment or maternal depression may moderate or mediate this relationship.

Drawing on the family adverse experiences and child development literature, this paper examined the prevalence and determinants of early childhood potential for developmental delay among immigrant families in the U.S. that enroll in home visitation. Although prevalence rates of delay in low and middle income countries of origin may indicate higher levels of delay expected, it is unclear whether families enrolling in a voluntary program may be more likely to have lower rates. I also explore the role of maternal depression and the quality of the parent–child relationship in mediating the influence of adverse family experiences on children’s potential for developmental delay.

### **Background**

Early childhood is a critical developmental period involving the foundational development of age-appropriate cognitive, psychomotor, and socioemotional competencies (Black et al., 2017). However, not all children reach their full developmental potential owing to various family-related and sociocultural risk factors such as poverty, low education, and poor caregiver mental health (Ozkan et al., 2012; Yoshikawa et al., 2020). The prevalence of child development delay varies from country to country, with children in low and middle-income countries at a higher risk for delay. For instance, in a recent prevalence study, Gil et al. (2020) reported a prevalence of 10% in Europe and Asia and 42% in West and Central Africa. In the U.S., early developmental delay affects up to 17% of children (Zablotsky et al., 2019), with studies revealing racial and ethnic disparities in diagnosis and access to quality early intervention (Gallegos et al., 2021; Pope et al., 2022; Slopen et al., 2024). Risk factors associated with

increased risk for early childhood developmental delay are multifaceted and include the interplay between sociocultural and biological factors (Demirci & Kartal., 2018; Ozkan et al., 2012). Measuring the potential for developmental delay can help provide an opportunity for early intervention and preventive support for optimal child development.

Early exposure to extreme adversity can lead to a wide range of cognitive and emotional difficulties in children. The effects of family stress on a child's development are felt across multiple domains, including physical, social, emotional, and cognitive (Masarik & Conger, 2017). For instance, if children are raised in a resource-distressed environment, where violence is prevalent, neurobiological adaptations may result in later struggles to control their emotions and expose them to a broad range of health difficulties (Thompson et al., 2023). Indeed, biological sensitivity to adverse environmental signals may start as early as pregnancy (e.g., low birth weight and premature birth) and is often associated with concentrated poverty and maternal physical and mental health (Kayode et al., 2014). A low socioeconomic status is associated with a number of adverse child outcomes, including low birth weight among immigrants (Caporali et al., 2020; Racape et al., 2016). In a study of economic stress and parenting with 278 white and Mexican immigrant families, Parke et al. (2004) found that financial hardship was associated with maternal depressive symptoms, which in turn was associated with harsh parenting; maternal acculturation was linked to lower harsh parenting and increased marital problems which were associated with children's adjustment problems. Thus, various forms of family stress may limit parents' responsiveness and expose children to chronic stress associated with developmental health challenges such as emotional dysregulation, elevated blood pressure, weakened immune system, and cognitive and behavioral disability (De Weerth, 2018; Malinovskaya et al., 2018).

## **Risk Factors Associated With Child Development Delay**

Immigrants in the U.S. are known to have lower health insurance rates, use fewer health services, and receive poorer quality health care than Americans born in the U.S. (Chang, 2019; Derose et al., 2007). In addition to low socioeconomic status and lack of access to health services, undocumented immigrants' children face additional challenges, such as parental anxiety, separation fear, and acculturative stress, which can negatively affect their health and long-term development (Hainmueller et al., 2017). These factors may in turn generate differential outcomes compared to children of authorized immigrants (Ha et al., 2017; Wilson et al., 2020). The biopsychosocial stress model nestles the explanatory pathways of family stress and its influences on children's physical, socioemotional, and developmental outcomes within the frame of relational and environmental adverse experiences. Multiple individual, family, environmental, and sociopolitical stressors may impact immigrant families and their children's health and development.

Acute and chronic stressors (e.g., low SES) may put caregivers and children at risk for psychological distress and social maladjustment via disrupted parenting and additional environmental risks such as lack of social support (Masarik & Conger, 2017). Research shows early exposure to traumatic adverse experiences (e.g., child abuse) impacts children's brain development and may cause developmental delay or cognitive disability and lifelong stress-related diseases (Johnson et al., 2013; Lipscomb et al., 2021; Odgers & Jaffee, 2013). Evidence suggests that lower education and income (Millett, 2016), combined with recent immigrant status (Losoncz, 2015), may be a risk for heightened family stress as well as lower child and family wellbeing. Children of immigrants who report high economic hardship and acculturation stress have also been shown to have high levels of internalizing and externalizing behavior problems

(Mendoza et al., 2017). Additionally, single, teenage, first-time parenthood, as well as having multiple children under 6 years of age, can be major stressors with the potential to impact parenting and child psychosocial adjustment negatively (Armfield et al., 2021; Madigan et al., 2019; Putnam-Hornstein et al., 2015). Furthermore, evidence shows that child or parent disability (Bujnowska et al., 2019; Jenaro et al., 2020), parent incarceration (Poehlmann-Tynan et al., 2021), and family separation (Anakwenze & Rasmussen, 2021; Dreby, 2015) can be major contributors to family stress, especially in the absence of adequate social support.

Toxic stress can be described as chronic and frequent exposure to severe adverse events without the presence of supportive caregivers (J. S. Murray, 2018). Research suggests that immigrants may be some of the most vulnerable of U.S. populations with high rates of experience of trauma, PTSD, and adverse health outcomes compared to the general population (Grant & Guerin, 2014; Shi et al., 2021). Parental psychological distress may result from the negative experiences of displacement (LeBrun et al., 2015; Timshel et al., 2017). Parents' substance use, mental illness, economic hardship, child experiences of abuse, or exposure to intimate partner violence (IPV) are some of the major risk factors for toxic stress in early childhood (De Jong, 2016; Hornor, 2015; Johnson et al., 2013). One in 5 children under the age of 18 in the U.S. lives in poverty (Cox et al., 2018). Discrimination, lack of access to high-quality education and healthcare services, and lack of employment opportunities concentrate poverty in marginalized communities, including immigrant and refugee communities (Mendoza et al., 2017; Parolin, 2021). Poverty-related risks may severely impair parents' capacity to care for their children adequately, resulting in chronic stress in children, which is associated with a significant increase in serious illnesses and poor developmental outcomes (Cox et al., 2018; S. Murray, 2018).

There is a paucity of research, however, with immigrant and refugee families, particularly in the area of early childhood adverse experiences, risks for developmental delay, and pathways for protection. The scant available data focuses on adolescent children of immigrants and their risk-taking behaviors, including substance abuse (Pantin et al., 2003; Saint-Jean et al., 2008), or utilizes small sample qualitative studies (Artiga & Ubri, 2017), with major focus on children of undocumented Latino immigrants (Gutierrez & Dollar, 2023), or immigrant children and youth (Zetino et al., 2020), policy statements and conceptual literature reviews (Garner et al., 2021), or primarily focus on acculturative stress (Bekteshi & Kang, 2020). There is a need for research on the mechanisms of adverse experience risks and their impact on early childhood development outcomes through parent factors among the broader immigrant population to inform preventive intervention.

### ***Maternal Depression***

Maternal mental health, particularly depression, is associated with children's emotional and developmental outcomes. Researchers attribute this association to differences in how parents with and without depression interact with their children (Isobel et al., 2019). Mothers who experience depression, for example, may be irritable, less engaged, express less warmth, and initiate fewer playful interactions with their children compared to mothers who don't experience depression (Leijten, et al., 2020; Lovejoy et al., 2000). Maternal depression is associated with poor health and psychosocial outcomes in early childhood, such as poor emotion regulation skills (Sharkins et al., 2017), higher insecure attachment (Barnes & Theule, 2019), lower cognitive development (Liu et al., 2017), higher risk of child and adolescent psychopathology (Goodman et al., 2020), higher cortisol levels (Ulmer-Yaniv et al., 2018), and child psychomotor delay (Golding et al., 2014).

Depression may stem from current or prior maternal adverse experiences. Narayan et al. (2021) suggest that chronic mental health problems related to childhood trauma (e.g., PTSD) among caregivers increase the risk of poor parent–child relationships and negative parenting behavior, which also contributes to a higher risk of adverse childhood experiences (ACEs) in children. Langevin et al. (2022) also examined the role of emotional dysregulation in mothers and mother–child attachment on intergenerational continuity of child abuse with a sample of 186 Canadian mother–child dyads. They found that a history of physical neglect in mothers was associated with later emotional dysregulation in adulthood and maltreatment of their children. Stressors that occur both prior to and shortly following birth may increase postpartum depression (Reid & Taylor, 2015). These stressors may include socioeconomic challenges (Wang et al., 2011) as well as more acute trauma, such as IPV (Gustafsson et al., 2012). Thus, depression may impact the relationship between stress and later child development.

### **Parent–Child Relationship**

Research suggests the quality of the parent–child relationship influences many areas of children’s development (Berger & McLanahan, 2015). Positive caregiver–child relationships shape early child development through involved and responsive parenting practices (Bornstein & Putnick, 2022). In general, the literature suggests that high parental sensitivity to a child’s needs, parental support of babies and young children’s curiosity to discover their environment, and parent–child affectionate and encouraging interactions are associated with positive developmental outcomes for children improving cognitive and language development (Jeong et al., 2021), self-regulation (Speidel et al., 2020), psychosocial adjustment (Zimmer-Gembeck et al., 2022) and overall health and wellbeing (Bornstein & Putnick, 2022). Parent emotional availability (affection) and discipline strategies (responsiveness) are two domains of parenting



that can increase the influence of family adverse experiences on child development outcomes (Rowell & Neal-Barnett, 2022). From an attachment framework, they are both relevant during early childhood and directly influence children's later behavior (Narayan et al., 2021).

Family stressors and caregivers' emotional regulation capabilities can negatively influence parenting behaviors (Zimmer-Gembeck et al., 2022). Family stressors are associated with lower parent responsiveness to their children's needs, negatively impacting child cognitive and psychosocial outcomes (Dennis et al., 2018; Ward & Lee, 2020). Parent insensitivity and the absence of positive caregiver-child interactions prevent children from developing cognitive and socioemotional skills necessary for child adjustment (Goodman et al., 2017). Poor parenting behavior (e.g., harsh parenting) is also associated with poor child behavior regulation and lower cognitive development (Ayar et al., 2021). Caregiver-child warm and nurturing relationships may also prevent the neurobiological changes associated with stress, and interventions to build such relationships are particularly effective (Morris et al., 2021; Osher et al., 2021; Vu et al., 2015).

### **Families Engaged in Home Visitation**

Research on home visitation suggests a substantial representation of families with indicators of IPV, CPS involvement and other stressors (Janczewski et al., 2023; Jonson-Reid et al., 2018). Yet less is known about the engagement in home visitation for these families. Further, very little research has focused on immigrant families enrolled in home visitation. Families with fewer risks, more positive parent-child relationships, or greater facility with English may be more likely to seek additional support through home visitation (Park & Katsiaficas, 2019). Thus, it is unclear what level of family and child risk exists among immigrant families who choose to enroll in a universal home visitation program like Parents as Teachers (PAT).

## The Current Study

In this study I sought to help fill gaps in understanding of the impact of family stressors on early childhood development outcomes among immigrant families engaged in home visitation. The aim of this study was to examine the association between family stress, maternal depression, parent–child interaction, and early childhood development among immigrants to the U.S. at enrollment in home visitation. Little research is available on how stressors, ACEs and parenting challenges interact among immigrant populations (Berge et al., 2020; Dosanjh et al., 2023). It is possible that the impact of stress may be lower among immigrant families compared to existing work on nonimmigrant families due to the healthy immigrant effect (Millett, 2016), but this may also vary by country of origin (LaBrenz et al., 2020). It is also possible that the families enrolled in home visitation have lower risk and are less likely to have English language barriers (Park & Katsiaficas, 2019). This study addressed the following research questions: (1) What is the prevalence of and risk factors associated with early childhood development delay for children of immigrants? (2) Are high levels of family stress associated with delays in child development controlling for other family demographics? And is the relationship moderated by parent–child relationship? (3) Is the effect of family stress on child development mediated by maternal depression and parent–child attachment? I hypothesized that high levels of family stress would be associated with child development delay, and the quality of parent-child attachment would moderate the relationship. In addition, given previous evidence indicating that family stress influences child development through disrupted parenting and parent psychological distress (Masarik & Conger, 2017; Thompson, 2014), I hypothesized that the quality of parent–child attachment and the level of maternal depression would mediate the relationship between family stress and child development.

## Methods

The present study used a cross-sectional design to understand the baseline prevalence of and association of risks with developmental status of children in immigrant families participating in home visitation.

### Data and Sample

PAT is an evidence-based home-visiting intervention that offers parenting education and support to children from prenatal to kindergarten (PAT National Center [PATNC], 2022).

PATNC home visiting data recorded in their Penelope electronic system was used in the current study. As of 2023, data on more than 150,000 families across the country were included.

Generally, programs that have achieved the highest rating on fidelity to the PAT model are most likely to use the national electronic records system. Data are currently provided by such programs across 41 states. At enrollment, immigrant status is indicated according to whether or not the family has immigrated to the U.S. in the previous 5 years. Among families who enrolled in programs from 2010 to 2022 and were participating as of 2015, 6130 families were identified as immigrants (PATNC, 2022). For the current study, I restricted the sample to families with children between 2 and 60 months of age at enrollment. In addition, one child was randomly selected per family to follow. Thus, the final sample for this study was 4649 children in immigrant families (Mean age = 20.9 months;  $SD = 15.4$ ; 52.2% boys).

Parent educators completed observational assessments on children in collaboration with caregivers. The Ages and Stages Questionnaire (ASQ3) was completed for children aged 2–60 months ( $N = 4649$ ; 49.5% boys). The Ages and Stages Questionnaire: Socioemotional, Second Edition (ASQ:SE-2) was applied to children aged 2–60 months ( $n = 4274$ ; 49.3% boys). The sample size for specific analyses varies by assessment tool because program sites participating in

the PAT home visiting program varied in what indicators they completed for children and caregivers as part of the home visitation services (see Table 3). For example, the ASQ3 assessment was applied to children receiving home visiting services in 41 states, but only 41% of the program sites recorded depression assessments of mothers, and only 39% of the participating program sites applied Parenting Interaction with Children: Checklist for Observations Linked to Outcomes (PICCOLO) assessments to caregiver–child dyads. PICCOLO was completed for children aged 10–72 months ( $n = 1302$ ; 13.9% boys). Assessment of maternal depression was completed for mothers ( $n = 1448$ ; 72.1% Hispanic). Only the PICCOLO is compared in Table 4 as models including maternal depression did not converge.

## **Measures**

### ***Child Development***

The primary outcome measure of child development is the total cognitive, motor, and socioemotional development score for children at enrollment. The Ages and Stages Questionnaire (ASQ-3) measured children’s cognitive and motor development. The instrument measures five developmental domains—gross motor, fine motor, communication, problem-solving, and personal-social, with items rated as typical development, at risk for delay, and potential delay—need further assessment (Rothstein et al., 2017). The ASQ-3 instrument has been translated into multiple languages and validated, showing excellent test-retest reliability with diverse populations (Fauls et al., 2020; Gokiert et al., 2010). The cutoff score varies for each domain. The lower the score, the greater concern for cognitive and psychomotor delay, and further assessment with a professional may be needed. To assess the prevalence and relative risk for developmental delay between children showing age-appropriate development, children who screened positive for potential developmental delay, and those children at risk for developmental

delay, the five domains were collapsed into two distinct domains of cognitive (communication, personal social and problem solving combined) and motor (gross and fine motor combined). Additionally, a child-level cumulative score was based on the five developmental areas for a total score of child cognitive psychomotor development for the mediation test for Hypothesis 3.

Child socioemotional development was measured with the Ages and Stages: Social Emotional—Second Edition (ASQ:SE-2). The ASQ:SE-2 is a validated early childhood measure of socioemotional behaviors (de Wolff et al., 2013). As infants and toddlers develop relationships with nurturing and responsive adults, they learn how to communicate, identify and regulate their emotions, and get their needs met, which is referred to as socioemotional development (Rademacher & Koglin, 2018). As part of ASQ:SE-2, children are assessed in seven areas of socioemotional development: self-regulation, compliance, social communication, adaptive functioning, autonomy, affect, and interpersonal interaction. However, ASQ:SE-2 provides only one total score for socioemotional behaviors instead of providing scores for each area. A child's overall score can fall below the cutoff (typical development), in the monitoring zone (at risk for delay), or above the cutoff (potential delay). The cutoff is a score that varies by age. The higher the score, the greater concern for behavior and socioemotional delay, and further assessment with a professional may be needed. The instrument has been studied extensively, and psychometric studies show high reliability and internal consistency (Chen et al., 2017; Velikonja et al., 2017). With the PAT home visiting program, ASQ:SE-2 is done for all children enrolled at baseline and completed every 6 months by the parent, with the parent educator present to provide support when needed. A child-level cumulative score was based on the seven developmental areas: self-regulation, compliance, autonomy, social communication, and interpersonal relationships.

### ***Family Stressors***

Multiple family adverse experiences were measured from participant self-report, including five forms of household dysfunction (parent mental illness, substance use, IPV, incarceration, child abuse), four forms of environmental stressors (insecure housing, recent immigrant/refugee, low education, low income), and 10 forms of family stressors (teen parent, single parent, parent with disability, death in the family, child behavior concerns, first-time parents, multiple children under 6, and relative as a caregiver, child disability, low birth weight). The sample selection was based on the immigrants/refugee indicator; therefore, this was eliminated from the total score of stressors. Child disability and child low birth weight/preterm birth were also redacted from the total family stress score and used in data analysis as control variables given the obvious association with the cognitive and motor outcome measures. Each family's remaining adverse experiences were summed into an aggregate count. A continuous measure of family stress was used for path analysis. A categorical family stress variable was also created, with four stressors or more indicating high family stress for correlates at different levels of child development.

### ***Parent–Child Interaction***

Participant families in many programs ( $N = 28$  states) completed the 29-item PICCOLO, a widely used measure of parent–child relationship and parenting behavior (Roggman et al., 2013). Research with diverse populations shows that the measure has good internal reliability and construct validity (Norman & Christiansen, 2013; Roggman et al., 2013). Items are rated from 0 (barely) to 2 (frequent behavior) for a total attachment score ranging from 12–60. A dichotomous measure of the parent–child relationship was created where  $\geq 42$  was set as the optimum attachment score indicative of strong parent–child attachment (Ayar et al., 2021;

Innocenti et al., 2023). For this study, parent sensitivity (responsiveness) and parent warmth (affection) were used along with the total attachment score to assess the role of parent–child attachment quality and parenting behavior in relation to child development outcomes. Affection (parental warmth) measures the physical or verbal expression of affection, positive emotions, positive evaluation, and regard. Responsiveness includes parents’ sensitivity to the child’s needs and reacting positively to the child’s behavior. It is linked to outcomes of child secure attachment, cognitive, language, and social development, emotion regulation, and social adjustment (Bornstein & Putnick, 2022; Jeong et al., 2021). A score of 11 or higher was set as an indicator of optimal parenting for affection and responsiveness.

### ***Maternal Depression***

Maternal depression was measured in programs from 26 states reported to Penelope. A dichotomous measure of maternal depression was created based on mothers’ response to the Edinburgh postnatal depression scale (Cox et al., 1987), which is used to detect the presence and severity of depressive symptoms. The 10-item depression screening instrument is designed to address depressive symptoms after childbirth specifically. A cutoff score of 13 has been validated for detecting major depression in the perinatal period in childbearing women and demonstrated high internal consistency and validity (Cox et al., 1996). For the PAT home visiting program, a depression score of 10 or greater is classified as elevated depressive symptoms and is a cause for referral to outside sources (PATNC, 2015). Hence, a score of 10 or greater was classified as major depression for this study. A participant-level cumulative score was also taken based on the ten items ranging from 0 to 30. Multivariate modeling, including the PICCOLO and maternal depression, did not converge, and maternal depression was omitted from multivariate analyses.

### ***Demographic Variables***

Demographic data collected at program enrollment were used to code family race, ethnicity, place of origin, family size, maternal education level, child age, gender, and community type. I coded five racial groups (White, Black, Asian, more than one race, and other/unknown) and dichotomous variables for ethnicity (Hispanic or not Hispanic). Immigrant families' native region based on the geographical proximity of the native language spoken in the immigrant household was considered as control variable, in addition to parent race or ethnicity.

### ***Potential Confounding Variables***

A child with a disability or chronic health condition and a child with very low birth weight or preterm birth were included as potential confounding characteristics. Because the disability indicator was broad and did not identify which child in the family has a disability or the type of disability, and because a disability in one domain does not mean one has a disability in other domains; those children from households who reported having a child with disability as a stressor were not excluded. Likewise, although very low birth weight can result in disability, it is not deterministic. Child/family clustering at the program site level was also considered to control for potential regional variation in context and program accessibility.

### **Data Analysis**

Initial data cleaning was performed in Excel and data linkage performed using SAS 9.4. All data analyses were conducted using STATA 18 (Kohler & Kreuter, 2005). Chi-square tests were used for descriptive statistics based on developmental screen level (normal, borderline, or delay). Multinomial logistic regression analysis was used to test the moderating role of parent-child attachment in the relationship between family stress and the comparative relative risk for delay among three groups: children who were potentially delayed, children at risk for



developmental delay, and children at age-appropriate development for cognitive, social, emotional development. The final models adjusted for clustering by program site were controlled for child disability and low birth weight, and I reported relative risk ratios and robust standard errors.

Finally, multiple mediation analysis was used to test if the parent–child relationship and maternal depression mediated the effect of family stress on a child’s cognitive, psychomotor, and socioemotional development. In multiple mediation analysis, two or more mediating variables are included in the model to test the relationship between a predictor and outcome variable (Preacher & Hayes, 2008). The multiple mediation model was estimated using the built-in `sem` command of STATA for SEM. The indirect effect and significance of family stress on child development via the two mediating variables were estimated using the `medsem` postestimation command, following the mediation procedures described by Zhao et al. (2010). The advantage of `medsem` is that, due to the simultaneous estimation capability of structural equation modeling (SEM), it can be used to conduct a proper and comprehensive mediational analysis for models with multiple mediators (Chen & Hung, 2016). Using this procedure, I calculated the total and specific indirect effects for each mediating variable and tested all pairwise comparisons among specific indirect effects, allowing us to obtain unstandardized coefficients, standard errors, and Sobel and Monte Carlo  $z$  scores. I accepted the indirect effect as statistically significant only if the Sobel test demonstrates that the value of the indirect effect is greater than 0 with  $p < .05$  value. There was no significant multiple mediation, so only the direct effect of parent–child interaction was reported.

**Table 3***Descriptive Statistics for Sample Demographics and Study Variables*

Demographic characteristics	<i>n</i>	% or mean(SD)
<b>Race (N = 3478)</b>		
White	1973	56.7%
Black	316	9.1%
Asian	428	12.3%
More than one race	191	5.5%
<b>Ethnicity</b>		
Hispanic	2298	66.1%
Not Hispanic	1136	32.6%
<b>Immigrant family native region (N = 4580)</b>		
Europe	50	1.1%
Middle East	312	6.8%
South/East Asia	366	7.9%
Sub-Saharan Africa	126	2.7%
Latin America	2978	65%
Unknown (other)	748	16.3%
<b>Child age (N = 4649)</b>		
0–3	3735	80.3%
3–6	914	19.6%
<b>Child gender</b>		
Female	2220	47.7%
Male	2429	52.2%
<b>Independent variable (N = 4649)</b>		
Family stressors index	4649	2.4 (1.5)
Number of family stressors		
0	321	7.1%
1–3	3437	73.9%
4 or more	885	19.1%
<b>Mediating variables</b>		
Parent–child relationship (PICCOLO scale)	1245	45.5(10.6)
Parent–child relationship $\geq 42$ (strong attachment)	872	70.1%
Parent–child relationship $< 42$ (weak attachment)	373	29.9%
Maternal depression (EPDS scale)	1448	4.8(5.0)
EPDS $\geq 10$ (major depression)	252	17.4%
EPDS $< 10$ (minor depression)	1196	82.6%
<b>Outcome variables</b>		
Child cognitive, psychomotor development	4593	57.5(5.7)
Child socioemotional development	4274	22.9(27.9)

*Note.* The cutoff scores for the ASQ3 and ASQ:SE-2 vary based on the development domain measured and the age of the child being assessed, hence are not reported in the descriptive table.

## Results

The overall sample characteristics included in bivariate statistics are displayed in Table 3. According to the language group, about 65% of families were from Latin America, 7.9% from South/East Asia, 6.8% from the Middle East, and 2.7% from sub-Saharan Africa. The mean number of stressors per family was 2.4; approximately 74% of families reported at least one stressor and 19.1% of families reported four or more family stressors. The mean parent–child attachment was 45.5. The mean maternal depression score was 4.8. The mean child cognitive psychomotor development score was 57.5, and the mean socioemotional development score was 22.9.

**Table 4**

*Descriptive Statistics for Sample Demographics and Study Variables for Households with PICCOLO Scores*

Demographic characteristics	Total sample households		Sample households with Piccolo Score	
	n = 3478	% or mean (SD)	n = 1245	% or mean (SD)
<b>Race</b>				
White	1973	56.7%	643	51.6%
Black	316	9.1%	134	10.7%
Asian	428	12.3%	164	13.2%
More than one race	191	5.5%	78	6.2%
Other/ unknown	570	17.1%	226	18.3%
<b>Ethnicity</b>				
Hispanic	2298	66.1%	818	65.7%
Not Hispanic	1136	32.6%	413	33.2%
Unknown/ did not report	44	1.2%	14	1.1%
<b>Immigrant family native region</b>				
Europe	36	1.04%	10	1%
Middle East	251	7.28%	79	6.4%
South/ East Asia	236	6.8%	97	7.8%
Sub-Sahara Africa	93	2.7%	35	2.8%
Latin America	2297	66.6%	821	66.6%
Unknown (other)	533	15.4%	191	15.4%
<b>Child age</b>				
0-3	2907	83.5%	1017	81.7%
3-6	571	16.4%	228	18.3%

<b>Child gender</b>				
Female	1657	47.6%	580	46.6%
Male	1821	52.3%	665	53.4%
<b>Independent variable</b>				
Family stressors index	3478	2.5 (1.5)	n/a	n/a
Number of family stressors				
0	179	5.1%	78	6.2%
1-3	2582	74.2%	921	73.9%
4 or more	717	20.6%	246	19.7%
<b>Mediating variables</b>				
Parent-child relationship (PICCOLO scale)	1245	45.5(10.6)	n/a	n/a
Parent-child relationship $\geq 42$ (strong attachment)	872	70.1%	n/a	n/a
Parent-child relationship $< 42$ (weak attachment)	373	29.9%	n/a	n/a
Maternal depression (EPDS scale)	1448	4.8(5.0)		
EPDS $\geq 10$ (major depression)	252	17.4%	n/a	n/a
EPDS $< 10$ (minor depression)	1196	82.6%	n/a	n/a
<b>Outcome variables</b>				
Child cognitive, psychomotor development	3439	57.5(5.5)	1231	57 (5.9)
Child socio-emotional development	3296	23.5(28.9)	1199	26.3 (29.3)

*Note.* This table shows the specific sample used in the analyses for research questions two and three as it changes when using the PICCOLO measure as moderating and mediating variable

Table 4 indicates the percentage of the overall sample with non-missing PICCOLO scores. There are fewer cases with non-missing maternal race, and the community population rates are not available by program; therefore, it is not clear if the higher rates of PICCOLO scores for Black and mixed race reflect the local demographics of programs reporting. The differences in percentage scores present by other variables are relatively small. Thus, the sample characteristics of those children with PICCOLO scores do not appear practically different from those in the sample overall.

### **Cognitive Delay Descriptives**

Cognitive delay bivariate descriptives are presented in Table 5. Of all the children in the sample, 13.7% screened positive for cognitive delay, 20.6% for motor delay, and 7.2% for socioemotional developmental delay. Child disability and low birth weight were both statistically

significant indicators of cognitive delay ( $X^2 = -0.54, p < .001$ ;  $X^2 = -0.27, p < .01$ ), motor ( $X^2 = -0.45, p < .001$ ;  $X^2 = -0.22, p < .05$ ) and socioemotional delay ( $X^2 = 0.44, p < .001$ ;  $X^2 = 0.36, p < .001$ ). The descriptive statistics (frequencies and percentages) and bivariate correlations of the different developmental levels of children aged 2–60 months are presented in Table 5. Findings reveal that cognitive delay was prevalent in 9.4%–36% of children.

Family characteristics that showed higher rates of cognitive delay in immigrant families by demographics were a male child (16.6%), large family size (16.4%), and rural setting (13.6%). Families from the Middle East (14.3%) and sub-Saharan Africa (15.7%) had a higher prevalence of cognitive delay than other regions.

Relationships between outcomes were also run by parent–child interaction, limited to cases with valid PICCOLO scores; and by maternal depression, limited to cases with valid EPDS scores. Maternal characteristics related to cognitive delay included low maternal warmth (20.6%), low maternal sensitivity (20.2%), and elevated maternal depression (18.5%). A chi-square test of independence also revealed a statistically significant relationship between cognitive delay and greater maternal depression ( $X^2 = -0.21, p < .05$ ), maternal affection ( $X^2 = -0.21, p < .01$ ), and maternal responsiveness ( $X^2 = 0.22, p < .001$ ).

### **Motor Delay Descriptives**

Motor delay bivariate descriptives are presented in Table 5. The prevalence rate of motor delay ranged from 14% for children from sub-Saharan African families to 41% for children with disabilities. Motor delay prevalence rates were higher for Asian children (21.6%), male children (22.1%), and 3–6-year-old children (22.8%). A chi-square test of independence was performed to examine the relation between cognitive delay and select demographic risk factors. In addition to parents' ethnicity, low birth weight (28.4%;  $X^2 = -0.21, p = 0.01$ ) was statistically significant

indicators of motor delay. While motor delay prevalence rates were higher in families with low levels of maternal warmth (26.3%) and maternal sensitivity (27.1%), there were no statistically significant differences in motor delay by the level of parent–child attachment or family stress.

### **Socioemotional Descriptives**

Socioemotional delay bivariate descriptives are presented in Table 5. The lowest rates of socioemotional deficiencies were found in children with optimal parent–child attachment, at 5.2%, whereas the highest rates were found in children from households with reported child disability as a stressor, at 18.5%. A high prevalence of socioemotional delays was observed in children from Asian (8.4%), European (8.5), Middle Eastern (8.3%), and non-Hispanic families (8.1%).

There was a statistically significant relationship between socioemotional delay and child gender ( $X^2 = 0.14, p < .001$ ), parent race ( $X^2 = -0.02, p < .01$ ), maternal warmth ( $X^2 = -0.37, p < .001$ ), maternal depression ( $X^2 = 0.23, p < .05$ ), high family stress ( $X^2 = 0.17, p < .01$ ), and low levels of maternal responsiveness ( $X^2 = -0.26, p < .001$ ).

**Table 5**

*Demographic Characteristics, Bivariate Correlations, and Prevalence (n, %) of Different Developmental Levels in 2- to 60-Month-Old Children of Immigrants.*

	<i>n</i>	<b>Cognitive</b>			<i>X</i> <sup>2</sup>	<b>Motor</b>			<i>X</i> <sup>2</sup>	<i>n</i>	<b>Socioemotional</b>			<i>X</i> <sup>2</sup>
		DL	AR	AA		DL	AR	AA			DL	AR	AA	
<b>Full sample</b>	4927	649 (13.7)	846 (17.2)	3432 (69.6)		1014 (20.6)	382 (7.7)	3528 (71.6)		4353	311 (7.2)	443 (10.2)	3599 (82.7)	
<b>Child gender</b>					.000				.004					.001
Female	2373	224 (9.4)	370 (15.6)	1779 (74.9)		449 (18.9)	170 (7.2)	1751 (73.9)		2077	136 (6.5)	177 (8.5)	1764 (84.9)	
Male	2554	425 (16.6)	476 (18.6)	1653 (64.7)		565 (22.1)	212 (8.3)	1777 (69.6)		2276	175 (7.7)	266 (11.7)	1835 (80.6)	
<b>Child Age</b>					.026				.179					.077
0-3 year old	3835	486 (12.7)	680 (17.7)	2669 (69.6)		770 (20.1)	299 (7.8)	2764 (72.1)		3446	241 (6.9)	368 (10.7)	2837 (82.2)	
3-6 year old	901	137 (15.2)	133 (14.7)	631 (70.1)		205 (22.8)	72 (8.0)	623 (69.2)		855	63 (7.4)	69 (8.1)	723 (84.6)	
<b>Community type</b>					.008				.502					.121
Urban	2878	386 (13.4)	458 (15.1)	2034 (70.7)		576 (20.1)	213 (7.4)	2086 (72.6)		2533	178 (7.1)	236 (9.3)	2119 (83.6)	
Rural	542	74 (13.6)	84 (15.5)	384 (70.8)		114 (21.1)	45 (8.3)	383 (70.6)		482	36 (7.5)	46 (9.5)	400 (82.9)	
Suburban	1474	185 (12.5)	298 (20.2)	991 (67.2)		319 (21.6)	122 (8.3)	1033 (70.1)		1321	97 (7.3)	158 (11.9)	1066 (80.7)	
<b>Maternal education</b>					.075				.640					.146
<high school	1222	133 (10.8)	216 (17.7)	873 (71.4)		234 (19.2)	102 (8.4)	885 (72.5)		1090	66 (6.1)	130 (11.9)	894 (82.1)	
HS diploma/ GED	766	109 (14.2)	129 (16.8)	528 (68.9)		154 (20.1)	56 (7.3)	556 (72.6)		708	55 (7.7)	71 (10.1)	582 (82.2)	

Some college/technical	413	45 (10.9)	56 (13.5)	312 (75.5)	72 (17.4)	27 (6.5)	314 (76.1)	379	25 (6.6)	38 (10/1)	316 (83.4)
Associate/BA degree	737	87 (11.8)	139 (18.8)	511 (69.3)	148 (20.1)	64 (8.7)	525 (71.2)	678	49 (7.2)	53 (7.8)	576 (84.9)
Low income	3952	504 (12.7)	686 (17.4)	2762 (69.9)	819 (20.7)	309 (7.8)	2821 (71.4)	3481	242 (6.9)	374 (10.7)	2865 (82.3)
<b>Parent Race</b>					.012			.000			.002
White	2101	238 (11.3)	338 (16.1)	1525 (72.5)	384 (18.3)	149 (7.1)	1567 (74.6)	1905	128 (6.7)	183 (9.6)	1594 (83.7)
Black	329	43 (13.1)	47 (14.3)	239 (72.6)	50 (15.2)	20 (6.1)	259 (78.7)	300	17 (5.7)	25 (8.3)	258 (86.0)
Asian	449	61 (13.6)	91 (20.3)	297 (66.2)	97 (21.6)	44 (9.8)	308 (68.6)	419	35 (8.4)	33 (7.8)	351 (83.7)
More than one race	194	20 (10.3)	24 (12.4)	150 (77.3)	51 (26.3)	16 (8.3)	127 (65.5)	172	11 (6.4)	22 (12.8)	139 (80.8)
<b>Parent Ethnicity</b>					.461			.015			.191
Hispanic/Latino	2456	293 (11.9)	397 (16.2)	1766 (71.9)	494 (20.2)	195 (7.9)	1765 (71.9)	2201	146 (6.6)	239 (10.8)	1816 (82.5)
Not Hispanic	1180	149 (12.6)	207 (17.5)	824 (69.8)	220 (18.6)	89 (7.54)	871 (73.8)	1103	89 (8.1)	96 (8.7)	918 (83.2)
<b>Family Native origin</b>					.736			.609			.344
Europe	50	6 (12.0)	10 (20.0)	34 (68.0)	10 (20.0)	2 (4.0)	38 (76.0)	47	4 (8.5)	6 (12.7)	37 (78.7)
Middle East	329	47 (14.3)	59 (17.9)	223 (67.7)	70 (21.3)	25 (7.6)	234 (71.1)	300	25 (8.3)	34 (11.3)	241 (80.3)
South/East Asia	383	49 (12.8)	71 (18.5)	263 (68.6)	70 (18.3)	36 (9.4)	277 (72.3)	343	19 (5.5)	27 (7.8)	297 (86.6)
Sub-Saharan Africa	127	20 (15.7)	15 (11.8)	92 (72.4)	18 (14.2)	8 (6.3)	101 (79.5)	117	7 (5.9)	9 (7.7)	101 (86.3)



Latin America	3163	399 (12.6)	542 (17.2)	2222 (70.3)		670 (21.2)	245 (7.7)	2246 (71.1)		2803	192 (6.8)	296 (10.5)	2315 (82.6)
Other/Unkn own	795	117 (14.7)	133 (16.7)	545 (68.5)		165 (20.7)	60 (7.5)	569 (71.6)		696	63 (9.1)	66 (9.5)	567 (81.5)
<b>Family size</b>					.041				.924				.675
<5 family members	4610	597 (12.9)	782 (16.9)	3231 (70.1)		947 (20.6)	359 (7.8)	3301 (71.6)		4078	295 (7.2)	415 (10.2)	3368 (82.6)
>=5 family members	317	52 (16.4)	64 (20.2)	201 (63.4)		67 (21.2)	23 (7.3)	227 (71.6)		275	16 (5.8)	28 (10.2)	231 (84.0)
<b>Family Stress</b>					.085				.069				.001
Low	355	51 (14.4)	63 (17.7)	241 (67.9)		62 (17.5)	22 (6.2)	271 (76.3)		313	19 (6.1)	21 (6.7)	273 (87.2)
Moderate	3618	463 (12.8)	596 (16.5)	2559 (70.7)		744 (20.5)	300 (8.3)	2572 (71.1)		3218	223 (6.9)	310 (9.6)	2685 (83.4)
High	954	135 (14.1)	187 (19.6)	632 (66.2)		208 (21.8)	60 (6.3)	685 (71.8)		822	69 (8.4)	112 (13.6)	641 (77.9)
<b>Maternal Depression</b>					.002				.007				.047
Mild depression	1297	121 (9.3)	178 (13.7)	998 (76.9)		218 (16.8)	89 (6.8)	989 (76.3)		1137	71 (6.2)	105 (9.2)	961 (84.5)
Major depression	270	41 (15.2)	47 (17.4)	182 (67.4)		67 (24.9)	19 (7.1)	183 (68.1)		241	22 (9.1)	31 (12.8)	188 (78.1)
<b>Attachment - Affection</b>					.004				.420				.000
Maternal warmth ≥11	1118	158 (14.1)	202 (18.1)	758 (67.8)		260 (23.3)	89 (7.9)	769 (68.8)		1037	61 (5.8)	109 (10.5)	867 (83.6)
Absent/emerging <11	238	49 (20.6)	54 (22.7)	135 (56.7)		62 (26.3)	22 (9.3)	152 (64.4)		225	30 (13.3)	39 (17.3)	156 (69.3)
<b>Attachment - Responsive</b>					.000				.068				.000
Maternal sensitivity ≥11	973	131 (13.5)	169 (17.4)	673 (69.2)		217 (22.3)	75 (7.7)	680 (69.9)		895	47 (5.2)	97 (10.8)	751 (83.9)

Absent/emerging <11	381	77 (20.2)	85 (22.3)	219 (57.5)		103 (27.1)	36 (9.5)	241 (63.4)		365	45 (12)	48 (13.2)	272 (74.5)	
Child disability	435	157 (36.1)	92 (21.2)	186 (42.7)	.000	178 (41.1)	39 (8.9)	217 (50.0)	.000	405	75 (18)	60 (14.8)	270 (66.7)	.000
Low birth weight	155	35 (22.6)	30 (19.4)	90 (58.1)	.001	44 (28.4)	16 (10)	95 (61.3)	.014	137	17 (12)	27 (19.7)	93 (67.8)	.000

*Note.* DL = developmental delay, AR = at risk for developmental delay, AA = age-appropriate development

**Table 6**

*Multinomial Logistic Regression Comparing Children's Relative Risk of Early Childhood Cognitive and Socioemotional Delay, Using Child Disability, Premature/Low Birth Weight, and Clustering by program site as Controls*

	Social emotional development ( $n = 1184$ )								
	Delay versus age-appropriate development			Risk for delay versus age-appropriate development			Developmental delay versus risk for developmental delay		
	RRR	95% CI	Robust SE	RRR	95% CI	Robust SE	RRR	95% CI	Robust SE
Family stress (High)	1.36	[0.58–3.19]	0.59	1.26	[0.72–2.20]	0.35	1.07	[0.41–2.78]	0.52
Strong attachment $\geq 11$	0.85	[0.44–1.65]	0.28	0.50*	[0.30–.84]	0.13	1.68	[0.75–3.79]	0.69
High family stress * strong attachment	0.73	[0.26–2.08]	0.39	1.53	[0.80–2.91]	0.50	0.48	[0.15–1.51]	0.28
Child gender (Male)	1.48	[0.79–2.75]	0.46	1.66*	[1.07–2.58]	0.37	0.88	[0.42–1.85]	0.33
Child age (3–6)	0.84	[0.44–1.59]	0.27	0.75	[0.52–1.07]	0.13	1.11	[0.58–2.13]	0.37
Community type									
Rural	0.92	[0.41–2.04]	0.37	1.02	[0.62–1.68]	0.25	0.89	[0.41–1.95]	0.35
Suburban	0.92	[0.50–1.68]	0.28	1.32	[0.83–2.11]	0.31	0.69	[0.41–1.18]	0.18
Child disability	2.07*	[1.00–4.30]	0.77	0.80	[0.46–1.36]	0.22	2.57*	[1.22–5.39]	0.97
Preterm birth/low birth weight	3.44*	[1.57–7.53]	1.37	1.90	[0.88–4.08]	0.74	1.80	[0.69–4.74]	0.89
(LR) $X^2 = 53.6(18)$ , $p < .001$ Pseudo $R^2 = 0.062$									
	Cognitive development ( $N = 1181$ )								
	Delay versus age-appropriate development			Risk for delay versus age-appropriate development			Developmental delay versus risk for developmental delay		
	RRR	95% CI	Robust SE	RRR	95% CI	Robust SE	RRR	95% CI	Robust SE
Family stress (high)	1.03	[0.61–1.75]	0.27	1.01	[0.58–1.78]	0.29	1.01	[0.51–2.00]	0.35

Strong attachment ≥11	0.62*	[0.39–.97]	0.14	0.66	[0.38–1.12]	0.18	0.93	[0.54–1.61]	0.26
Family stress * strong attachment	0.78	[0.41–1.51]	0.26	0.99	[0.49–1.99]	0.35	0.79	[0.34–1.82]	0.33
Child gender (Male)	2.53**	[1.92–3.33]	0.35	1.44*	[1.02–2.04]	0.25	1.75*	[1.19–2.56]	0.33
Child age (3–6)	0.95	[0.58–1.58]	0.24	0.68*	[0.45–1.01]	0.13	1.40	[0.82–2.40]	0.38
Community type									
Rural	0.67	[0.39–1.17]	0.18	0.95	[0.59–1.52]	0.22	0.70	[0.35–1.41]	0.25
Suburban	1.19	[0.74–1.91]	0.28	1.62	[1.04–2.54]	0.37	0.73	[0.47–1.12]	0.15
Child disability	3.74**	[2.19–6.38]	1.02	2.02*	[1.16–3.50]	0.56	1.84*	[1.08–3.15]	0.50
Preterm birth/low birth weight	2.46*	[1.10–5.51]	1.01	0.56	[0.20–1.52]	0.28	4.37*	[1.32–14.47]	2.67
(LR) $X^2 = 111.9 (18)$ , $p < .001$ Pseudo $R^2 = 0.105$									

*Note.* Relative risk ratio (95% confidence interval) \*\*\* $p < .001$ ; \*\* $p < .01$ ; \* $p < .05$ ; Table shows the relative risk ratio of developmental delay analysis with child disability in the household (reported as a stressor) as one of the control variables. The reported child disability in the household survey does not identify which child in the household has disability or what type of disability. Hence, child disability was included in the multi-variate analysis as a potential confounding variable.



Family stress * strong attachment	0.79	[0.42–1.48]	0.25	0.90	[0.44–1.80]	0.32	0.87	[0.38–2.00]	0.36
Child gender (Male)	2.66***	[2.04–3.48]	0.36	1.50*	[1.08–2.10]	0.25	1.76**	[1.21–2.56]	0.33
Child age (3–6)	1.01	[0.62–1.63]	0.24	0.66*	[0.44–0.98]	0.13	1.51	[0.89–2.57]	0.41
Community type									
Rural	0.76	[0.47–1.24]	0.18	0.93	[0.58–1.48]	0.22	0.82	[0.42–1.57]	0.27
Suburban	1.31	[0.83–2.06]	0.30	1.63	[1.05–2.53]	0.36	0.80	[0.54–1.20]	0.16
Preterm birth/low birth weight	3.55**	[1.67–7.52]	1.35	0.79	[0.32–1.96]	0.36	4.43**	[1.69–11.60]	2.17
(LR) $X^2 = 121.16$ (16), $p < .001$ Pseudo $R^2 = 0.0348$									

*Note.* Relative risk ratio (95% confidence interval) \*\*\* $p < .001$ ; \*\* $p < .01$ ; \* $p < .05$ ; Table shows the relative risk ratios of developmental delay analysis between groups without reported child disability in the household as a confounding variable.

## Multivariate Analyses

Table 6 displays outcomes for the main multinomial logistic regression for cognitive and socioemotional delay controlling for child disability, low birth weight/ pre-term birth and sample clustering by program site. A similar model was attempted for motor delay, but the model did not converge. Additionally, while parent–child interaction was significant, models including maternal depression did not converge. Therefore, maternal depression is not included in the final models. Table 7 displays outcomes for the second multinomial logistic regression for cognitive and socioemotional delay controlling for low birth weight/ pre-term birth and sample clustering by program site, without child disability as a confounding variable.

The main multinomial logistic regression model (refer to Table 6) suggested that adjusting for age, child disability, preterm birth/low birth weight, and sample clustering by program site, both parent–child attachment and child gender had a significant association with more than one early childhood development level. Children classified in the at-risk range for socioemotional delay were significantly less likely to have a strong parent–child attachment (RRR: 0.50, 95% CI: [.30–.84]) and significantly more likely to be male (RRR: 1.66, 95% CI: [1.07–2.58]) than the children classified in the age-appropriate socioemotional development group. Children classified in the cognitive development delay group were also significantly less likely to have a strong parent–child attachment (RRR: 0.62, 95% CI: [0.39–0.97]) and significantly more likely to be males (RRR: 2.53, 95% CI: [1.92–3.33]) than children classified in the age-appropriate cognitive development group and at risk for cognitive delay group (RRR: 1.75, 95% CI: [1.19–2.56]). The second model (see Table 7) with child disability as control also revealed similar results where parent-child attachment and child gender showed significant association with both cognitive and socioemotional delay or risk for delay.

Both child disability and preterm birth/low birth weight were statistically significant risk factors for early childhood cognitive and socioemotional developmental delay in the main model. Children in the development delay group were significantly more likely to have a disability than children in the age-appropriate group for socioemotional development (RRR: 2.07, 95% CI: [1.00–4.30]) and cognitive development (RRR: 3.74, 95% CI: [2.19–6.38]). Children in the development delay group were also significantly more likely to have low birth weight/preterm birth than children in the age-appropriate group for socioemotional development (RRR: 3.44, 95% CI: [1.57–7.53]) and cognitive development (RRR: 2.46, 95% CI:[1.10–5.51]). In the second model, similar significant relative risks for low birth weight/ pre-term birth between groups were found except for children in the socioemotional delay group compared to children in the age appropriate group. The quality of parent–child attachment did not moderate the association between family stress and child cognitive and socioemotional development delay. No other factors were statistically significant.

### **Mediation Analysis**

Multiple mediation analysis demonstrated that the parent–child relationship and maternal depression did not mediate the association between family stress and child cognitive, psychomotor, and socioemotional development.

### **Discussion**

The first aim of this study was to examine the prevalence and correlates of developmental delay in children of immigrants. I found that about 30% of the sample had at least one developmental delay, which exceeded the average national rate of developmental delay for the U.S reported by Zablotzky et al. (2019) and developmental delay rates for low and middle-income countries (Wondmagegn et al., 2024). This high prevalence might be due to the high



prevalence of low-income and high risk families. My findings were consistent with studies of developmental delay among low income families (Wei et al., 2015). The prevalence of adverse experiences was also higher than the U.S. prevalence reported by Swedo (2023). In my study, high ACEs (four or more adverse experiences) were associated with an increased rate of child development delay. These findings run similar to ACEs studies that have found elevated risk for development delay (Miccoli et al., 2022; Turney, 2020). Child disability and low birth weight were both significantly associated with delays in all developmental domains. From all the children from households who reported child disability as a stressor, 36% screened positive for cognitive delay, 41% for motor delay, and 18% for socioemotional delay which indicates that not all children from households with reported disability as a stressor have a disability and that a disability in one domain does not translate to a disability in other developmental domains.

Bivariate results show that developmental delay differed by immigrant families' native region, race, and ethnicity. Immigrant families from sub-Saharan Africa had higher rates of cognitive delay and lower rates of socioemotional delay compared to other regions. Immigrant families from Latin America and the Middle East had higher rates of motor delay. Immigrant families from Europe or the Middle East reported higher rates of socioemotional delay. These findings are consistent with some research indicating that immigrant families from low and middle-income countries are at high risk for cognitive delay (Abdullahi et al., 2019). Hispanic families reported lower rates of developmental delay in all child development domains. Similar findings were reported by Yopez et al. (2024), who found that Spanish-speaking Hispanics were less likely to report child development delay. These disparities in reported rates of development delay in children of immigrants by immigrant family's place of origin and racial/ethnic background could be symptoms of a bigger problem of ethnic minorities being less likely to

identify development delay in young children (Sapiets et al., 2021). Much of the work related to the immigrant paradox has focused on Hispanic populations (Millett, 2016). It is unclear whether this paradox operates differently by region of origin and whether that relates to conditions that exist prior to immigration or to experiences following entry into the U.S.

Bivariate results also show that the quality of the parent–child relationship and greater maternal depression were significantly associated with higher rates of development delay, with the lowest rates of socioemotional delay observed in families with optimal parent–child attachment. This finding highlights the importance of developmental parenting in early childhood development (Roggman et al., 2013). In the presence of adverse experiences, sensitive parenting can lead to secure attachment and can be a protective buffer from adverse experiences. However, poor parent–child relationships may result in later socioemotional problems, including difficulty with social skills and mental health struggles (Bogat et al., 2023).

My second aim was to examine the relative risk for development delay across different levels of development and test if the quality of the parent–child relationship moderates the influence of high family stress on child developmental delay. Multivariate analysis results showed that after adjusting for age, child disability, preterm birth or low birth weight, parent–child attachment, and child gender had a significant association with more than one level of early childhood development. Region of origin and maternal depression were insignificant and omitted from the final model. Stressors were retained, given the focus of the research questions, but were not significant. Parent–child attachment was a significant predictive factor for cognitive and socioemotional delay. There was partial evidence in support of the first hypothesis, such that high levels of family stress were significantly associated with socioemotional developmental delay at bivariate analysis. There was no sufficient evidence found from the multi-variate

analyses in support of the study hypothesized direct relationship between family stress and child development delay, or the moderated and mediated indirect relationships through parent-child attachment and maternal depression.

The results highlight the importance of maternal mental health and parent-child attachment in early childhood development and align with the theory of attachment. The quality of the parent-child attachment and elevated maternal depression were both significantly associated with child development delay supporting attachment theory's assertion that parent emotional availability and sensitivity are domains of parenting that directly influence early childhood development (Rowell & Neal-Barnett, 2022). The lack of sufficient evidence in support of the direct and indirect family processes of family stress' influence on child development delay via parent-child attachment however do not align with the theoretical frameworks of the study, particularly with the theoretical ecological model of stress process whereby family stress negatively impacts early childhood development outcomes by disrupting the parent-child attachment and through parental depression (Masarik & Conger, 2017).

Given the lack of a relationship between family stress and the outcome, it was not surprising that the quality of the parent-child relationship did not moderate the influence of high family stress on child development. Nor was it surprising, given the lack of direct association, that mediated associations were not present. There are at least three potential reasons for this. It is possible that the simultaneous measurement cannot differentiate between present and prior conditions of stress that may be more important in relation to the child outcome at enrollment. There were relatively few meaningful differences between families doing worse and those doing better at enrollment. For instance, over 70% of the mothers reported strong parent-child attachment, and more than 80% of the mothers in the study reported mild depression and low

levels of stress. The lack of family's stress influence on child development outcomes may be due to immigrant families' resilience, where higher family stress does not affect the quality of the parent-child attachment or elevate maternal depression. My study was likely underpowered or underspecified despite the relatively large sample. Children exist within the settings of family, society, and culture (Metwally et al., 2016), and their socioemotional development is shaped and impacted by positive interaction and stimulation in all these settings (Tran et al., 2017). It was not possible to test interactions with the region of origin nor include program-specific measures. Nor was it possible to differentiate between those who may have been leaving traumatic experiences in their home region (refugees) compared to voluntary migrants. Finally, no measure of acculturative stress was available. Although PAT (2015) noted immigration as recent, there may be significant variations between newly arrived immigrants and those who have been in the country for multiple years.

### ***Limitations***

The study had several limitations. The immigrant population has significant variability by reason for migration, documentation, and prior and immigration-specific conditions. While a proxy was developed for the region of origin, it was not possible to control for these key aspects of the immigration experience. Data on family stress was drawn from household demographic intake assessments, which are subject to validity threats such as instrumentation or participant comfort in answering questions. In addition, not all PAT sites currently use the electronic Penelope data system. While the large sample size and the likely fidelity to the PAT model of programs participating are strengths, it is not possible to know how representative findings are of immigrant participation in PAT overall according to all levels of fidelity to the PAT model. While the sample statistics appear relatively similar for participants with present or absent data

on moderating and mediating factors (i.e., PICCOLO and maternal depression), it is impossible to eliminate the possibility of underlying biases in program screening behaviors or unmeasured participant characteristics. Unevenly collected data is another limitation. The sample size was different for various child and parent measures. In models exploring moderated and mediated effects of parent depression and attachment, this may have impacted statistical power. The study is not able to measure intergenerational (parent's childhood experience) trauma and ACEs, which may have a separate impact on maternal depression and parenting. Nor was it possible to measure changes in these stressors, only measured at enrollment. For example, the experience of IPV is measured at baseline, but it is unclear if this represents a past, current, or continuing phenomenon or all three. Finally, perceptions about children's development may differ across cultures because of parental beliefs and their influence on parenting practices research (Yepez et al., 2024). or perhaps the concept of developmental delay and intervention may not appear to apply in the family's native culture. While most of the measures used by the home visiting program in the present study have been used across a number of populations, the lack of attention to immigrants in the literature raises the possibility that cultural norms may have influenced parent responses.

### **Conclusion**

Family wellbeing and parent-child relationships are fundamental factors for optimal child development in early childhood. While research indicates immigrant families may face significant challenges, the research related to early childhood is underdeveloped. Understanding the prevalence risk factors of early childhood development delay may inform early intervention and prevention with immigrant populations, as well as raise questions for future research. For example, future research is needed to specify refugee subgroups and specific countries of origin.

Similarly, little prior work has examined immigrant families that enroll in home visitation. This study demonstrated that the rates of developmental delay in immigrant families are high and even higher than the rates for the general population in some development domains. Present findings also suggest that immigrants who enroll in PAT are not those with particularly low levels of challenges to parenting. Similar to general population studies, parent–child interaction seems to play a role in later outcomes. More work needs to be done to understand the family context and perceptions of needs and the relative availability of community services to address needs outside the domain of home visitation. On the other hand, large-scale representative data on immigrant populations do not exist that would allow comparison between families who do or do not engage in early childhood programming. Future work should endeavor to collect community-based information on service use. Overall findings underscore the need for further early intervention research addressing the developmental needs of immigrant families with young children.

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## **Chapter 4: The Influence of Child Welfare Involvement on Parent Engagement Among Immigrant Families Who Receive Home Visiting Services**

### **Abstract**

Child protective services (CPS) contact is most common in early childhood and may influence engagement with home visitation, but no research has studied this for immigrant families. The current study examined the association between select demographic and risk factors and family self-report of prior CPS (also called child welfare) involvement among immigrant families and whether CPS involvement influenced the level of engagement in home visiting services. Administrative data on 4896 immigrant families involved in the Parents as Teachers (PAT) home visiting program was used. A logistic regression model of CPS involvement was used to develop propensity scores. A multinomial regression analysis of PAT engagement was conducted, and the sample was weighted using CPS propensity scores to assess whether a history of CPS involvement impacted engagement. Marginal effects were estimated. Substance abuse, intimate partner violence, single parenthood, and teen parenthood were significant risk factors for CPS involvement among immigrant families. Multinomial regression results show families with child welfare involvement were more likely to engage in home visiting services for between 90 days and 1 year compared to over 1 year (RRR: 3.64,  $p < .01$ , 95%CI: [1.65–8.03]). Additionally, a history of CPS involvement decreased the probability of early dropout from home visitation (less than 90 days) compared to 90 to 365 days by 27 percentage points. While CPS-involved families appear more likely to engage successfully, they are less likely to be long-stayers in PAT. Further research is needed to identify why these families do not persist for more than a year.

## Introduction

Recent U.S. prevalence studies of substantiated reports suggest that 1 in 8 children have reports of maltreatment confirmed before their 18<sup>th</sup> birthday (Wildeman et al., 2014). In contrast, the number of children reported (including unsubstantiated) for maltreatment to child protection is about 1 in 3 (Kim et al., 2017). The age-specific hazard for reports is highest for children under age 3 for all types except sexual abuse (Kim et al., 2017). While a report to CPS is not always indicative of maltreatment, similar childhood rates of experiencing maltreatment have been found in self-report studies (Finkelhor et al., 2015). Further, a number of studies have found similar longer term untoward outcomes for both substantiated and unsubstantiated reports (Gnanamanickam et al., 2020; Holbrook & Hudziak, 2020; Knight & Collins, 2005) and for any CPS contact compared to none controlling for poverty (Jonson-Reid et al., 2012). This suggests that CPS contact, at a minimum may reflect parenting concerns even if the situation had not risen to the level considered to be maltreatment.

Immigrants may be at high risk for maltreatment due to high rates of poverty, as low socioeconomic status has been increasingly associated with elevated risk for child maltreatment (Akmatov, 2011; Drake et al., 2022). Millett (2016) contended the majority of immigrants have lower socioeconomic status with a 50% higher poverty rate compared to native-born families. Poverty magnifies the risk factors for child maltreatment by contributing to home instability, parent stress, and increasing the risk of abusive parenting practices (Drake et al., 2022; Luby et al., 2013). Immigrant mothers with lower education levels may also face greater poverty, which was found to be positively associated with harsh parenting (Khoury-Kassabri, 2010). Additionally, social inequality due to discrimination, isolating public policies, and immigration laws can also limit immigrant parents' access to resources and may trigger overrepresentation in

the child welfare system (Losoncz, 2015; Morland et al., 2005; Maiter & Stalker, 2011).

Immigrant families go through unique experiences of adverse life events, and it is unknown if there are similar predictors of maltreatment or CPS involvement as found in studies of nonimmigrant populations.

### **Protective Factors**

Studies suggest higher educational levels and two-parent households for immigrant parents may mean lower parental stress or less poverty and act as a buffer against child maltreatment (Dettlaff & Earner, 2012; Euser et al., 2011). Research also shows that living in a neighborhood with a high number of immigrant families may prevent child maltreatment by increasing parents' network of social support (LeBrun et al., 2015). Additionally, early interventions such as home visiting programs may act as buffers to decrease distress and the risk of child maltreatment (Avellar & Supplee, 2013; Gubbels et al., 2021). Most home visiting programs, however, have high attrition rates, which may limit outcomes (Chiang et al., 2018). Some studies have observed that child welfare-involved families are more likely to leave home visitation early (Fettes et al., 2021). Studies that examined maternal challenges like mental health have found mixed effects related to longer term retention (Chiang et al., 2018). Few studies of immigrant parents engaged in home visiting exist to inform practice related to longer term engagement.

The current study examines the contextual risk factors associated with immigrant families' CPS involvement and the potential effect of that involvement on the level of early childhood home visiting intervention engagement for those families. On one hand, prior CPS involvement may discourage engagement in other formal services if parents are concerned about future reporting to CPS. On the other hand, prior research does not suggest a lower initial uptake

of home visitation by CPS status. Immigrant parents may often have been subjected to various traumas themselves; hence, exploring the contextual risk factors for child maltreatment with this population and whether child welfare involvement influences their level of engagement in early interventions is particularly relevant.

### **Background**

The prevalence of maltreatment or CPS involvement for immigrant families is difficult to estimate as most data systems lack documentation of nativity. A recent systematic review conducted on immigrant child maltreatment estimates lifetime immigrant child physical abuse range between 9%-65% and sexual abuse prevalence between 5%–20% (Jud et al., 2020). The scant available research suggests that immigrant families may be overrepresented in CPS in the U.S. & Canada for child physical abuse (LeBrun et al., 2015). Losoncz (2015) argues that newly arrived immigrant's children are at high risk for child welfare removal due to cultural differences, including the differential understanding of what child abuse is. At the macro level, socioeconomic status and patriarchal beliefs are identified as major social and cultural risk factors. On the other hand, other studies suggest immigrants are underrepresented in the CPS system. Millett (2016) conducted a systematic review of 19 studies to examine whether the immigrant advantage found in health literature is mirrored by child maltreatment in general and its forms in particular, and their findings showed evidence of an immigrant advantage for reduced emotional and sexual abuse. However, the evidence for neglect was mixed. The researchers also found that immigrants were less likely to be reported to CPS; however, they had higher rates of physical neglect and lack of supervision in the community data. A recent county-level analysis suggested that higher rates of immigrants within a county were associated with lower rates of reported maltreatment (Kim & Kim, 2023).

## **Causes of Maltreatment or CPS involvement**

Empirical evidence suggests that a single factor does not cause children's maltreatment; instead, adverse outcomes are more closely related to the accumulation of risk factors (Hunter & Flores, 2021). The extent to which cooccurring stressors such as single parenthood, economic struggle, and low education affect adverse outcomes, such as poor parenting behaviors, may be due to the ways through which they are appraised as stressful by a parent and the lack of social support networks to moderate their impact (McKenzie et al., 2021). Based on the ecological stress model and attachment theory, a chain of family processes is hypothesized to influence child safety and development as a result of stress. Stress impacts parents' emotional distress, undermines interpersonal relationships, and, in turn, compromises parenting behaviors, thereby negatively affecting children (Freisthler et al., 2021; Kim & Drake, 2018; Liu et al., 2020a).

In high-income countries like the U.S., it is important to take into consideration the multigenerational barriers faced by U.S. minoritized populations to economic and educational success due to concentrated disadvantages such as high levels of poverty and female-headed families (Kim & Drake, 2018; Krivo et al., 1998), low educational achievement (Hung et al., 2020), substance abuse, community violence and mental health problems (Frazer et al., 2018; Salhi et al., 2021; Skewes & Blume, 2019) and long-term exclusion from political and economic decisions (Lichter et al., 2012) particularly for those born in the U.S.. While poverty is associated with CPS reporting as well (Kim & Drake, 2018), even within low income families, research has found that those reported have higher rates of multiple risk factors, including developmental delay, low maternal education, maternal substance abuse, and depression, and higher number of children in the family (Dubowitz et al., 2011).

### **Risk Factors Associated With Child Maltreatment in Immigrant Families**

However, it is unclear from available literature how immigrant populations experience factors operative for U.S.-born minoritized or low income families. Child maltreatment occurrence is considered to be higher in low-income families, of which one-third are immigrant families (Segal & Mayadas, 2005). Some studies have found lower rates of maltreatment among first-generation Hispanic and some immigrant families, however, despite equal likelihoods of poverty (Kim & Drake, 2018; Zhang et al., 2021). Some research shows that the longer an immigrant resides in the host country, the less at risk they are for physical abuse. LeBrun et al. (2015) explained this phenomenon with the acculturative stress hypothesis, where increased stress related to acculturation and less familiarity with the host country's laws and social norms are assumed to increase immigrant families' risk for child maltreatment. Studies have reported the beliefs and use of corporal punishment as an appropriate child discipline measure among immigrants (Timshel et al., 2017), differences in child-rearing approaches, and child maltreatment definition variability among different groups of immigrants (Maiter & Stalker, 2011).

Immigrant families raising their children socialized to a different culture and worldview than their parents may affect family cohesion, confounding immigrants' parenting challenges (Kohli & Fineran, 2020). Parent-child relationships among immigrant families can be strained due to daily hardship and stress (Frounfelker et al., 2017), immigrant parent's loss of control as a result of their children's American way of living (Akinsulure-Smith, 2017), and cultural conflict related to parent's desire to keep native culture and language while also trying to assimilate (Deng & Marlowe, 2013). U.S. resettlement support for refugees is also briefly focused on getting refugees to be self-sufficient as quickly as possible, forcing them to adopt the host



country's culture swiftly, which may compound their social and economic challenges. For example, some cultural considerations for immigrant family's risk of child maltreatment are related to the acceptability of corporal punishment and patriarchal culture. Among immigrants, refugees are shown to be one of the most vulnerable populations with higher experience of trauma, PTSD, and adverse health outcomes compared to other immigrants and native-born people (Shi et al., 2021). Research shows that parental PTSD and depression symptoms are one of the major risks for child abuse (Ayers et al., 2019). There is also growing recognition that some immigrants face racial and ethnic discrimination and heightened economic insecurity postmigration (Shi et al., 2021), with a long-lasting impact on their mental and physical health and parenting behavior. Parental stress is a commonly noted risk factor for child maltreatment in not only immigrant families but also in nonimmigrant families as well (Liu et al., 2020a; Martins et al., 2023). In a study conducted with Cambodian families, fathers who maltreated their children were more likely to have alcohol abuse problems. In contrast, immigrant mothers who abused their children were more likely to be suffering from mental illnesses such as depression (Chang et al., 2008).

On the other hand, the relationship between parental adverse experiences and parenting may vary by culture of origin or other factors. LaBrenz et al. (2020) found that parental mental health and substance use were associated with parents' adverse experiences but not always with parenting behaviors among Spanish-speaking Latino families. Resettlement-related loss of social support can challenge immigrant parents' ability to take care of themselves and their children, which may result in social isolation (Vaughn et al., 2017). Lack of support networks may also overburden immigrant parents with competing priorities, leaving them with little or no time for their children. Language and economic barriers to mental health services access also exacerbate

the negative influences of immigrants' adverse experiences, which can also impact their children. Additionally, older age, lower educational status, and newcomer immigrant status were also found to be immigrant-specific risk factors (Rhee et al., 2012).

### **Home Visiting Program Engagement**

Home visiting programs are designed to improve the health and development outcomes of high-risk children from disadvantaged families at risk for child maltreatment and adverse psychosocial outcomes. Research suggests that early childhood home visiting programs have improved parenting behavior and children's physical health, socioemotional development, and child maltreatment risk (Molloy et al., 2021; Peacock et al., 2013). Early childhood home visiting programs for the prevention of child maltreatment, in particular, are identified in the current literature as popular and promising interventions with mixed effectiveness results (Nygren et al., 2018). Kim et al. (2022) examined county-level associations between evidence-based home-visiting programs and child maltreatment reports of U.S. national data from 2011–2018. They found a small effect size of home visiting intervention on reduced child maltreatment.

The limited impact of the home-visiting program for high-risk children has led researchers to suggest consideration of factors such as family engagement, program fidelity, and adding mental health professionals. Family engagement in home visiting programs is an important factor that affects child developmental outcomes. Research suggests the majority of participants receive fewer home visits and for shorter durations than are recommended by evidence-based models (Folger et al., 2016). Heightened parenting stress has been shown to negatively impact families' level of engagement in home visiting programs (Rostad et al., 2018). Additionally, research indicates that while child welfare-involved families may have high initial

engagement, they may also have high attrition rates from home visiting programs (Stahlschmidt et al., 2018). At least one study suggested that retention in home visiting among child welfare-involved families varied by race and level of social support (Chiang et al., 2018). Little work has been done to understand the participation of and outcomes for immigrant families enrolled in home visitation, in part due to a lack of data that identifies immigrant status (Park & Katsiaficas, 2019).

### **Study Objective**

Little information about immigrant family involvement with CPS is available due to limitations of indicators for nativity in existing data. Nor is it clear how this involvement may alter their engagement in buffering interventions like home visitation. This study aimed to examine the risk factors associated with family child protective service (CPS) involvement and home visitation engagement among immigrants enrolled in home visitation. Prior research indicates that CPS involvement among families enrolled in home visitation is associated with the presence of a number of other stressors (Janczewski et al., 2023). Relatively little data is available on home visitation among CPS-involved families (Lee et al., 2018). Some data suggests that home visitation outcomes for the CPS-involved population may be limited by maternal depression (Jonson-Reid et al., 2018). No known data is available on factors associated with CPS involvement among immigrant families enrolled in home visitation. This study specifically addresses the following research questions: (1) What risk factors are associated with an immigrant family's history of family CPS involvement? And (2) Do families with a history of CPS involvement have differing levels of home visitation engagement? It was hypothesized that immigrant families' level of engagement in home visitation would differ based on prior history of family CPS involvement.

## Methods

The present study uses administrative data from the PAT program to understand the baseline prevalence and association of risks with a prior history of CPS involvement. Then, it uses longitudinal service data to examine retention in home visitation.

### Data and Sample

PAT is an evidence-based home-visiting intervention that offers parenting education and support to children from prenatal to kindergarten (PAT National Center [PATNC], 2022). PATNC (2022) home visiting data recorded in their Penelope electronic system was used in the current study. As of 2023, data on more than 150,000 families across the country were included. Generally, programs that have achieved the highest rating on fidelity to the PAT model are most likely to use the national electronic records system. Data are currently provided by such programs across 41 states (PATNC, 2022). At enrollment, immigrant status is indicated according to whether or not the family has immigrated to the U.S. in the past 5 years. Among families who enrolled in programs from 2010 to 2022 and were participating as of 2015, 6130 families were identified as immigrants. One child was randomly selected per family. The final sample for the current study is 4983 immigrant households with children aged 0–73 months (age  $M = 30.2$  months;  $SD = 82.0$ ; 51.8% boys).

### Measures

#### *Dependent Variables*

There are two outcome measures for the present study. The first was parent-reported history of family contact with CPS as reported at baseline child abuse or neglect and families' level of engagement in the home visiting program. Such involvement could include a documented initial report, a substantiated report of abuse/neglect of a child or sibling, or a

current or recent open case with the child welfare system. The CPS involvement measure was a categorical variable (1= yes, otherwise 0).

The second outcome was the families' level of engagement in the home visiting program. Because the PAT model recommends different frequencies of visits based on family needs, engagement was operationalized by the number of enrollment months. A three-level categorical measure of home visiting engagement was created: (a) never engaged (in the program for <90 days), (b) participated in the program at least 90 days but less than a year, and (c) participated in the program for a year or more.

### ***Independent Variables and Controls***

Data collected during program enrollment was used to code family demographics, including race, ethnicity, and place of origin. Multidimensional family adverse experiences were measured from participant baseline self-report, including four forms of household dysfunction (parent mental illness, substance use, intimate partner violence [IPV], incarceration), four forms of environmental stressors (insecure housing, recent immigrant/refugee, low education, low income), and ten forms of family stressors (teen parent, single parent, parent with disability, death in the family, child behavior concerns, first-time parents, multiple children under 6, relative as a caregiver, child disability, preterm birth/low birth weight).

### **Data Analysis**

Initial data cleaning was performed in Excel, and data linkage was performed using SAS 9.4. All data analyses were conducted using STATA 18 (Kohler & Kreuter, 2005). Statistical significance was set at  $p < 0.05$ . Bivariate statistics were used to assess the relationship between risk and demographic factors and immigrant families' child welfare involvement. Logistic regression was conducted to examine what demographic factors influence immigrant families'

child welfare involvement. The final model was adjusted for statistically significant factors at bivariate comparison  $p < 0.05$  and controlled for clustering by program site. I report model fit, odds ratios, robust standard errors, and 95% confidence intervals. Propensity scores were output with the same logistic regression model to control for differences in risk and demographic factors for those with histories of CPS involvement.

Based on the final logistic regression model results, a multinomial regression analysis was conducted of the level of home visitation engagement according to prior CPS involvement using a sample weighted by propensity score. I considered the same covariates as those in the logistic regression model to calculate the propensity score. Then, I converted the results into predicted values that can be used as weights. This method allows for estimating the complex factors related to CPS involvement without having to control for these factors in the final model. It is also a means of controlling for unmeasured confounding variables, and to balance the child welfare involved and the noninvolved sample on the observed covariate. To reduce bias in the weighted model estimate that may arise for reasons such as having child welfare involved sample with higher propensities and no suitable comparison sample for them, I restricted my analysis to subjects on the “common support,” which is limited to the range of propensity scores at which I observe both the child welfare involved and non-child-welfare involved families (Lunt, 2014). Therefore, I calculated the largest propensity score in the non-child-welfare involved sample (0.7420272) and the smallest in the child-welfare-involved cases (0.0029243) and restricted my analysis to it. Restricting my analysis to sample within this range means that I lost cases that fall outside of that range, which reduced the final analysis sample ( $n = 3386$ ). Without unmeasured confounding, my weighted multinomial logistic regression model estimates the effect of child welfare involvement in a population whose distribution of risk factors is equal to

that found in all study subjects (Olmos & Govindasamy, 2019). Relative risk ratios and robust standard errors are reported. I also report the marginal effects of child welfare involvement on immigrant families' home-visiting program engagement.

**Table 8**

*Descriptive Statistics for Sample Demographics and Study Variables*

Demographic characteristics	<i>n</i>	% or mean(SD)
<b>Race</b>		
White	2120	56.9
Black	332	8.9
Asian	456	12.2
More than one race	200	5.3
Prefer not to report	305	8.2
<b>Ethnicity</b>		
Hispanic	2477	66.5
Not Hispanic	1199	32.2
Prefer not to report	46	1.2
<b>Immigrant family native region</b>		
Europe	50	1.02
Middle East	334	6.8
South/East Asia	384	7.8
Sub-Saharan Africa	128	2.6
Latin America	3201	65.3
Unknown (other)	805	16.4
<b>Child age</b>		
< 3	3879	80.9
3–6	914	19.07
<b>Child gender</b>		
Female	2401	48.1
Male	2582	51.8
<b>Study variables</b>		
Number of family stressors		
0	358	7.1
1–3	3661	73.4
4 or more	964	19.3
Reported/substantiated child abuse/neglect	100	2.01
Months enrolled in home visiting program	4983	22.8 months (21.6)
Level of home visiting engagement		
Never engaged (< 90 days)	486	9.9
Less than a year	1720	35.04
Year or more	2702	55.05

Note: *n* = 4983 households

## Results

Sample characteristics are presented in Table 8. Two percent of the study sample had a history of child welfare involvement. Approximately 73% of the sample reported at least one adverse experience, and 19.3% reported four or more family adverse experiences. The mean enrollment length for families was 22.8 months. Over half of the families participated in the home visiting program for a year or more (55%). More than 65% of the sample were immigrants from Latin America and ethnically Hispanic. Approximately 8% of the sample were immigrants from South/East Asia, 6.8% were immigrants from the Middle East, and about 3% were immigrants from sub-Saharan Africa.

**Table 9**

*Select Demographic Factors Associated with Immigrant Families' Child Welfare Involvement*

Effect	OR	Robust SE	95% CI	
			LL	UL
Teen parent	2.16*	0.67	1.17	3.99
Child disability	0.80	0.28	0.39	1.63
Mental illness in the family	1.95*	0.64	1.02	3.74
Low education	1.42	0.33	0.90	2.23
Low income	1.41	0.59	0.62	3.23
Substance abuse	4.74***	1.75	2.29	9.79
Low birth weight	3.07**	1.36	1.29	7.33
Intimate Partner Violence (IPV)	5.31***	1.36	3.21	8.79
Single parent	3.25***	0.93	1.84	5.72
Low student achievement	1.94	0.80	0.86	4.38
Child behavior concerns	3.03**	1.38	1.24	7.41
First time parents	0.70	0.19	0.40	1.22
Multiple children under 6	1.07	0.29	0.63	1.83
(LR) $\chi^2 = 303.7(16), p < .001$				
Pseudo $R^2 = 0.223$				
C Statistic = 0.840				

*Note.* \*\*\* $p < .001$ ; \*\* $p < .01$ ; \* $p < .05$ ; Model adjusted for child age, gender, immigrant native region, and clustering by program site.  $n = 4983$ .

I conducted a logistic regression analysis to answer the first research question (What factors are associated with immigrant families' involvement with CPS?). Table 9 displays the



results. The logistic regression model was statistically significant  $X^2(16, N = 4902) = 303.74, p < 0.001$ . Adjusted for the immigrant family native region, child age, gender, and sample clustering by program site, immigrant teen parents were twice as likely to have CPS involvement as non-teen parents (OR=2.16,  $p = .014$ , 95%CI [1.17–3.99]). Mental illness in the family was also associated with an increase in the likelihood of CPS involvement (OR= 1.95,  $p = .042$ , 95%CI [1.02–3.74]).

Immigrant parents with a substance abuse problem were four times as likely to have CPS involvement as families without (OR= 4.74,  $p < .001$ , 95%CI [2.29–9.79]). Immigrant families with a preterm birth/low birth weight were 3 times as likely to have CPS involvement than without (OR= 3.07,  $p = .011$ , 95%CI [1.29–7.33]). Immigrant parents with experience of IPV were 5 times as likely to have CPS involvement than those parents with no IPV experience (OR= 5.31,  $p < .001$ , 95%CI [3.21–8.79]). Immigrant single parents were also three times as likely to have CPS involvement than married parents (OR= 3.25,  $p < .001$ , 95%CI [1.84–5.72]). Additionally, immigrant parents with child behavior concerns were three times as likely to have CPS involvement than parents with no behavior concerns (OR= 3.03,  $p = .015$ , 95%CI [1.24–7.41]). No other correlates were significant.

To answer the second research question (whether families' history of child welfare involvement influences the level of home visiting program engagement), I conducted a weighted multinomial logistic regression and calculated the marginal effects at means for the relative risk and effects probability of child welfare involvement on immigrant families' level of engagement or lack thereof in home visitation program. The logistic model used to estimate the propensity score yielded a c-statistic of 0.84. After the child welfare involved and not involved groups were balanced using propensity scores, the weighted multinomial model (see Table 10) revealed a

statistically significant effect of child welfare involvement on home visiting engagement for immigrant families. The sample size is lower because of the method of selecting cases within a certain range of propensity score rates.

**Table 10**

*Multinomial Logistic Regression Analysis of the Effect of Immigrant Families' Child Welfare Involvement on Home Visiting Engagement, Using Propensity Score Weighting*

Home visiting engagement	Child abuse report			Marginal effects (base outcome: CAN =0)				
	RRR	95% CI	Robust SE	Dy/dx	SE	Z	95% CI	
Never engaged VS a year or more	0.512	[0.10–2.42]	0.40	Never Engaged <sup>a</sup>	-0.043	0.01	-3.09	[-.06—0.01]
Less than a year VS a year or more	3.65**	[1.64–8.10]	1.48	Less than a year <sup>b</sup>	0.321	0.08	3.83	[0.15–0.48]
Never engaged VS < year	0.14**	[0.03–0.56]	0.09	A year or more <sup>c</sup>	-0.279	0.08	-3.29	[-.44–0.11]

*Note.* \*\*\* $p < .001$ ; \*\* $p < .01$ ; \* $p < .05$ ; CAN = child abuse and neglect. ( $n = 3386$ )

<sup>a</sup> Family stayed in the home visiting program for less than 90 days

<sup>b</sup> Family stayed in the home visiting program for less than a year

<sup>c</sup> Family stayed in the home visiting program for a year or more

Child welfare-involved families were significantly more likely than non-CPS-involved families to stay in a home visiting program for less than a year versus a year or more (RRR = 3.65, 1.48, 95%CI [1.64–8.10]). Additionally, child welfare-involved families were significantly less likely than non-CPS involved families to drop out of the home visiting program early (<90 days) versus staying in the program between 90 days and a year (RRR = 0.14, 0.09, 95%CI [0.03–0.56]).

The results of the marginal effects show that being in a family with a history of child welfare involvement decreases the average probability of never engaging in a home visitation program by 0.043, and increases the average probability of engaging in a home visiting program

for less than a year by 0.32, and decreases the average probability of engaging in home visiting program for a year or more by 0.27. In other words, the probability of families with a history of child welfare involvement never engaging in home visitation services decreased by 4 percentage points, and their probability of engaging in a home visitation program for less than a year increased by 32 percentage points. However, the probability of child welfare involved immigrant families engaging in home visitation program for a year or more decreased by 27 percentage points.

### **Discussion**

The present study examined what risk factors are associated with immigrant families' child welfare involvement and whether this, in turn, influences the level of parent engagement in home visiting program. Overall, the self-reported level of CPS contact was very low in the present study. Some of this may relate to the child's age at baseline when the question is asked, the length of time in the U.S., or possibly the healthy immigrant paradox (Millett, 2016). However, given that the question is asked when a family is enrolling in a voluntary service, there may also be a reluctance to share this information. My results did indicate that the following risk factors are associated with immigrant families' child welfare involvement: teen parenting, mental illness, substance abuse, low birth weight/preterm birth, IPV, single parent and child behavior concerns. These risk factors are consistent with prior research on nonimmigrant and immigrant populations related to overall stress levels as well as specific risk factors (Chang et al., 2008; Dubowitz et al., 2011; Liu et al., 2020; Martins et al., 2023; Younas & Gutman, 2023).

Although the rates of families endorsing IPV and substance use specifically were low in the present study, both were major risk factors for immigrant families' child welfare involvement. Immigrant parents with substance abuse issues were four times as likely to have

child welfare involvement. In contrast, immigrant parents with experience of IPV were five times as likely to have child abuse report than those with no IPV experience. The relationship between parental substance abuse and CPS involvement or maltreatment has been found in studies of immigrant and nonimmigrant populations (Chang et al., 2008; Dubowitz et al., 2011) and was again found to be a strong risk factor in a recent systematic review (Younas & Gutman, 2023). While substance abuse is a common factor in predicting maltreatment for immigrants and nonimmigrants alike, immigrants may face unique barriers to accessing substance abuse treatment (DeFries et al., 2022). Knowledge of effective substance abuse treatment models for parents of infants and young children is also just emerging. A recent review found a significant need for more rigorous research on promising programs that address parental substance use and prevent maltreatment (West et al., 2020). Still, it was unclear whether this was specific to CPS-involved families, and no studies focused on immigrants.

The cooccurrence of IPV and child maltreatment is common, with estimates ranging anywhere between 40% to 70% (Appel & Holden, 1998; Bidarra et al., 2016). Child maltreatment and violence against women share many risk factors. Unfortunately, specific measures of culture of origin or social norms were not available. Guedes et al. (2016) illustrate, however, that both are a function of social norms that normalize violence against women and children while discouraging help-seeking, often cooccurring in the same household and with severe developmental and lifelong consequences. For example, research indicates that maltreated children are more likely to experience IPV later in adulthood (Abajobir et al., 2017; Millett et al., 2013; Whitfield et al., 2003). Addressing the shared risks and expanding the implementation of integrated early interventions are important in streamlining the efforts to improve women's and children's wellbeing. There are a few intervention models within home visiting, but most of this

work has focused on nurse home visiting models (e.g., Feder et al., 2018; Jack et al., 2012). It is unclear how direct intervention may be incorporated into paraprofessional home visitation models. Scant research exists that includes attention to how IPV intervention in home visitation meets the needs of immigrant populations where only one article was located that included a focus on foreign-born Hispanic mothers (Li et al., 2022). More research is needed that examines referral and intervention models for immigrant families acknowledging IPV.

Single parenting, child behavior concerns, and child low birth weight/preterm birth were all significant risk factors for child abuse in immigrant families such that households with these demographic characteristics were three times as likely to be reported for child abuse. Results also show that teen immigrant parents were two times as likely to be involved with the child welfare system, whereas immigrant parents with mental illness were almost twice as likely to be reported for child abuse. These findings show child maltreatment risk factors for immigrant families are similar to those of nonimmigrant families involved with the child welfare system (Caporali et al., 2020; Putnam-Hornstein et al., 2015). My findings are also in line with studies of maltreatment risk with immigrant samples (Dettlaff & Earner, 2012). Results showed that risks for child maltreatment did not differ by demographic characteristics such as parent race and ethnicity, immigrant native region, and community type. Single parenting may also be a proxy for social support, which was not available as a measure in the present study.

Overall, the findings corroborate the family processes of stress and family conflict stipulated by attachment theory and the ecological model of stress and show household dysfunctions such as IPV and substance abuse are associated with increased risk for child welfare involvement. These results particularly support the bio-psychosocial model of stress which stipulates that environmental and family stressors increase family conflict and poor mental

health which compromises parenting behaviors thereby increasing the risk for child welfare involvement.

This study also examined the effect of immigrant families' child welfare involvement on their engagement level in home visiting program. As hypothesized, the level of engagement in home visitation differed based on the immigrant families' prior history of child welfare involvement. I discovered that child welfare-involved immigrant families were more likely to engage in home visitation than not but were less likely to stay engaged for more than a year. Similar results were found with nonimmigrant samples (Folger et al., 2016; Stahlschmidt et al., 2018). Social support, race and ethnicity, and other family characteristics have been linked to home visitation engagement or lack thereof (Folger et al., 2016). In contrast, other studies have found greater participation in prevention programs, particularly home visits, among mothers with higher parenting risk and adversity (Ammerman et al., 2006; Damashek et al., 2011). This suggests there may be other contextual factors at play for child welfare-involved families and the processes that influence their level of engagement with home visitation programs for a short period of time. The results also show that families involved in child welfare are willing to engage in home visiting. Investigating potential barriers preventing families from engaging with home visitation in the long term can inform early intervention design and community-based enrichment. These findings are particularly salient for immigrant families considering the evidence that immigrant families with children under the age of six use public benefits less often than families with U.S.-born parents, even though they are, on average, more likely to live in poverty and have less educated parents than nonimmigrant families (Martin-Herz et al., 2012).

## Limitations and Implications

The PAT demographic intake form does not differentiate between immigrants and refugees. The immigrant population has significant variability by reason for migration, documentation, and prior and immigration specific conditions. While a proxy was developed for the region of origin, it was not possible to control for these key aspects of the immigration experience. The present study lacked measures of acculturation or discrimination, which may be additional stressors unique to the immigrant experience. The lack of a specific country of origin and timing of immigration also hampers assessment of the impact of the immigration experience.

In addition, not all PAT sites currently use the electronic Penelope data system. While the large sample size and the likely fidelity to the PAT model of programs participating are strengths, it is not possible to know how representative findings are of immigrant participation in PAT overall according to all levels of fidelity to the PAT model. Nor was it possible to measure how a particular program may be training staff to be more culturally competent to enhance engagement.

Data on immigrant families' child welfare involvement were drawn from a cross-sectional intake assessment at home visitation enrollment. Reported or substantiated abuse/neglect was a single-item measure that recorded the presence or absence of such report and the family's child involvement. It was not possible to determine the exact timing of the contact (past or present), reason, or chronic nature of that involvement or if any of the CPS involved families were court mandated to participate in home visitation. There is a need to better understand whether or not the CPS involvement was current and may have influenced the reason for starting PAT as well as dropping out. Further, the reported rate of involvement was very low. As stated earlier, there are a variety of potential reasons for this. While the fact that the model of

CPS involvement indicated factors implicated in prior work lends support to the idea that those who self-reported involvement were different than those who did not, it is still likely that the present rate is an undercount. Future studies may be able to obtain a better estimate of whether official state CPS records can be linked to home visiting records.

Similarly, risk factors for CPS involvement are also only measured at enrollment. For example, the experience of IPV is measured at baseline, but it is unclear if this represents a past, current, or continuing phenomenon or all three. There was no measure of maternal childhood exposure to adverse childhood experiences or premigration trauma that may also have been relevant. Finally, while some programs measure parent resilience factors, these were not consistent enough within the present data to include. Such factors should be included in future research to better inform aspects of home visiting that can support families that may be experiencing a number of challenges to parenting.

### **Conclusion**

Immigrant and refugee families are largely invisible in the existing literature on child maltreatment, CPS involvement, and ongoing participation in home visiting, despite how common it is for U.S. children to have at least one immigrant parent (Millett, 2016). While the present study helps fill some gaps in my understanding of immigrant experience with child welfare and home visitation, findings raise even more questions. The lack of research and specific identification of the reason for and experience of immigration (voluntary legal, voluntary undocumented, or refugee) along with the country of origin and timing of adverse experiences limits the ability to understand competing theoretical models for CPS involvement (e.g., healthy immigrant, attachment or cumulative stress) and hampers development of implications for home visitation. This considerable diversity between immigrant populations, as



well as within group variation in the experiences and effects of immigrant families' child welfare involvement, illuminates the need for more research on this population and other similarly vulnerable populations.

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## Chapter 5: Modeling the Impact of IPV on Children of Immigrants' Socioemotional Development: Is Home Visiting Protective?

### Abstract

Research indicates that witnessing IPV during childhood is common in the general population and may result in untoward socioemotional development (Cao et al., 2023). Exposure to trauma and other stressors may be buffered by participation in home visitation (McKelvey & Fitzgerald, 2020). However, some research suggests IPV may limit home visiting participation (Sharps et al., 2008). It is unclear how these relationships may hold for immigrant families. The present study helps fill knowledge gaps regarding the socioemotional development of young immigrant children and the conditions under which the direct and indirect effect of IPV (measured at program enrollment) may be mediated by maternal depression and home visiting. The sample included 4149 immigrant households with children aged 10–72 months ( $M = 21.3$  months,  $SD = 16.2$ ; 52.4% boys) at exit who participated in PAT home visiting program between 2010–2022. Conditional indirect effects were tested via path models with longitudinal data using structural equation modeling. Findings revealed a significant indirect effect of baseline IPV report on later child socioemotional development via maternal depression ( $\beta = 1.74$ ,  $p < .05$ ). This was moderated by the length of home visiting engagement, such that the indirect effect was found only in families who stayed in the program for more than two years ( $\beta = 2.36$ ,  $p < .05$ , 95%CI [0.25–4.48]). Results suggest extra support is needed to address parent depression and IPV to promote positive socioemotional development among immigrants enrolled in home visitation.

## **Introduction**

Although the impact of IPV exposure on children's developmental and mental health outcomes have been well-documented (Chiesa et al., 2018; Gartland et al., 2021), the impact of IPV exposure on children of immigrants, as well as immigrant families engagement with early intervention program for their children's physical and socioemotional health needs remain understudied. The few available studies on IPV among immigrants tend to focus on the IPV victimization of immigrant women (Grady et al., 2019) rather than child outcomes, use qualitative methods with a small sample, or focus on one immigrant cultural subgroup (Akinsulure et al., 2013; Lee & Hadeed, 2009).

While home visitation may be able to buffer the effects of risks to child development like IPV, the effects of early intervention targeting one or more manifestations of adverse experiences on children's developmental and mental health outcomes are mixed at best with high variability of the type of early intervention and the populations studied (Li et al., 2022; Prosman et al., 2015). There is also a lack of knowledge on how these interventions translate to work with immigrant families. For example, there has been some attention to addressing IPV within specific early intervention models, but only one study was focused on immigrants limited to Latinx families (Li et al., 2022).

This study addresses these gaps by examining the direct and indirect effect of IPV on children of immigrants' psychosocial adjustment and whether home visiting program engagement and dosage mitigate these effects.

## **Background**

IPV is common in the U.S., and while prevalence figures vary widely in studies focused on immigrants, data suggest it is common for immigrant families as well (Gonçalves & Matos,

2016). Intimate partner violence (IPV) is likely to have a particularly high impact and contribute to health disparities for marginalized or immigrant survivors and their children (Adams & Campbell, 2012; Grady et al., 2019; Sabri & Granger, 2018; Stockman et al., 2015). In a cross-sectional study with 331 perpetrated Latinx immigrants, Latino immigrants with higher family stress had an elevated risk for IPV victimization. In contrast, those with more adverse childhood experiences had an increased risk for IPV perpetration (Cao et al., 2023). Wright and Benson (2010), in their exploration of neighborhood conditions and IPV among Latino immigrant communities, indicate that networks of strong social ties and cultural values act as protective factors in reducing IPV for immigrant women. Resilient findings such as these are sometimes categorized under the health immigrant effect (e.g., Miao et al., 2018; Millett, 2016). There is significant diversity, however, within the broad categorization of immigrants. This includes, at a minimum, the country and culture of origin, the reason for migration (voluntary or forced), and whether it is documented or not. For example, the rate of IPV among immigrant women in the U.S. has been found to vary widely among studies depending on the country of origin and measures used (Morrison et al., 2024). Other IPV evidence for newly arriving immigrants and refugees suggests that even though recent immigrants seem to have lower rates of IPV than women born in the West, immigrant women from developing countries report a higher prevalence of IPV (Hassan & Malik, 2011).

### **IPV and Child Development**

There is an increased risk of mental and behavioral health issues in children who are exposed to IPV (Bair-Merritt et al., 2006; Kimber et al., 2018; Wood & Sommers, 2011). Traumatic experiences such as IPV or child maltreatment are characterized by harm or the threat of harm (McLaughlin et al., 2014), which may impact children's mental and physical health,



including difficulty managing emotions (McEwen & McEwen, 2017). The mechanisms for this association may vary. For example, some children who have experienced interpersonal violence have a reduced threat reactivity (McLaughlin et al., 2014). Other effects may operate through disruptions in parent–child attachment (Schelbe & Geiger, 2017). Early childhood IPV exposure has been linked to negative cognitive, developmental, and child mental health outcomes (Gartland et al., 2021; Gibson et al., 2015; Wood & Sommers, 2011). In a prospective IPV and child outcomes study with 615 mother–child dyads in Australia, Gartland et al. (2021) collected maternal reports of IPV at three intervals over 10 years. Their study results showed that IPV exposure from infancy to age ten was associated with twice the odds of child psychiatric diagnoses, emotional and behavioral difficulties, impaired language skills, and asthmatic and sleep-related health issues compared to children without reported exposure.

IPV impacts early childhood development and may also operate indirectly through the effect of IPV on the parent. Parents with a history of IPV may experience poor outcomes such as depression, anxiety, substance abuse, suicidality, and PTSD, all of which are associated with what researchers call toxic stress (Matlow & DePrince, 2013; Sabri & Granger, 2018; Simmons et al., 2015). Parents experiencing one or more of these effects may be less engaged with their children and have poorer coping skills, affecting parent–child interactions (Chiesa et al., 2018). For instance, depressed mothers are often preoccupied with their relationship stress and mental health (Lindstrom Johnson et al., 2018), contributing to parenting stress associated with negative parenting behaviors (harsh or neglectful parenting) and parent insensitivity (emotional coldness, rejection, and withdrawal) (Chiesa et al., 2018; Ehrensaft et al., 2018). In contrast, other studies suggest that in some cases, higher levels of IPV victimization are associated with parental warmth and positive parenting, suggesting that mothers may compensate for distress in their

relationships by investing more energy and time into parenting and parent–child relationships (Ateah et al., 2019; Hasselle et al., 2020; Kouros et al., 2014).

### **IPV and Early Childhood Development**

During infancy and early childhood, children are particularly vulnerable to early developmental insults such as insecure attachment and maternal depression associated with experiences of IPV. This is because, during the first three years of life, a child’s ability to self-regulate effectively during times of distress is largely determined by the quality of relationships with his or her caregiver (Leyton, 2020). Young children are especially vulnerable to IPV exposure due to their dependency on caregivers for safety and care, and they are more likely to be at home during IPV episodes (Bender et al., 2022). For example, many children are exposed to IPV prenatally since IPV prevalence rates tend to be higher among pregnant women (Bogat et al., 2023). Self-regulation, a person’s ability to regulate their cognition, emotions, and behaviors in response to external stimuli, develops during early childhood, which includes both executive function and physiological reactions to stress (Lobo & Lunkenheimer, 2020). In situations where sensitive caregiving is absent or inconsistent, children may develop insecure attachments and have trouble managing their emotions and behaviors (Bender et al., 2022). Thus, by negatively affecting a parent’s mental health, IPV may negatively affect a child’s self-regulation as well (Jeong et al., 2020; Mueller & Tronick, 2020). The direct (witnessing the violence) or indirect (via insecure attachment, parental depression, and trauma) effects of IPV on the developing child can result in externalizing behavior problems (Fong et al., 2019; Zhang et al., 2023), internalizing mental health problems such as anxiety and depression (Lee et al., 2023), and poor psychosocial adjustment in the form of poor social skills (Mueller & Tronick, 2019).

## **Home Visiting Participation as a Buffer**

As illustrated in the Double ABCX model of family stress and adaptation (McCubbin et al., 1983; McCubbin & Patterson, 2014), adverse events or poor parenting may be offset if there are sufficient protective buffers. Evidence-based home visiting is the most well-known response to adverse experiences in early childhood and parenting support needs. This intervention is designed to improve the health and development outcomes of high-risk children from disadvantaged families at risk for toxic stress. Early childhood home visiting programs for the prevention of child maltreatment, for instance, are identified in the current literature as popular and promising interventions with mixed effectiveness results (Nygren et al., 2018). A systematic review of 21 randomized controlled trials of home visiting programs found that studies reporting no significant benefits were much more common than studies reporting statistically significant benefits for children at high risk (Molloy et al., 2021; Peacock et al., 2013). Kim et al. (2022) examined county-level associations between evidence-based home-visiting programs and child maltreatment reports of U.S. national data from 2011–2018. They found a small effect size of home visiting intervention on reduced child maltreatment. While child maltreatment and IPV frequently overlap, generally, home visitation was not designed to address IPV, and early studies noted the negative impact of IPV on participation (Sharps et al., 2008). Similarly, the effects of home visiting models on child behaviors are understudied, with only three models noted as having measured outcomes in this area in a large national review of evidence-based home visiting models with positive effects found in only 2 of 9 studies (Michalopoulos et al., 2019).

Innovations within home visitation programs are becoming increasingly popular as a way to address maternal depression (Ammerman et al., 2013; Jonson-Reid et al., 2018), substance use (O'Malley et al., 2021) as well as other social risk factors (Azar et al., 2017). However, few

studies have examined the moderating role of these programs under real-world conditions, and existing studies suggest mixed results (Casillas et al., 2016; Chartier et al., 2017; Han & Oh, 2022). IPV has been found to be common among home-visiting populations. Some specific modules or programs have been developed to intervene with IPV in the context of home visitation but much of this has focused on nurse home visiting approaches (e.g., Feder et al., 2018). Much of the intervention work has focused on reducing IPV. One study limited to young adults found that home visiting was associated with less time two reporting IPV, but IPV then mediated program impacts at Time 3 (Easterbrooks et al., 2021). Limited work has been done to understand the impacts on parenting or child development outcomes of home visiting in the context of IPV among families who do engage. One study found that nonparental child care reduced the impact of IPV on child behavioral problems, but it is not clear whether a home-based intervention would have a similar impact (Nicholson & Ha, 2024).). None of these studies have focused on immigrant populations.

### **Study Aim**

This study attempts to address some of the gaps in the literature by examining the potential pathways from the parental experience of IPV to early childhood socioemotional development for immigrant families who receive home visiting services. The primary aim was to examine the association between parent IPV, other family stressors, families' home visiting engagement, and child socioemotional development among young children in immigrant families. Research suggests that IPV in the U.S. is common, though the prevalence among immigrant populations is less clear (Breiding et al., 2014; Morrison et al., 2024). Exposure to trauma may disrupt attachment and be particularly salient for children's socioemotional development (Treat et al., 2019). Exposure to trauma and other stressors may be buffered by

participation in home visitation (McKelvey & Fitzgerald , 2020). However, some research suggests IPV may limit home visiting participation (Sharps et al., 2008). It is unclear how these relationships may hold for immigrant families. Specific research questions included: (1) Is parent IPV experience associated with level of maternal depression and child socioemotional development? (2) Is the association between parent IPV experience and child socioemotional development mediated by maternal depression? Is the effect of IPV on child socioemotional development via maternal depression moderated by (3) the number of home visits or (4) level of program engagement? In keeping with previous findings related to the mechanisms of parent–child transmission of stress and psychopathology (Capaldi et al., 2020; Jeong et al., 2020), it was hypothesized that maternal depression would mediate the relationship between parent experiences of IPV and child socioemotional concerns. In addition, in accordance with the idea of buffering effects (McCubbin et al., 1983; McCubbin & Patterson, 2014), it was hypothesized that the indirect effect of early parent IPV exposure on later child socioemotional development would be moderated by (a) the number of home visits a family received and (b) the level of families’ home visiting program engagement.

### **Methods**

The present study uses administrative data from the Parents as Teachers (PAT) program to understand the baseline prevalence of IPV and then uses longitudinal service and child socioemotional data to examine moderating and mediating effects of stress, maternal depression, and home visitation. Repeated measures of childhood socioemotional development, as well as service utilization with exact dates, are available. Deidentified data were provided by PAT, and human subjects approval was obtained from Washington University’s Human Subjects Review Committee (#202311079).

## Data and Sample

PAT is an evidence-based home-visiting intervention that offers parenting education and support to children from the prenatal period to kindergarten years (PAT National Center [PATNC], 2022). PATNC (2022) home visiting data recorded in their Penelope electronic system was used in the current study. As of 2023, data on more than 150,000 families across the country were included. Generally, programs that have achieved the highest rating on fidelity to the PAT model are most likely to use the national electronic records system. Data are currently provided by such programs across 41 states. At enrollment, immigrant status is indicated according to whether or not the family has immigrated to the U.S. in the past 5 years. This study was conducted using PAT home visitation program service data, which represented immigrant households that received PAT home visiting services between 2010 and 2022 (PATNC, 2022). The sample for this study was restricted to families who have been in the home visitation program for more than 90 days to ensure the opportunity to have more than one measure of child development. Because the program measure of socioemotional development is not given to children less than two months old, this was an additional inclusion criteria.

Parent educators completed observational assessments on children in collaboration with caregivers. The Ages and Stages Questionnaire: Social Emotional— Second Edition (ASQ:SE-2) was applied to children aged 2–60 months ( $n = 3831$ ; 51.3% boys). Indicators for adverse parental experiences, including IPV, were completed for all immigrant households in the study. Assessment of maternal depression was completed for mothers ( $n = 1345$ ; 71.9% Hispanic). Thus, the final sample for this study was 4149 immigrant families with 2–73 months old children ( $M = 21.3$  months;  $SD = 16.2$ ; 52.4% boys) and 1345 mothers with maternal depression records (66.1% Hispanic; 56.9% White). The sample size for specific research questions varies by

assessment tool because program sites participating in the PAT home visiting program varied in what indicators they completed for children and caregivers as part of the home visitation services. For example, only 41% of the program sites completed maternal depression assessments for immigrant mothers. Sample sizes for specific analyses are provided in the results section.

## **Measures**

### ***Child Social Emotional Development***

Child socioemotional development was measured with the Ages and Stages: Social Emotional–Second Edition (ASQ:SE-2). The ASQ:SE-2 is a validated early childhood measure of socioemotional behaviors (de Wolff et al., 2013). As infants and toddlers develop relationships with nurturing and responsive adults, they learn how to communicate, identify and regulate their emotions, and get their needs met, which is referred to as socioemotional development (Rademacher & Koglin, 2018). As part of ASQ:SE-2, children are assessed in seven areas of socioemotional development: self-regulation, compliance, social communication, adaptive functioning, autonomy, affect, and interpersonal interaction. However, ASQ:SE-2 provides only one total score for socioemotional behaviors instead of providing scores for each area. A child's overall score can fall below the cutoff (typical development), in the monitoring zone (at risk for delay), or above the cutoff (potential delay). The cutoff is a score that varies by age. The higher the score, the greater concern for behavior and socioemotional delay, and further assessment with a professional may be needed. The instrument has been studied extensively, and psychometric studies show high reliability and internal consistency (Chen et al., 2017; Velikonja et al., 2017). With the PAT home visiting program, ASQ:SE-2 is done for all children enrolled at baseline and completed every six months by the parent, with the parent educator present to

provide support when needed. A child-level cumulative score was taken based on the seven developmental areas, including self-regulation, compliance, autonomy, social communication, and interpersonal relationships. A continuous score of child socioemotional development was used for path analysis.

### ***Intimate Partner Violence***

Families in the home visiting program were screened for current household risk factors, including domestic violence, at program enrollment. For this study, IPV is included as a single-item measure. It is measured within six months of the family's service enrollment. It is coded as a dichotomous variable (1 = yes, otherwise 0). A value of 1 indicates that the parent/caregiver is a survivor of IPV per self-report, positive screening, or court proceedings. This may include physical, sexual, psychological violence and economic coercion.

### ***Maternal Depression***

Maternal depression was measured with the standardized measure Edinburgh postnatal depression scale (Cox et al., 1987), which is used to detect the presence and severity of depressive symptoms. It is a repeated measure first collected at enrollment and completed annually. The 10-item depression screening instrument is designed to address depressive symptoms after childbirth specifically. A cutoff score of 13 has been validated for detecting major depression in the perinatal period in childbearing women and has demonstrated high internal consistency and validity (Cox et al., 1996). For the PAT home visiting program, a depression score of 10 or greater is classified as elevated depressive symptoms and is a cause for referral to outside sources (PATNC, 2015). Hence, a score of 10 or greater was classified as major depression for this study. A participant-level cumulative score, ranging from 0 to 30, was used for path analysis.



### ***Home Visiting Program Engagement***

Families' home visiting program engagement is important to early childhood intervention success. This study considers home visiting dosage (operationalized by the total number of visits a family received) and level of home visiting program participation (operationalized by the enrollment months) as intervention variables. A minimum of one home visit per month per family is required, but under PAT policies, families with two or more stressors are eligible for twice-a-month home visits (PATNC, 2015). Thus, assessing the effects of intervention dose and participation level may offer insight into the possible moderating role of home-visiting programs in preventing poor child development outcomes. Home visit dose and level of engagement are both count variables. I created a categorical variable of home visiting engagement with (1) representing families who stayed in the program for one to two years and (2) representing families who stayed in the program for more than two years. A count measure of home visiting dose was used for path analysis.

### ***Potential Confounding and Control Variables***

#### ***Demographic Variables***

Demographic data collected at program enrollment were used to code family race (White, Black, Asian, more than one race), ethnicity (Hispanic or not), a proxy for the region of origin based on spoken language, family size, maternal education level, child age, and sex, and the type of community families live in (rural, suburban or urban).

Family stress at baseline (excluding IPV) was recoded as a count variable. Immigrant families' adverse experiences were measured from participant self-report, including five forms of household dysfunction (parent mental illness, substance use, IPV, incarceration, child abuse), four forms of environmental stressors (insecure housing, recent immigrant/refugee, low

education, low income), and ten forms of family stressors (teen parent, single parent, parent with disability, death in the family, child behavior concerns, first-time parents, multiple children under 6, and relative as a caregiver, child disability, low birth weight). The number of adverse experiences for each family was summed up in an aggregate index (range 0–13). A continuous measure of family stress was used for path analysis.

Baseline socioemotional child screen score per the ASQ SE was also used as a control variable. Data clustering at the program site level was also taken into consideration to account for program variation.

### **Data Analysis**

Initial data cleaning was performed in Excel, and data linkage across household, parent, and child files was performed using SAS 9.4. All statistical analyses were conducted using STATA 18 (Kohler & Kreuter, 2005). Descriptive analysis and estimation of correlation coefficients were completed on all study variables, including examination of missing values. Missingness was 1.1% for the child indicators and was listwise deleted. All analytic procedures performed exclude missing data.

Longitudinal path analyses were used to explore how parent IPV experience measured at baseline can influence later child socioemotional outcomes measured at the last visit while taking into account mediating factors like maternal depression and the moderating role of the home visiting intervention (Yee & Niemeier, 1996). Child socioemotional score at the last visit was the primary outcome of interest. While the measure of maternal depression is repeated annually, not all families are retained for a full year, and therefore, analyses were restricted to the baseline depression measure. Bivariate analyses of correlation among study variables were completed. In

the analyses, demographic variables showing a significant relationship ( $p < .05$ ) with one or more independent variables or dependent variables were considered as covariates.

The hypothesized mediation model was estimated using STATA's built-in *sem* command for structural equation modeling (SEM). The indirect effect and significance of parent IPV on child socioemotional development via maternal depression was estimated using the *medsem* postestimation command, following the mediation procedures described by Zhao et al. (2010), followed by Sobel's (1987) z-test for statistical significance. The mediational analysis is accepted as significant when the Sobel test demonstrates the value of the indirect effect is greater than zero with  $p < .05$ . According to Baron and Kenny's (1986) definition of a mediator, maternal depression will be considered a mediator if (a) IPV predicts child socioemotional development, (b) IPV significantly predicts maternal depression, and (c) maternal depression significantly predicts child socioemotional development, controlling for other family stressors and baseline socioemotional development score. The relationship between early parent IPV exposure and later child social socioemotional development after controlling for maternal depression is called the direct effect. In a mediation analysis, predictor variables are quantified based on which pathway they affect the outcome through versus which one they affect independently (Vanderweele, 2016).

The hypothesized moderated mediations were estimated using STATA's built-in *sem* command for structural equation modeling (SEM). The conditional indirect effects for the first moderated mediation model and their standard errors were estimated following the procedures by Preacher et al. (2007) and Hayes (2013). Moderated mediation analysis tests the conditional indirect effect of a moderating variable (i.e., the total number of completed home visits) on the relationship between predictor (i.e., IPV) and an outcome variable (i.e., children's

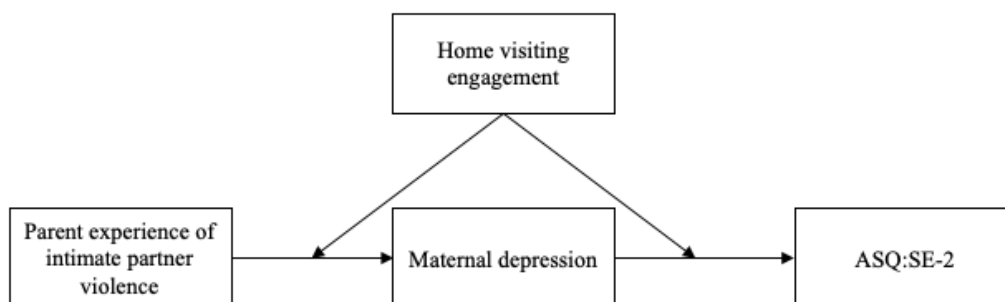
socioemotional wellbeing) via a potential mediator (i.e., maternal depression). To control for unmeasured effects, child gender, age, family native region, race and ethnicity, baseline socioemotional score, and a measure of family stress were entered as covariates. The process model via bootstrapping approach (Hayes, 2013, Model 14) was used to test the significance of the indirect (i.e., mediated) effects moderated by home visit dosage, i.e., conditional indirect effects. This model explicitly tests the moderating effect on the mediator to dependent variable path (i.e., path b). An index of moderated mediation was used to test model significance, i.e., the difference in the indirect effects across levels of home visit dosage (Hayes, 2015). Significant effects were supported by the absence of zero within the confidence intervals.

The second hypothesized moderation mediation model (Figure 1) was tested using SEM for moderated mediation with categorical variables in a single model using a bootstrapping approach (Hayes, 2013, Model 59). The multiple-group analysis was used to test the significance of the indirect (i.e., mediated) effects moderated by families' level of program engagement, i.e., conditional indirect effects. Early parent IPV exposure was the predictor variable, with maternal depression scores at baseline as the mediator. The outcome variable was children's later socioemotional development scores measured at the service end, and the level of home visitation engagement was the moderator. To account for potential confounding effects outside of the relationship between the variables of interest, child gender, age, family stress score, and baseline child socioemotional score were entered as covariates. For this analysis, home visiting program engagement was recoded to a dichotomous variable with two distinct categories: the first group representing families who have been in the program for one to two years, and the second group representing families that have been in the program for over two years, to make the results comparable. This model has a single moderator variable (level of home visitation engagement)

that moderates both the path between IPV and maternal depression and maternal depression and children's socioemotional wellbeing. However, it does not explicitly test the moderating effect on the predictor to mediator (i.e., path a) or the moderating effect on mediator to outcome (i.e., path b); rather, the interactions are implicit in the multiple group analysis itself. The hypothesized moderated mediation model is shown in Figure 1. Significant effects were supported by the absence of zero within the confidence intervals. Estimated coefficients, 95% confidence intervals, and bias-corrected standard errors are reported (bootstrap draws = 1000).

### Figure 1

*Hypothesized Model of Direct and Indirect Effects of IPV on Child Socioemotional Problems at Different Levels of Families' Home Visiting Engagement.*



Model fit was evaluated using four indices (Kline, 2016), namely the model  $\chi^2$  test, the root mean square error of approximation (RMSEA), the comparative fit (CFI), and the standardized root mean square residual (SRMR). A significant chi-square, RMSEA value below 0.06 with a lower 90%CI and CFI values 0.90 and greater indicate a good model fit. Additionally, a smaller SRMR is considered a good fit, with values of 0 indicating a perfect model fit.

**Table 11***Descriptive Statistics for Sample Demographics and Study Variables*

Demographic characteristics	<i>n</i>	% or mean (SD)
<b>Race (<i>n</i> = 3159)</b>		
White	1800	56.9
Black	296	9.3
Asian	385	12.1
More than one race	170	5.3
<b>Ethnicity</b>		
Hispanic	2089	66.1
Not Hispanic	1033	32.7
Prefer not to report	37	1.1
<b>Immigrant family native region (<i>n</i> = 4089)</b>		
Europe	43	1.1
Middle East	286	6.9
South/East Asia	333	8.1
Sub-Saharan Africa	109	2.6
Latin America	2667	65.2
Unknown (other)	651	15.9
<b>Child age (<i>N</i> = 4079)</b>		
< 3	3300	80.9
3–6	779	19.1
<b>Child gender (<i>n</i> = 4149)</b>		
Female	1969	47.4
Male	2180	52.5
<b>Independent variable</b>		
Intimate partner violence ( <i>n</i> = 4149)	196	4.7
<b>Covariates</b>		
Child social emotional development at baseline	3871	23.7(28.9)
Family stressor count	4149	2.4(1.5)
0	262	6.3
1–3	3043	73.3
4 or more	844	20.3
<b>Moderating variables</b>		
Months enrolled in home visiting program	4149	25.3(20.9)
<b>Level of home visiting engagement</b>		
>90 days < 1 year	518	20.09
1–2 years	898	34.8
More than 2 years	1162	45.07
Total number of home visits (dosage)	4149	30.6(24.4)
<b>Outcome variable</b>		
Child socioemotional development score at last visit	2596	25.6(29.0)

## Results

Table 11 shows the distribution of study variables for the full sample. The study sample was 56.9% White, 12.1% Asian, 9.3% Black, and 66.1% Hispanic. Participating families were 65.2% from Latin America, 8.1% from South/East Asia, 6.9% from the Middle East, and 2.6% from sub-Saharan Africa. Approximately 81% of the children in the study were under three years old. The prevalence of IPV was 4.7% for the immigrant sample in the study. About 73.3% of the sample reported they had experienced at least one type of adverse experience. About 20% of the sample reported four or more adverse experiences. The average maternal depression score at program enrollment was 4.8. The average parent–child attachment score was 45.9 at program enrollment. About 45% of the sample participated in the program for over two years. The mean program enrollment was two years, and the mean home visits dose was 30 visits per immigrant family.

Table 12 shows the sample limited to cases in which maternal depression was measured. For example, 62.3% of the sample who identified as White also had measures of maternal depression compared to about 9.3% of Asian families. A greater proportion of children under age 3 had mothers with completed depression screens.

Table 13 illustrates bivariate relationships between outcomes, moderators, mediator, and family stress. A significant correlation (Spearman was used due to lack of normality) between baseline parent IPV experience maternal depression and later child socioemotional development to check for initial support for the hypothesized paths. In bivariate correlations, however, baseline family stress had the strongest relationship with the final measure of socioemotional development.

**Table 12**

*Descriptive Statistics for Sample Demographics and Study Variables for Households with Maternal Depression Scores*

Demographic characteristics	Total household sample		Household sample with Maternal depression record	
	N = 3159	% or mean (SD)	N = 1345	% or mean (SD)
<b>Race</b>				
White	1800	56.9%	838	62.3%
Black	296	9.3%	131	9.7%
Asian	385	12.1%	126	9.3%
More than one race	170	5.3%	72	5.3%
Other/ unknown	508	16.4%	178	13.4%
<b>Ethnicity</b>				
Hispanic	2089	66.1%	968	71.9%
Not Hispanic	1033	32.7%	363	26.9%
Prefer not to report	37	1.2%	14	1.2%
<b>Immigrant family native region</b>				
Europe	33	1.05%	8	0.6%
Middle East	233	7.44%	69	5.15%
South/ East Asia	216	6.8%	80	5.97%
Sub-Sahara Africa	87	2.7%	28	2.09%
Latin America	2081	66.42%	965	72.07%
Unknown (other)	483	15.5%	195	14.1%
<b>Child age</b>				
< 3	2617	83.8%	1212	91.1%
3-6	504	16.1%	119	8.9%
<b>Child gender</b>				
Female	1498	47.4%	652	48.4%
Male	1661	52.5%	693	51.5%
<b>Independent variable</b>				
Intimate partner violence	154	4.87%	63	4.68%
<b>Covariates</b>				
Child social emotional development at baseline	3034	23 (29.0)	n/a	n/a
Family stressor count	3159	2.5 (1.60)	1345	2.7 (1.5)
Number of family stressors				
0	169	5.35%	32	2.3%
1-3	2351	74.4%	1004	74.6%
4 or more	639	20.2%	309	22.9%
<b>Moderating variables</b>				
Months enrolled in home visiting program	3159	24.3 (18.4)	1345	25.5 (17.4)
Level of home visiting engagement				
>90 days < 1 year	1120	35.6%	426	31.8%
One to two years	911	28.9%	387	28.9%
More than two years	1114	35.4%	526	39.2%



Total number of home visits (dosage)	3159	32.9 (25.2)	1345	37.4 (26.9)
<b>Outcome variable</b>				
Child socio-emotional development score at last visit	2136	25.2 (29.1)	n/a	n/a

Note: This table shows the specific sample used in the analyses for research questions two, three and four as it changes when using the maternal depression EPDS measure as a mediating variable

**Table 13**

*Spearman Rank Correlations for Study Variables*

	1	2	3	4	5	6	7
1. Socioemotional development end-time	1						
2. Intimate partner violence	.07*	1					
3. Maternal depression	.14*	.10*	1				
4. Home visiting dosage	.00	.03	.02	1			
5. Home visiting engagement	.02	.03	.03	.68*	1		
6. Family stressors	.21*	.17*	.08*	.04	-.02	1	
7. Socioemotional development at baseline	.42*	.00	.14*	-.00	.01	.10*	1

Note.  $n = 809$ . \* $p < .05$

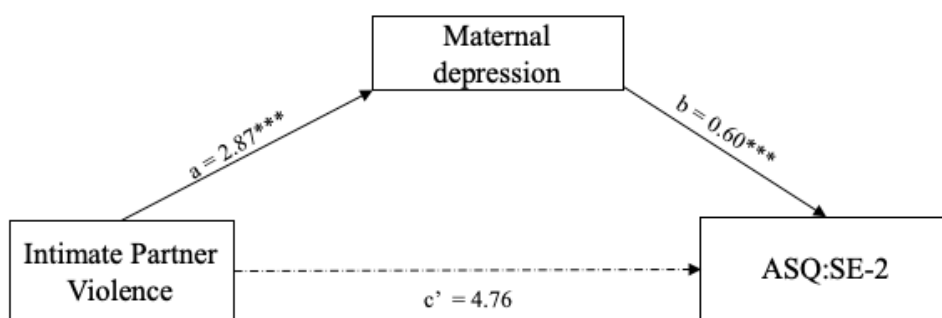
**Test of Mediation**

To test the first hypothesis, a single mediator model was constructed where parent IPV impacts child socioemotional development via maternal depression (Figure 2). The analysis of paths revealed that controlling for non-IPV family stressors, child socioemotional score at baseline, child age, gender, parent race, ethnicity, immigrant native region, and clustering by program site, there was a significant full mediation between parent IPV and child socioemotional development via maternal depression. Path a (i.e., parent IPV on maternal depression) ( $\beta = 2.87$ ,  $p < .001$ ) and path b (i.e., maternal depression on child socioemotional well-being) ( $\beta = 0.60$ ,

$p < .01$ ) were both significant. Path  $c$  (i.e., the direct effect of parent IPV on child socioemotional well-being) was not significant ( $\beta = 4.76, p = 0.224$ ). Hence, there was only a significant indirect effect of parent IPV on child socioemotional outcome mediated by maternal depression ( $\beta = 1.74, p = 0.05$ ). In addition, the Sobel test for the indirect effect ( $z = 2.16, p = 0.030$ ) was significant. In other words, adjusting for other family stressors, child socioemotional score at baseline, child age and gender, race, ethnicity, immigrant native region, and clustering by program site, about 27% of the effects of parent IPV on children's socioemotional well-being was mediated by maternal depression.

## Figure 2

### *Indirect Effect of Parent IPV on Child Socioemotional Development Via Maternal Depression*



*Note.*  $n = 987$ . Higher ASQ:SE-2 score indicates greater child behavior and socioemotional concern model fit indices:  $X^2: 25.75(4), p < .001$ ; RMSEA 0.07 95% CI[0.04–0.10], CFI/TLI 0.962/0.717, SRMR 0.022

## Test of Moderated Mediation

To test the second hypothesis on the moderating role of home visiting intervention in the mediated relationship between IPV and child socioemotional development, the model looked at both home visiting dose and level of engagement separately. Home visiting dose was operationalized by the total number of home visits a family received. Level of home visiting engagement is operationalized by the enrollment months a family stayed in the home visiting

program. To test the moderating effect of home visiting dose, the interaction effect was used (Little et al., 2007), and all the conditions described by Baron and Kenny (1986) were first satisfied. This model explicitly tests the moderating effect on maternal depression to child socioemotional development path (i.e., path b). The results revealed that there was no significant moderated mediation ( $\beta = 1.33$ ,  $p = 0.149$ , 95%CI [-0.48–3.15]). As the index of moderated mediation  $p$ -value was greater than .05 and the bootstrapped bias-corrected 95% confidence interval included zero, it was concluded that the home visiting dose did not moderate the indirect effect of parent IPV at baseline on later child socioemotional concerns.

Next, to test the direct and indirect effects of early parent IPV exposure on children's self-regulation and adjustment later in the program, a moderated mediation analysis for families who have participated in the home visiting program for at least a year and above was performed (see Table 14). After adjusting for other family stressors, baseline socioemotional score, child age, and gender, the path analysis revealed that the indirect effect varied by families' duration of home visiting engagement. In households who engaged in home visiting for more than two years, there was a significant indirect effect for paths linking parent IPV experience, maternal depression, and child socioemotional concern ( $\beta = 2.36$ ,  $p < .05$ ). This indirect effect is not significant in the other group. There was a significant conditional effect on path a (IPV on maternal depression) for those who engaged in services for over two years ( $\beta = 3.54$ ,  $p < .001$ ). There was no effect of IPV on maternal depression for the households who engaged in services for less than two years. Additionally, there were significant conditional effects on path b (maternal depression on child socioemotional concern) in households who engaged in services for less than two years ( $\beta = 0.82$ ,  $p < .001$ ) and for those who stayed over 2 years ( $\beta = 0.66$ ,  $p < .01$ ) (Table 14).

**Table 14***Multigroup Path Analysis: Direct and Indirect Effects by Family Home Visiting Engagement*

Paths	Coefficients(SE) [95% CI]			
	1– 2 years <sup>a</sup> (n =325)		>2 years <sup>b</sup> (n =484)	
<b>Direct effects</b>				
IPV →maternal depression (1)	0.66(1.52)	[-2.02–3.65]	3.54(1.0)***	[1.57–5.50]
Maternal depression →Socioemotional concern (2)	0.82(0.20)***	[0.42–1.22]	0.66(0.23)**	[0.20–1.13]
IPV → Socioemotional concern (3)	-2.96(5.58)	[-13.9–7.9]	5.16(5.33)	[-5.28–15.6]
<b>Covariates</b>				
Family stress → Maternal depression (4)	0.11(0.17)	[-0.22–0.45]	0.34**(0.14)	[0.05–0.62]
Family stress → socioemotional concern (5)	1.26(0.63)*	[0.02–2.50]	2.79(0.76)***	[1.29–4.30]
Socioemotional baseline → Socioemotional at end line (6)	0.57(0.05)***	[0.47–0.67]	0.40(0.05)***	[0.30–0.51]
Gender → Socioemotional concern (7)	0.41(2.03)	[-3.57–4.40]	7.78(2.37)**	[3.12–12.4]
Age → Socioemotional concern (8)	0.03(0.08)	[-0.13–0.19]	0.005(0.10)	[-0.19–0.20]
<b>Indirect effects</b>				
(1) x (2)	0.54(1.26)	[-1.94–3.03]	2.36(1.07)*	[0.25–4.48]
(4) x (5)	0.09(0.14)	[-0.18–0.37]	0.22(0.12)	[-0.01–0.47]

*Note.*  $p < 0.05$ , \*\* $p < 0.01$ , \*\*\* $p < .001$ , Socioemotional concern is measured by ASQ:SE-2; higher score indicates greater child behavior and socioemotional concern model fit indices:  $X^2$  19.16(4):  $p < .001$ ; RMSEA 0.09 95%CI[0.05–0.14]; CFI/TLI 0.96/0.75; SRMR 0.028

<sup>a</sup> Families participated in home visiting program for 1 to 2 years

<sup>b</sup> Families participated in the home visiting program for more than 2 years

As the results were somewhat counterintuitive, a post-hoc description of risk levels by home visitation was conducted (see Table 15). Those families staying longer in home visitation contained higher proportions of families who had initially screened positive for depression, high stress, and IPV.

**Table 15***Post Hoc Analysis of Risks by Duration of Home Visitation*

	1–2 years <i>n</i> (%)	Over 2 years <i>n</i> (%)
Depression		
Major depression	40 (35.09)	74 (64.9)
Mild depression	285 (41)	410 (58.9)
Family Stress		
High stress	379 (43.22)	498 (56.78)
Low stress	519 (43.87)	664 (56.13)
IPV	39 (39.80)	59 (60.20)

**Discussion**

IPV victimization can result in a number of adverse outcomes for the parent experiencing it, such as posttraumatic stress disorder, depression, anxiety, and dysregulation of emotions (Bender et al., 2022; Drexler et al., 2022; Muñoz-Rivas et al., 2021), and impaired socioemotional and cognitive development for the child (Bender et al., 2022; Johnson et al., 2021). While relatively little research sheds light on the prevalence of IPV among U.S. immigrant families, existing research suggests that it is not rare (Gonçalves & Matos, 2016). The rate of self-reported IPV was lower than expected, with only weak (though significant) bivariate associations with other stressors and maternal depression. While the present sample had a lower prevalence of IPV than the national rate (Leemis et al., 2022), families had a higher prevalence of overall adverse experiences (73.3%) compared to 64% prevalence for U.S. adults (Swedo, 2023). The prevalence of experiencing four or more adverse experiences in the sample (20.3%) was also higher than the national average (17.3%). These findings suggest that extra support is required to address caregiver mental health needs and child socioemotional needs for immigrant families with elevated family stressors and IPV victimization. No differences by race/ethnicity or by immigrant native region were observed.

This study's findings can be further summarized into two categories. The first highlights the causal chain of effects with which IPV impacts children's socioemotional development. The second focuses on how early intervention can modify the mechanisms of influence at work so as to shed light on the circumstances in which home visiting may moderate the effects of IPV on children's long-term socioemotional problems via maternal mental health.

In this study, it was found that the impact of IPV measured at program enrollment was significantly influencing the socioemotional development of children later in the program. As hypothesized, the relationship between parent IPV and child socioemotional problems was fully mediated by the level of maternal depression, such that experiencing IPV was associated with higher scores of depressive symptoms for mothers, which in turn was associated with increased socioemotional problems in children. The mediation of IPV through maternal depression is consistent with other research on the import of maternal mental health for parenting. For example, Weissman et al. (2004) found that depressed mothers reported a three times higher risk of serious socioemotional problems in their children compared to nondepressed mothers. Similar findings have been found in other nonimmigrant samples (Ahlf-Dunn & Huth-Bocks, 2014; Fusco, 2017) as well as in studies from low and middle-income countries (de Oliveira et al., 2022). This suggests the importance of screening not only for IPV in home visitation but also for maternal depression. Interventions to address maternal depression may be particularly important to improve socioemotional child outcomes.

Results showed that there was no sufficient evidence to support the hypothesized moderating role of the number of visits on the mediated relationship between parent IPV and later socioemotional development via maternal depression. However, as hypothesized, there was a significant difference by the level (duration) of parent engagement in home visiting services.

Duration was divided into two groups: (a) families who engaged in the program between one to 2 years, and (b) families who stayed in the home visiting program for over 2 years. While the ABCX model of family stress and adaptation (McCubbin & Patterson, 2014) illustrates that adverse events in the family system may be buffered with supports that strengthen protective factors, this study suggests the duration of home visiting (the buffer) matters, but in a somewhat counterintuitive way. More specifically, the impact of IPV was strongest for families who stayed in the program for over two years. Among these families, a history of IPV was predictive of higher maternal depression for mothers, which in turn lead to more severe child socioemotional problems. Family stress processes were also more pronounced for families who stayed in the program for more than two years, where family stress predicted higher depression for mothers, which in turn lead to more severe child socioemotional problems. These findings suggest that families who engage with home visiting services for longer period of time may have elevated risks and require extra support.

In the study's sample, households with IPV experiences, elevated depressive symptoms, and who reported four or more family stressors were overrepresented in the group who stayed in the program for over two years. The majority of the mothers who reported IPV also reported higher depressive symptoms and participated in home visiting services for a longer period of time, suggesting that family stress processes may be associated with a longer program stay. IPV has been found to be common among home visiting populations, and there is emerging work on integrating IPV intervention within the home visitation model (e.g., Feder et al., 2018). The effects of early IPV exposure on child outcomes may also be more evident for families who stay longer, as child behavior and socioemotional problems may be more easily identifiable later in the developmental period with toddlers and preschool age children. Early behavioral problems in

children usually begin after the first year (Ahlf-Dunn & Huth-Bocks, 2014). Higher socioemotional problems in long stayers may also be a function of the home visiting intervention such that mothers are more aware of the child development and are attuned to their children's needs.

While some prior work suggests that heightened parenting stress negatively impacts families' level of engagement in home visiting programs (Rostad et al., 2018), this may not always be the case. Consistent with my findings, other studies have found that greater participation in prevention programs, and in particular home visits, was found among mothers with higher parenting risk and adversity (Ammerman et al., 2006). It may be that a subset of families with the greatest risk stay longer, but it is not clear if this is specific to immigrant families. This suggests that understanding how program dose or engagement is measured in relation to later outcomes needs to include consideration of whether or not the more at-risk families may stay longer. Currently, the PAT program does not reassess for various stressors other than maternal depression.

Overall, the results of hypotheses two and four support the theoretical evidence on family processes of psychopathology (Levendosky & Graham-Bermann, 2001; Fusco, 2017). The study findings align with attachment theory's assertion that children exposed to early adverse experiences (e.g., IPV) are more likely to struggle with behavior problems and emotion regulation (Jeong et al., 2020). The study findings also align with the ecological model of stress' assertion that potentially traumatic experiences such as IPV negatively impact parent mental health and child socioemotional problems (Bogat et al., 2023). The results of hypotheses three and four however do not align with the ABCX model of family stress and adaptation's (McCubbin & Patterson, 2014) illustration that adverse events in the family system may be



buffered with supports that strengthen protective factors. These results indicate there is a need for further research to revisit stress and risk measures over time that may facilitate attention to risk that is not ameliorated during the early stage of participation but may still impact child outcomes.

### ***Limitations***

The PAT demographic intake form does not differentiate between immigrants and refugees. The immigrant population has significant variability by reason for migration, documentation, and prior and immigration specific conditions. While a proxy was developed for the region of origin, it was not possible to control for these key aspects of the immigration experience. The present study lacked measures of acculturation or discrimination which may be additional stressors unique to immigrant experience. The lack of a specific country of origin and timing of immigration also hampers assessment of the impact of the immigration experience. For example, it is not possible to measure past structural and collective trauma's impact on the family system, which may be associated with fleeing conflict or threats like famine. It may be possible for PAT to add a more specific query about immigration that would shed more light on differences within the group in the future.

In addition, not all PAT sites currently use the electronic Penelope data system. While the large sample size and the likely fidelity to the PAT model of programs participating are strengths, it is not possible to know how representative findings are of immigrant participation in PAT overall according to all levels of fidelity to the PAT model. Nor was it possible to measure how a particular program may be training staff to be more culturally competent to enhance engagement. The sample population for this study only included immigrant households enrolled in home visiting programs that are part of the PAT Penelope electronic data system, which limits

the generalizability of my results to immigrant populations who voluntarily enroll in PAT services.

Data on IPV experiences were drawn from the baseline demographic survey that recorded the presence or absence of such experience. Cross-sectional measures of IPV in the family may limit understanding of the magnitude and sequence of exposure to IPV in children. Measuring it at one point in time confounds whether it was one episode of IPV (e.g., the victim left the abusive relationship) or whether the IPV is ongoing. More information on the occurrence, type, and magnitude of IPV victimization, whether children in my study were exposed to it in utero or after birth, could have elucidated some of the mechanisms of influences on elevated child socioemotional problems later in the program that my findings show. In this study, I do not know the actual level of IPV exposure among children.

Another limitation of my study is that the ASQSE-2 is completed by parents with the help of parent educators. Children were not assessed directly. It is possible perceptions of emotion and behavior problems in children may be influenced by the presence of elevated depressive symptoms in parents. Other unmeasured confounders (e.g., immigrant family past trauma) may also limit the interpretation of my findings. Finally, it is unclear if the greater understanding of normative development gained from longer participation in home visiting may actually result in parents rating higher levels of problematic behaviors.

Data on protective factors and variables noted in prior studies of child development and adverse experiences like social support (e.g., Sangalang et al., 2019) were not available. While the relationship between the home visitor and the parent may be one form of formal social support, it does not shed light on family or friend networks that both provide additional aid and

persist when services end. Future work should include a more thorough assessment of protective factors to better inform practice.

### **Conclusion**

The moderating effect of home-visiting models on child behavior has been understudied, with only two studies showing positive effects in a large national review of evidence-based home visiting models (Michalopoulos et al., 2019). To my knowledge, no prior research has examined the influences of IPV on child socioemotional problems via maternal depression in immigrant families. The sample composition represents a study strength by allowing us to generate knowledge about a subgroup of the immigrant population that is at high risk for maternal depression and child behavioral problems. My findings also suggest that program duration may be more important to understand than the dosage of visits and that immigrant families that are retained may be among those most at risk at baseline. More research is needed to understand what factors may be associated with early dropout, midrange, and longer term participation (e.g., Chiang et al., 2018). In order to understand IPV's effects and the effects of timing of exposure, measuring IPV exposure consistently throughout families' enrollment in-home visitation program is also important. It is clear that immigrant families facing significant stress do engage in home visitation. It is hoped that the present study will encourage further work to identify the modifiable risk and protective factors that are best addressed in early childhood visitation directly or through linkage to community resources to improve the socioemotional development of immigrant children.

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## **Chapter 6: Conclusion**

This chapter reviews the overall findings, study strengths and limitations, and implications of the three papers previously presented.

The dissertation study used electronic secondary data from the Parents as Teachers (PAT) national Penelope database to explore how family stress, trauma, parental challenges, and attachment are associated with child outcomes across developmental domains among a large sample of immigrant families. Informed by attachment theory (Blakely & Dziadosz, 2015) and the biopsychosocial model of stress (Rith-Najarian et al., 2014), the study examined how adverse family experiences affect child developmental outcomes. It explored mediating and moderating processes that may explain this association and account for the observed effects. This study also helped fill gaps in understanding regarding the duration of participation in home visitation for immigrant families according to the presence of specific stressors at enrollment.

Hence, the study sought to contribute to my understanding of the specific mechanisms through which adverse experiences affect the family system and tested possible intervening pathways with immigrant families. As home visiting has become more prevalent over the past decade, this dissertation demonstrates that immigrant populations experience similar relationships between stressors and child outcomes and that home visiting programs may offer insight into potential areas for improvement that can benefit future participants. The three paper format included one aim for each paper.

### **Paper 1 Summary**

Paper 1 focused on understanding the relationship between stressors and child development at the time of enrollment in PAT. The aim was to examine the association between family stress, maternal depression, parent–child interaction, and early childhood development

among immigrants to the U.S. at enrollment in home visitation. The rates of cognitive, motor, and socioemotional screenings in the delayed range exceeded prevalence rates for the general population.

Findings reveal that based on the baseline child cognitive, psychomotor, and socioemotional development screenings, the developmental delay rates in my sample were high. About 30% of my child sample had at least one developmental delay, which exceeded the average national rate of developmental delay for the U.S (Zablotsky et al., 2019) and developmental delay rates for low and middle-income countries (Wondmagegn et al., 2024). My findings were consistent with studies of developmental delay among low-income families (Wei et al., 2015). The prevalence of adverse experiences was also higher than the U.S. prevalence reported by Swedo (2023). Hispanic families reported the lowest development delay across all domains, which may be indicative of the Immigrant Paradox, which has been noted across some domains studied for Hispanic immigrants (Millett, 2016). These disparities in reported rates of development delay in children of immigrants by immigrant family's place of origin and racial/ethnic background could also be a symptom of lower awareness of or ability to shield children from threats to development that may vary by country of origin or racial and ethnic background. It was not possible to capture the exact country of origin in the present study; it was only a proxy for the region based on the language spoken.

High family stress was associated with socioemotional delay but not with other developmental domains. While fewer programs had measures of attachment included in the Penelope system, lower parent-child attachment was a significant risk factor for both cognitive and socioemotional delay. The quality of the parent-child relationship did not moderate the influence of high family stress on child development in this study. I also discovered that the

effects of family stressors were not mediated by parent–child attachment or maternal depression. However, maternal depression and attachment measures were available in only about a third to 40% of programs reporting data to the administrative data system. While there did not appear to be a strong systematic variation in the percent of families with data for these factors across other variables, it was not possible to know if the present findings would hold across all high-fidelity PAT programs. These results could also be due to immigrant families’ resilience, where higher family stress does not affect the quality of the parent–child attachment or the level of maternal depression.

### **Paper 2 Summary**

Child maltreatment, as measured by reports to child protective services during early childhood, is common (Kim et al., 2017). While a report of maltreatment may not be the same as actual maltreatment, research suggests that reports during early childhood often signal significant health and developmental risk (Godinet et al., 2014; Putnam-Hornstein, 2011). Prior research indicates that CPS involvement among families enrolled in home visitation is associated with the presence of several other stressors (Janczewski et al., 2023). Relatively little data is available on home visitation among CPS-involved families (Lee et al., 2018). Some data suggests that home visitation outcomes for the CPS-involved population may be limited by maternal depression (Jonson-Reid et al., 2018). No known data is available on factors associated with CPS involvement among immigrant families enrolled in home visitation. Paper two aimed to examine the risk factors associated with family child protective service (CPS) involvement and home visitation engagement among immigrants enrolled in home visitation.

Despite the relationship between poverty and child maltreatment (Drake et al., 2022) and the high level of poverty in the immigrant households in the sample (refer back to Table 1), self-

reported CPS involvement was lower than anticipated, given the global prevalence of maltreatment but may be impacted by reliance on parent report, reliance on reporting at baseline enrollment before a relationship is developed with the home visitor, or even the healthy immigrant effect. Overall, IPV and substance abuse were the two most potent risk factors for immigrant families' child welfare involvement, followed by teen parenting, mental illness, low birth weight, single parenthood, and child behavior concerns. These results were consistent with prior work on low-income nonimmigrant and scant work on immigrant populations (Chang et al., 2008; Dubowitz et al., 2011; Younas & Gutman, 2023). Results also showed that risks for CPS involvement did not differ by demographic characteristics such as parent race and ethnicity, immigrant native region, and rurality of current residence. Findings also revealed that child welfare-involved immigrant families were more likely to engage in home visitation for longer than 90 days but were less likely to stay engaged for more than a year. While some researchers have suggested that CPS-involved families may avoid formal services due to fears of surveillance bias, research suggests such factors result in only small effects (10% or less of reports) related to home visitors (Chaffin & Bard, 2006; Holland et al., 2024). My findings are consistent with prior work suggesting a willingness for CPS-involved families to engage in home visitation (Stahlschmidt et al., 2018).

### **Paper 3 Summary**

Research suggests that IPV in the U.S. is common, though the prevalence among immigrant populations is less clear (Breiding et al., 2014; Morrison et al., 2024). Exposure to trauma may disrupt attachment and be particularly salient for children's socioemotional development (Treat et al., 2019). Exposure to trauma and other stressors may be buffered by participation in home visitation (McKelvey & Fitzgerald, 2020). However, some research

suggests IPV may limit home visiting participation (Sharps et al., 2008). It is unclear how these relationships may hold for immigrant families. The third paper aimed to examine the association between parent IPV, other family stressors, families' home visiting engagement, and child socioemotional development among young children in immigrant families.

Similar to self-reported CPS involvement, the rate of IPV reported was lower than anticipated despite overall high rates of stress. Results showed there was a significant correlation between baseline parent IPV experience of maternal depression and later child socioemotional development. I found that the impact of IPV measured at program enrollment was significantly influencing poorer socioemotional development of children later in the program but that the level of maternal depression fully mediated the effect. The influence of IPV on socioemotional problems via maternal depression did not differ by the number of home visits an immigrant family received, but I found significant differences by the level of parent engagement in home visiting services. More specifically, the impact of IPV was strongest for families who stayed in the program for over two years. Higher proportions of families with high stress, IPV, and maternal depression at baseline were represented in longer-staying families. More research is needed to understand what factors may be associated with early dropout, midrange, and longer-term participation (e.g., Chiang et al., 2018). To understand IPV's effects and the effects of timing of exposure, measuring IPV exposure consistently throughout families' enrollment in home visitation programs is also important. It is clear that immigrant families facing significant stress do engage in home visitation.

The remainder of this chapter will look at the findings specific to ACEs and child development and ACEs and home visitation program participation, followed by a summary of strengths, overall limitations, and implications for practice, policy, and research.

### **Adverse Experiences and Child Development**

About 25% of U.S children have at least one immigrant parent (Millett, 2016), but what is known about this heterogeneous refugee/immigrant population with vast ethno-cultural and geographical variability within the area of traumatic stress and early development is very limited. For example, despite high levels of reported trauma present among immigrant and refugee populations in prior research (Cerdeña et al., 2021; Flanagan et al., 2020; Langevin et al., 2021), little research has been done to understand how child development may be impacted. While the overall prevalence of stressors that may be considered “traumatic,” maltreatment (as measured by CPS involvement), or IPV was lower than anticipated, the overall level of stress was high. Stressors and specific forms of traumatic experiences like IPV were associated with developmental outcomes, but only certain outcomes appeared mediated by other factors, such as maternal depression. Generally, the study findings support aspects of both the role of attachment and biopsychosocial stress theories.

### **Adverse Experiences and Home Visitation Participation**

As home visiting has become more prevalent over the past decade, understanding if immigrant populations experience similar relationships between stressors and parenting, as well as whether participation in home visiting programs helps offset potential threats to optimal child development, such as stress, IPV, and maternal depression, may offer insight into potential areas for improvement that can benefit future participants. Findings suggest that immigrant families enrolling in home visitation have significant levels of stress and high levels of child delay. This suggests that immigrant families are not self-selecting into PAT based on being very low risk. While prior work suggests that IPV or CPS involvement may impact engagement and outcomes

of home visitation, families indicating IPV and CPS involvement were likely to engage for at least 90 days.

### **Study Strengths**

Immigrants in the U.S. are considered to be an understudied and underserved population (Lee & Hadeed, 2009; Millett, 2016; Saechao et al., 2012). Studies with sufficient samples of immigrant populations are difficult to find, partly due to a lack of markers for immigrant status in many data systems (Millett, 2016; Park & Katsiaficas, 2019). PAT is a widely available, universal home visitation model, and the development of their Penelope data system provides a unique opportunity to look at a large enough population of immigrant families to be able to assess factors associated with both child outcomes and home visitation participation.

The attempt to derive relationships between theory and models of outcomes is also a strength. While the study raises as many questions as it answers, the alignment with theory helps identify active mechanisms that may be modifiable through home visitation services or connection to community-based services. The current results reveal the need to explore alternative means to capture the prevalence of specific trauma experiences like CPS involvement or IPV to better understand if the lower rates are due to self-report bias or actual lower prevalence among immigrant families engaged in home visitation. Measures of risk factors were more available in the data system than protective factors. While resilience measures are included, these are only provided to specific families based on screening responses. It was also not possible to link available data to community risk and protective factors that may be available through other data like Census information. Many of these limitations, however, may be addressed by changes to data and screening protocols going forward.



### **Limitations and Implications for Future Research**

There were several limitations to this dissertation overall. These limitations have particular relevance for future research and possible changes to the PAT administrative data system that may make it easier for PAT to participate in continuing to advance understanding of best practices with immigrant families. The partner agency, PAT National Center, is also interested in how results may be used to improve their home visiting services.

Secondary data analysis has limitations by nature, and results from this study should be interpreted in light of its limitations. Data from administrative systems are typically designed around program monitoring and quality improvement outcomes rather than research, which means key data elements are often missing. The present study draws on PAT home visitation electronic records from the Penelope database. PAT National Center (2021) has set guidelines for participating in programs with essential requirements for program fidelity. These essential requirements include a guideline on the timeframe and frequency of data collection, PAT approved list of measures, screening and service outcome documentation processes. Participating programs that meet all the essential requirements of the PAT home visitation program are identified as high-fidelity blue ribbon programs. The study sample comes from these programs. The PAT essential requirements guideline is a very broad model and does not require participating programs to adhere to specified procedures, providing programs flexibility to tailor the intervention to the context of the families being served. Additionally, although PAT provides a list of approved measures to use, it is up to the discretion of participating programs to decide what measures they apply for child and parent outcomes. Hence, the data are collected based on agency tracking of services and outcomes of interest to them. Additional data about programs that participate in Penelope, such as measures prioritized, staff-to-family ratio, and some

measure of family satisfaction, would be extremely helpful in interpreting implications for program improvements.

Not all PAT sites currently use the electronic Penelope data system. This may reduce program site variation in home visiting outcomes. On the one hand, a strength of the data includes the fact that the vast majority of programs using the system are those considered by PAT to have high fidelity to the model. On the other hand, it is impossible to fully assess differences between participants in PAT programs that do not use the electronic system. As program use becomes more common, it may be possible for PAT to develop a metric of the percentage of programs at various stages in PAT accreditation and the percentage of programs that serve a given region that are represented. This would significantly improve assessments of generalizability.

### **Sampling**

The present study was focused on experiences and outcomes for immigrant families. Currently immigrants can only be identified through the baseline demographic survey and includes immigration within the past 5 years. The PAT demographic intake form does not differentiate between immigrants and refugees. The immigrant population has significant variability by reason for migration, documentation, and prior and immigration-specific conditions. While a proxy was developed for the region of origin, it was not possible to control for these key aspects of the immigration experience. The present study lacked measures of acculturation or discrimination, which may be additional stressors unique to the immigrant experience. The lack of a specific country of origin and timing of immigration also hampers assessment of the impact of the immigration experience. While the regional proxy was not important in papers 2 and 3, the immigrant region was associated with a difference in disability

prevalence in paper 1. Immigrant families from Latin America and the Middle East had higher rates of motor delay. Immigrant families from Europe or the Middle East reported higher rates of socioemotional delay. These findings are consistent with some research indicating that immigrant families from low and middle-income countries are at high risk for cognitive delay (Abdullahi et al., 2019). Hispanic families reported lower rates of developmental delay in all child development domains. Similar findings were reported by Yopez et al. (2024), who found that Spanish-speaking Hispanics were less likely to report child development delay. This suggests the importance of adding a more specific measure of immigration to the PAT survey in the future. At a minimum, this should include country of origin and year of immigration. Documentation status and reason for immigration would be ideal but may be sensitive due to policy and concerns about immigration status.

### **Measurement**

Data on immigrant families' adverse experiences, intimate partner violence, and child welfare involvement were drawn from a cross-sectional intake assessment at home visitation enrollment, which is subject to validity threats such as instrumentation and bias related to self-reporting. Trauma and stress are limited to recent or current family conditions, including known issues of intimate partner violence (IPV). So, it is not possible to understand how the proximal trauma may be influenced by historical trauma at the family or community levels.

Cross-sectional measures of IPV or CPS involvement in the family may limit understanding of the magnitude and sequence of exposure to children. Measuring these factors at one point in time also limits the potential to look at whether or not PAT may interrupt recurrent IPV or maltreatment reports. As many models that are designed for child welfare involved or IPV-involved families are focused on preventing ongoing violence or neglect, including repeat

measures of these factors would enhance the ability of PAT to participate in these emerging areas of research.

Singular reports of CPS or IPV also make it difficult to assess the relative level and chronicity of exposure to these factors by the child. For example, information on the occurrence, type, and magnitude of IPV victimization, whether children in my study were exposed to it in utero or after birth, could elucidate some of the mechanisms of influences on elevated child socioemotional problems later in the program that my findings show. Reported or substantiated abuse/neglect was a single-item measure that recorded the presence or absence of such report and the family's child involvement. This is a limitation because it is difficult to establish the frequency and severity of child maltreatment or to distinguish between maltreatment types. The cross-sectional nature of the measure also limited my ability to establish a causal relationship or base rate of child maltreatment.

### **Identify Factors to Include in Home Visitation vs. Refer Out**

It is crucial to empirically test whether evidence-based parenting interventions alone are effective in addressing parent mental health needs. Rigorous research is required to measure the effects of parenting interventions such as home visiting programs on parent trauma with marginalized children and their families. Second, the effectiveness of mental health intervention alone in reducing child development problems requires solid empirical evidence. There is no clear evidence that mental health interventions can solely moderate the relationship between parent mental health and positive parenting in the existing literature. Third, testing and measuring the effectiveness of integrated interventions (adult trauma and parenting interventions) to prevent early childhood exposure to adverse experiences is critical.

## **Outside Data Linkage**

One means of improving tracking of both services use external to PAT and other measures of trauma outside self-report may be linking PAT data to other service systems data (e.g., Jonson-Reid et al., 2023). Advances in data security and storage systems make this increasingly feasible, and several models of ongoing data linkage projects exist in the U.S. and internationally (Foust et al., 2021; Miller et al., 2016). Outside data, linkage may also make it possible to construct comparison groups of immigrant families not engaged in home visitation to better assess the effects of home visitation and the generalizability of developmental findings. While the current regional coverage may complicate this goal, as the Penelope system includes data that covers entire counties or states, it may be key to begin developing those data relationships to support ongoing research.

## **Implications for Policy**

Given the increased investment in home visiting over the last 10+ years in the U.S. (HRSA, 2024; HRSA, 2016), it is particularly important to note how the program impacts different subpopulations of families with young children. As yet, the home visiting effects reported related to harsh or neglectful parenting have been modest at best, but few have attended to the other factors and the dosage of participation. It is an essential contribution to the home visiting literature primarily based on studies with nonimmigrant populations and smaller controlled trials. Gaps in services related to risks like parental substance abuse are well-documented. The opioid crisis has had significant impacts on CPS and other systems. It may be that participation of programs like PAT in cost analysis studies may help address treatment disparities by suggesting cost savings in regard to improved child outcomes. Finally, it is not possible in the present study to discern what, if any, implications exist for immigration policy.

Adding more nuanced measures of immigrant compared to refugee status may help uncover such implications. A recent study of maltreatment rates in counties controlling for ICE activities (Kim & Kim, 2023) did not suggest a significant impact of immigration activities on maltreatment rates where there were large populations of immigrants. Such studies, however, cannot capture family-level stressors related to immigration. Finally, the poverty rate among families in the present sample was over 80%. Currently, two federal initiatives aimed at addressing poverty are being considered or enacted: HR 5421 EITC Modernization Act and Individual Development Accounts for Refugees (Office of Refugee Resettlement, 2024). It is unclear how the proposed legislation will include immigrants or how often refugees access existing opportunities to build assets. While some immigrant families may experience buffers from the effects of poverty (Millett, 2016), it is unclear whether this is universal. It may benefit PAT outcomes by ensuring participation in and eligibility for such resources.

### **Implications for Practice**

The variations in outcomes found in the present study may inform the continuing efforts of PAT to provide training and support in culturally competent services. It is not clear with currently available data what level of training home visitors receive relates to local populations. Partnering with local agencies focused on immigrant resettlement may be possible to improve engagement with immigrant families. Further, it appears that families with higher levels of baseline stress have a greater representation among long-staying families in the program. While most home visiting models aim to engage families in long-term services, if higher-risk families are more prevalent in this group, it is important that home visitors are equipped with ongoing assessment tools and referral resources to meet the needs of these families.

Ineffective, inappropriate, and often underfunded programs and services perpetuate trauma in already vulnerable families (Panofsky et al., 2021). There is a need for counseling and psychotherapy interventions for marginalized populations rooted in cultural paradigms of community strength and holistic healing that meet children, their caregivers, and community health needs. To be truly preventive, early childhood interventions should focus on increasing fetal and maternal health during pregnancy and the parent–child attachment after birth. Secondly, programs need to ensure that partnerships are developed with clinical resources in the community to address parental needs beyond the scope of home visitation. Such partnerships may be referral-based or hybrid models where clinicians are available to PAT families as needed.

It has been demonstrated that early intervention (e.g., home visiting programs) can significantly reduce childhood maltreatment risks because they help to address parenting needs and child maltreatment risks proactively (Dodge et al., 2019). A strong empirical foundation also exists for parent training interventions that focus on building parenting skills and child development knowledge to prevent and treat child maltreatment (Stith et al., 2022). As part of parent training programs, cognitive behavioral therapy, and psychoeducation could be incorporated into the treatment plan to address parents' attachment and child behavior management skills needs in a way that significantly reduces the risk of child maltreatment occurrence. Home visitation programs are also becoming increasingly popular as a way to address child maltreatment risk factors, particularly in addressing maternal depression (Ammerman et al., 2013; Jonson-Reid et al., 2018), substance use (O'Malley et al., 2021) as well as other social risk factors (Azar et al., 2017). It is as yet unclear what approaches can be adapted for delivery by paraprofessional home visitors and what will require hybrid models that integrate professional staff with local program offices.

Social workers may be particularly well poised to deliver early childhood intervention, taking into account the broader needs of the family. There is a need for social work practitioners to expand their scope of practice beyond targeted parent training of at-risk families and adopt a universal trauma-informed approach to practice with families and children that strengthens communities and reduces adverse risks. A framework of practice must emphasize and strengthen healthy relationships within the family unit beyond screening at-risk parents or providing parenting skills training. Furthermore, direct practice services need to consider the systems that serve families, children, and the community as a whole by integrating macro practice models that address health disparities as well as the sociocultural risks, such as poverty and institutional racism, that contribute to family stress for immigrant families. Social workers also need to tailor their interventions to the specific cultural background of families by incorporating culturally sensitive concepts of parenting and relationships while considering the scarcity of resources for refugee/immigrant families and other similarly vulnerable families (Scharpf et al., 2021). The prevalence and level of collaboration between clinical social work practitioners and early childhood services like home visitation are unknown.

### **Conclusion**

The present study addressed a pressing gap in understanding how early childhood adverse experiences impact child development as well as engagement in home visitation among immigrant families. Given the high prevalence of trauma among refugee and immigrant populations in the U.S. (Cerdeña et al., 2021; Sangalang & Vang, 2017), as well as the significant number of immigrants in the U.S., understanding the effect of adverse family experiences on parenting and associated child outcomes is critical for developing culturally responsive and effective early prevention and intervention strategies. PAT is one of the home



visitation models considered evidence-based, universal, voluntary and is offered in all U.S. states and territories. Because the program is not means tested, it also allows for economic diversity within the sample. An understanding of the impact of adverse family experiences on children's psychosocial and developmental outcomes for immigrant populations is essential for developing culturally appropriate early interventions.

Findings suggest consistency with theoretical models of developmental mechanisms while being linked to measures regularly collected as a part of home visitation practice. This study contributes to furthering the evidence base on early childhood development and associated risks for children in immigrant families. The study also adds to the literature on home visitation and outcomes, as prior work is scant specific to the immigrant population. It is hoped the empirical evidence produced by the study will benefit immigrant families by informing early treatment and prevention interventions and policies that support refugee and immigrant families with high ACE exposure.

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