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PATERNAL DEPRESSIVE SYMPTOMS AND CHILDREN'S SOCIO-  
EMOTIONAL OUTCOMES VIA PATERNAL PARENTING: A  
BAYESIAN APPROACH**

Elif Dede Yildirim  
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## **Abstract**

This study examined the associations between economic hardship and paternal mental health and preschool-aged children's behavioral difficulties, indirectly through paternal engagement across compliers, non-compliers and controls in the Building Strong Families Project. A confluence of propositions within paternal involvement frameworks, the bio-ecological systems model, the family stress model, and risk and resilience frameworks guided the framing of the questions and hypotheses. The sample consisted of 3,045 African American, European American and Hispanic American fathers and their young children. Families were randomly assigned to a treatment and a control group. Analyses employed Bayesian multi-group path analysis. Results indicate that economic hardship was positively associated with paternal depressive symptoms for fathers in the complier and control groups. Paternal depressive symptoms were negatively associated with paternal engagement in social and cognitive activities, caregiving activities, and physical play, and positively associated with children's internalizing and externalizing behaviors regardless of whether fathers received relationship skills education or not. For fathers in the complier and control groups, paternal depressive symptoms were positively associated with internalizing behavior indirectly through paternal engagement in caregiving activities. Data are discussed in terms of the possible influence of relationship skills education on the links between economic hardship, paternal depressive symptoms, paternal involvement, and children's behavioral difficulties.

THE ASSOCIATIONS BETWEEN ECONOMIC HARDSHIP AND PATERNAL  
DEPRESSIVE SYMPTOMS AND CHILDREN'S SOCIO-EMOTIONAL OUTCOMES VIA  
PATERNAL PARENTING: A BAYESIAN APPROACH

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## Chapter 1: Introduction

A growing body of research has sought to explain the effects of economic disadvantage and parental mental health on childhood development (D’Onofrio et al., 2009; Flouri, Midouhas, & Joshi, 2014; Parke et al., 2004; Rijlaarsdam et al., 2013). For instance, a number of studies have shown that economic disadvantage has implications for positive (e.g., warmth) and negative (hostile, insensitive) parenting practices (D’Onofrio et al., 2009; Flouri et al., 2014; Parke et al., 2004; Rijlaarsdam et al., 2013), as well as children’s internalizing (Zilanawala, & Pilkauskas, 2012) and externalizing behaviors (McBride Murry, Berkel, Gaylord-Harden, Copeland-Linder, & Nation, 2011), and cognitive skills (Nievar, Moske, Johnson, & Chen, 2014). Other studies have also demonstrated that parental mental health is associated with a broad range of parenting behaviors such as warmth and hostility (Sellers et al., 2014), harsh parenting (Connell & Goodman, 2002; Knox, Rosenberger, Sarwar, Mangewala, & Klag, 2015), poor academic achievement (Baker & Iruka, 2013; Shen et al., 2016; Grace, Evindar, & Stewart, 2003), sleep deprivation (Caldwell & Redeker, 2015), depressive symptoms (Matijasevich et al., 2015; Slykerman et al., 2015), aggression and delinquency (Wickham, Senthilselvan, Wild, Hoglund, & Colman, 2015), and internalizing and externalizing behaviors in children (Betts, Williams, Najman, & Alati, 2014; Connell & Goodman, 2002; Coyne & Thompson, 2011).

It is well established that the concurrence of economic risk factors and maternal mental health are associated with childhood outcomes directly (Leventhal & Dupéré, 2011; Zilanawala & Pilkauskas, 2012) and indirectly through maternal warmth (Sellers et al., 2014; Westbrook & Harden, 2010), harsh and hostile maternal parenting (Gershoff, Aber, Raver, & Lennon, 2007), mother-child relationships (Mistry, Vandewater, Huston, & McLoyd, 2002), and couple relationship quality and marital conflict (Lee, Wickrama, & Simons, 2013) after controlling for a



number of auxiliary factors, including maternal age and education, children's age and gender, household crowdedness, and race/ethnicity. Although, correlates and consequences of paternal mental health and parenting have gained increasing attention, the vast majority of empirical studies on paternal mental health has focused on paternal postpartum depression and its effect on newborn development (Ramchandani et al., 2008). Likewise, despite attempts to address the significance of fathers' presence and active involvement in children's lives in diverse socio-economic circumstances and structural arrangements (Bocknek, Brophy-Herb, Fitzgerald, Schiffman, & Vogel, 2014), few studies have focused on the role of economic risk factors and paternal mental health on children's socio-emotional development (Kane & Garber, 2004; 2009). Fewer yet have rigorously evaluated the efficacy of relationship skills education intervention on father-child interaction and paternal parenting (Panter-Brick, Burgess, Eggerman, McAllister, Pruett, & Leckman, 2014). Thus, there remains a gap in our understanding of how paternal parenting influences the associations between economic risk factors, paternal depression and children's socioemotional and behavioral outcomes in the context of intervention programs.

Using a combination of propositions within process models of paternal engagement (Cabrera, Fitzgerald, Bradley & Roggman, 2007; Lamb, Pleck, Charnov, & Levine, 1985; Pleck, 2010), family stress theory (Conger, Conger, Elder, & Lorenz, 1992; Conger et al., 1993), the bio-ecological systems model that focuses on contextual factors and intersystem relationships (Bronfenbrenner, 1995), and risk and resilience perspectives (Fagan & Palkovitz, 2007; Fagan, Palkovitz, Roy, & Farrie, 2009), a main goal of this study was to add to the extant literature by further exploring how paternal mental health and economic disadvantage are related to young children's behavioral difficulties, indirectly through paternal involvement across African American, European American and Hispanic American father-child dyads. This study

investigated: (1) the associations between economic hardship and children's internalizing and externalizing behaviors, and whether the associations were mediated by paternal depressive symptoms and paternal involvement among compliers and non-compliers of an intervention group and a control group of Building Strong Families programs; and, (2) the role of race/ethnicity on the associations between economic hardship, and children's internalizing and externalizing behaviors via paternal depressive symptoms and father's engagement in caregiving activities, social and cognitive activities, and physical play among compliers, non-compliers, and controls employing Bayesian multiple group path analysis.

It has been shown that federal, state, and local programs (e.g. relationship skills and marriage education, parenting skills education) geared toward improving parenting and couple relationship can alleviate the detrimental effects of poor mental health (Chazan-Cohen et al., 2007; Compas et al., 2015; Valdez, Mills, Barrueco, Leis, & Riley, 2011) and dysfunctional parenting (Poole, Seal, & Taylor, 2014) on children's socio-emotional and cognitive skills (Stoltz, van Londen, & Deković, 2015). This study sheds additional light on the role of relationship skills education on the associations between economic disadvantage and paternal mental health and children's behavioral difficulties in fathers who did and did not receive relationships skills education. In the following chapter, a review is provided of the empirical literature on the direct and indirect associations between economic disadvantage, paternal mental health and young children's psychosocial development via paternal parenting processes across racial-ethnic groups in the United States. Next, studies that have investigated the role of parenting, couple, marriage, and relationship education programs and interventions on fathering, paternal mental health and children's wellbeing in the United States are discussed.

## **Chapter 2: Literature Review**

### **The Direct and Indirect Association between Economic Disadvantage, Parental Mental Health and Children's Outcomes**

Over the last two decades, there have been significant advances in delineating diverse proximal and distal factors that contribute to risk and resilience in parenting young children (see reviews by Ahmed, Rohner, Gielen, 2016; Kane & Garber, 2004; Khaleque & Rohner, 2012; Wilson & Durbin, 2010). Key among them are parents' mental health (e.g., depressive symptoms, Connell & Goodman, 2002; Garai et al., 2009; Sellers et al., 2014), spousal/partner relationship (Compas et al., 2015; Lee et al., 2013), parenting competence (Poole et al., 2014), poor neighborhood quality (Fagan & Palkovitz, 2007; Fagan et al., 2009), lack of social support (Lee, Fagan, & Chen, 2012), and economic disadvantage (D'Onofrio et al., 2009; Rijlaarsdam et al., 2013). In view of the focus of the current study, overviews are provided of pertinent research on paternal depression, quality of father-child involvement and interactions, economic disadvantage, and interventions with fathers.

#### **Economic Factors and Paternal Involvement**

Economic risk or disadvantage has been broadly conceptualized as economic/material hardship, financial strain, and economic pressure by using objective indicators of financial resources, such as annual household income, income-to-needs ratio, debt-to-assets ratio, income loss/change, unstable work or joblessness, receiving some type of public assistance (e.g., WIC, TANF, SNAP, Food Stamps), and by subjective indicators of not being able to meet basic needs and having money left over (Barnett, 2008). A sizeable body of work provides evidence that exposure to some of these economic risk factors has unfavorable associations with parenting and child well-being (Mistry et al., 2002; Newland, Crnic, Cox, & Mills-Koonce, 2013).

It has been demonstrated that the objective domain of economic hardship is linked to individuals' perceptions of their own economic circumstances, which is more likely to create economic pressure, which in turn, is related to parental depressive symptoms and anxiety (Newland et al., 2003). Parke et al. (2004) examined the role of economic hardship and pressure on children's internalizing and externalizing behaviors via paternal and maternal depressive symptoms and parenting in a sample of European American and Hispanic American mother-father-child triads. They found that per-capita income, unstable work, and income loss were significant predictors of paternal economic stress, which was associated with paternal depressive symptoms for both groups. Paternal depressive symptoms were indirectly linked to children's adjustment problems via paternal hostile parenting and marital problems for both groups. Roy and Raver (2014) also found that, in addition to other risk factors, such as residential crowding, parental depressive symptoms, and single-parent households, the intensity of financial strain had an undeniable impact on child social and cognitive skills regardless of race/ethnicity.

The impact of economic hardship and pressure on children's socio-emotional development via parenting and family processes has been studied in ethnic and cultural groups across the United States to determine invariability in effects. However, the associations between race/ethnicity and poverty and childhood socialization and development remain unclear because of the confounding factors of living in disadvantaged neighborhoods and other risk factors such as single-parent household and joblessness. Nonetheless, the preponderance of evidence suggests that economic hardship is associated with less effective childrearing strategies and adverse outcomes in children among different racial-ethnic groups (Parke et al., 2004). For instance, Conger et al. (2002) investigated the role of poverty and family economic hardship on children's adjustment in a sample of 422 African American mother-father-child triads. Low

family per-capita-income and negative financial events were associated with higher levels of primary and secondary caregiver depressed mood via family economic pressure, which in turn, was positively associated with low-nurturing involved parenting via caregiver relationship conflict/withdrawal. Low-nurturing involved parenting was then related to lower levels of child positive adjustment, and higher levels of internalizing and externalizing behaviors among African American families.

In a later study, Delgado, Killoren, and Updegraff (2013) examined the associations between parents' perception of economic hardship and adolescents' depressive symptoms, risky behaviors, and academic achievement via parental warmth and parent-offspring conflict. The study sample included 246 Mexican-origin families living in the United States. It was found that fathers' reports of economic hardship were linked to youth reports of economic hardship, which in turn, was associated with lower levels of paternal warmth and higher levels of father-offspring conflict. Father-offspring conflict fully mediated the associations between economic hardship and adolescents' depressive symptoms, risky behaviors, and their GPAs, after controlling for adolescent gender and family income. These findings illustrate that the influence of experiencing financial difficulties on parenting, family processes, and children's adjustment was similar across European American, African American, and Hispanic American families.

Even though some researchers have argued that the strength of the associations between economic hardship, parental distress, parenting behavior, and children's social behavior do not differ across gender and racial-ethnic groups (e.g., Mistry et al., 2002), Reeb, Conger, and Martin (2013) further examined whether parents' perceived economic strains moderated the association between paternal depressive symptoms and paternal hostility across male and female adolescents. In a sample of 324 European American father-offspring dyads from the Iowa Youth

and Families Project, fathers' depressive symptoms and paternal hostility were dependent on the level of economic strain, after controlling for fathers' age, education and per capita family income.

Acknowledging that the cross-sectional nature of prior studies makes it impossible to address the directionality between constructs, there is still evidence that fathers' perceptions of financial difficulties, which is compounded with paternal depressive symptoms, negatively influence paternal parenting. Indeed, negative parenting strategies tend to aggravate the harmful consequences of paternal mental health problems in the context of economic disadvantage. For example, Leinonen, Solantaus, and Punamaki (2002) investigated the effects of economic hardship and pressure on the quality of parenting via mothers' and fathers' anxiety, depressive symptoms and social dysfunction. It was concluded that cutbacks in family and child expenditure led to social dysfunction and anxiety in fathers, which in turn, were related to less paternal involvement and more punitive paternal parenting. Paternal depressive symptoms and parenting and childhood well-being are considered more fully next.

### **Depression and Parenting and Childhood Outcomes**

Meta-analyses and systematic literature reviews have demonstrated the deleterious effects of poor parental mental health on many domains of parenting (Burkhart, Knox, & Brockmyer, 2013; Connell & Goodman, 2002; Garai et al., 2009; García, Manongdo, & Ozechowski, 2014; Grant et al., 2012; Kohl, Kagotho, & Dixon, 2011) and children's and adolescents' adjustment (Betts et al., 2014; Coyne & Thompson, 2011; van der Bruggen, Stams, Bögels, & Paulussen-Hoogeboom, 2010). The vast majority of studies on parental mental health has focused primarily on the potential impact of mothers' depressive symptoms, anxiety, and hostility on several aspects of children's development (see reviews by Goodman et al., 2011; Khaleque & Rohner,

2012; Sellers et al., 2014). But paternal mental health has received more attention in recent years and this has helped to build a better knowledge base on the implications of paternal risk factors for cognitive and social development during childhood and adolescence (Kane & Garber, 2004), on the relative contributions of mothers' and fathers' mental health to childhood functioning, and on the potential buffering effects of a partner's mental health on the association between the other parent's mental health and childhood outcomes (Leinonen et al., 2002).

In 2003, approximately 5.1% of men in the United States experienced major depressive symptoms such as depressed mood, loss of interest in daily activities, feeling of worthlessness, or fatigue or loss of energy for periods of at least two consecutive weeks (2013 National survey on Drug Use and Mental Health). Men's susceptibility to any major depressive symptom partially depends on socio-demographic characteristics, including unemployment or unstable job conditions, family instability, residential status, marital status, age, education level, living under the federal poverty line, and race/ethnicity (2013 report; Bronte-Tinkew, Carrano, Horowitz, & Kinukawa, 2008). Family demographic factors and living arrangements have emerged as a strong risk factors for poor parental mental health (Rijlaarsdam et al., 2013). For example, Meadows (2009) examined the trajectories of paternal mental health problems among married and unmarried fathers using data from the Fragile Families and Child Wellbeing Study. Mental health was conceptualized by three dichotomized items: heavy episodic drinking, illicit drug use, and diagnosis of a major depressive episode. Continuously single and cohabiting fathers were more likely to have mental problems at one, three-, and five-year follow-up than continuously married fathers. Moreover, fathers who entered marriage at three- or five-year follow-up showed lower mental health problems than continuously cohabiting fathers. These results might

underscore the mitigating function of shared resources among married partners on mental health difficulties.

There is considerable evidence that young fathers are at greater risk for depressive symptoms than older fathers (Quinlivan & Condon, 2005). Lee et al. (2012) examined the role of fathers' age status on depressive symptoms and father involvement when children were one-, three-, and five-years old by utilizing secondary data from the Fragile Families and Child Wellbeing Study. In a sample of 1403 African American, European American, and Hispanic American fathers in the United States, the study compared depressive symptoms during the late adolescent period (age 18-21), emerging adulthood (age 21-25) and adulthood (age 26 and older). There was a proportional difference among fathers in terms of race/ethnicity, education, marital status, regular work for pay, and ever being charged with a crime. Depressive symptoms were not significantly different during the late adolescent period, emerging adulthood, and the adult years, but fathers who were in late adolescence demonstrated higher parenting stress at the first- and third-year follow-up than those in emerging adulthood and adulthood. Fathers' age status was linked to depressive symptoms at the third- but not at the fifth-year follow-up. Fathers' depressive symptoms at the first-year follow-up were positively associated with depressive symptoms at the third-year follow-up, and at the fifth-year follow-up regardless of the fathers' age status. Receiving social support was negatively related to paternal depressive symptoms at the third-year follow-up.

Experiencing any depressive symptom interferes with the development of a healthy father-child relationship (Ramchandani et al., 2011). A recent meta-analysis by Wilson and Durbin (2010) determined the effect sizes of twenty eight studies and found that paternal depressive symptoms were linked to lower levels of positive parenting behaviors, which was



defined as paternal emotional availability, nurturance, acceptance, sensitivity and warmth, engagement, authoritative parenting, positive affection, rational guidance, and supportive parenting. In addition, paternal depressive symptoms were positively associated with negative parenting behaviors conceptualized as paternal hostility, poor discipline practices, psychological control, negative affect, aggravation, rejection and invalidation, coerciveness, and authoritarian parenting. In this meta-analysis, although a majority of the studies utilized European American samples, father and child age and race/ethnicity were found to moderate the associations between paternal depression and positive and negative parenting behaviors.

There is strong evidence that paternal depressive symptoms create a formidable barrier to ideal parenting and adequate social adjustment in childhood. In their meta-analysis, Kane and Garber (2004) reported that fathers' depressive symptoms were positively associated with children's internalizing and externalizing behaviors. This view was consistent with that of Fisher, Brock, O'Hara, Kopelman, and Stuart (2015) who investigated whether paternal and maternal postpartum depression were each linked to children's internalizing and externalizing behaviors via interparental conflict and paternal and maternal depression at toddlerhood. In this longitudinal analysis, it was found that paternal postpartum depression was associated with children's internalizing behavior indirectly through paternal depression at toddlerhood. Paternal postpartum depression was associated with children's externalizing behavior directly, and indirectly through paternal depression at toddlerhood. Ramchandani, et al. (2008) also found that fathers' prenatal and postnatal depression were linked to higher levels of children's conduct problems during the childhood years. These findings underline the importance of early recognition of fathers' depressive symptoms that might show continuity over time, thereby, continuing to affect children's adjustment as they develop.

Fathers' depressive symptoms also influence children's socio-emotional development indirectly through father-child relationships. For instance, utilizing a sample of 81 middle-class European American fathers and their school-aged children, Kane and Garber (2009) found that father-child conflict fully mediated the links between paternal depressive symptoms and children's internalizing and externalizing behaviors. Similar evidence of the mediational role of parent-child relationships on depressive symptoms and childhood outcomes was found in a study of 152 Finnish families (Aunola, Ruusunen, Viljaranta, & Nurmi, 2015). Fathers' depressive symptoms were associated with children's daily stress indirectly through paternal psychological control. These findings are in agreement with those of Gutierrez-Galve, Stein, Hanington, Heron, and Ramchandani (2014). In a sample of 13,822 families from the Avon Longitudinal Study of Parents and Children, they found that paternal depressive symptoms were linked to child behavioral problems at 42- and 84-months directly, and indirectly through maternal depressive symptoms, mother-father conflict, and paternal non-involvement.

Research suggests that the impact of paternal depressive symptoms on parenting and father-child interactions has implications for both young children's and adolescents' well-being. In a sample of 451 two-parent, middle-class European American families from rural Iowa, Reeb, Conger and Wu (2010) found that paternal depressive symptoms were associated with adolescents' depressive symptoms directly, and indirectly through perceived paternal hostility, controlling for family income, fathers' age and education. Subsequently, another study by Davis, Davis, Freed, and Clark (2011), which used a sample of 1,746 fathers from the Fragile Families and Child Well-being study, reported that fathers of one-year-old children who showed depressive symptoms were less likely to read stories and more likely to use spanking as a disciplinary practice compared to fathers who did not show depressive symptoms. Another study

by Sethna, Murray, Netsi, Psychogiou, and Ramchandani (2015) examined the effect of paternal depressive symptoms on father-infant interactions. In observing father-infant interaction along dimensions of sensitivity, intrusiveness, remoteness, and depressive affect in a sample of 192 fathers from the United Kingdom, they reported that increasing levels of paternal depressive symptoms were linked to decreasing levels of vocal and physical stimulation, and increasing levels of depressive affect during father-infant interactions.

A handful of studies has explored potential predictors of father-child relationships. Whereas early studies in this area mostly focused on two parent, middle class, European American fathers, recent research has examined residential and nonresidential father-child relationships in diverse racial- ethnic groups (Hewlett & Macfarlan, 2010; Lamb, 2010; Lamb & Lewis, 2013; Roopnarine, 2015). Along these lines, Cabrera, Hoffert and Chae (2011) examined whether paternal and maternal depressive symptoms, couple relationship, and family socio-demographic characteristics were associated with the level of fathers' engagement in verbal simulation, caregiving activities, and physical play across race/ethnicity. In a nationally representative sample of 5,089 African American, Hispanic American, and European American infants and their families from the Early Childhood Longitudinal Study, they found that across racial-ethnic groups high levels of maternal depressive symptoms were linked to high levels of paternal engagement in caregiving, but high levels of paternal depressive symptoms were associated with low levels of paternal engagement in caregiving activities. For African American fathers, higher levels of maternal depressive symptoms were associated with higher levels of paternal engagement in verbal simulation activities and higher levels of engagement in physical play. Fathers' working hours were negatively associated with fathers' engagement in verbal simulation, caregiving activities and physical play, and education level (at least some college

degree) was positively associated with fathers' engagement in verbal simulation activities, and negatively associated with engagement in physical play across racial-ethnic groups. Higher levels of mother-father conflict were linked to lower levels of paternal engagement in physical play, verbal simulation, and caregiving activities across the three racial-ethnic groups.

In a parallel study, Baker (2014) investigated the links between paternal depressive symptoms and stress and father involvement by using a nationally representative sample of 784 African American fathers and their young children from the Early Childhood Longitudinal Study. The results revealed that fathers' depressive symptoms were negatively associated with fathers' engagement in caregiving, home literacy, and play activities. At the same time, child gender, fathers' age, marital status and happiness with their partner were all significant predictors of fathers' involvement in play activities; fathers' employment status, number of children, and happiness with their partner were associated with fathers' involvement in caregiving activities.

### **Paternal Involvement with Children**

Research evidence from diverse cultural settings confirm the salience of warm, engaged parenting for positive childhood development. A meta-analysis on parental acceptance-rejection across 66 cultural communities indicate that caring and accepting parenting practices promote social adjustment in children and adolescents whereas harsh rejecting parenting is positively associated with internalizing and externalizing behaviors in children (Khaleque & Rohner, 2012). A comprehensive review (Ahmed et al., 2016) of 120 studies conducted in Arab countries reached a similar conclusion. However, studies on paternal sensitivity and engaged fathering and childhood development across ethnic and cultural groups are only now garnering

greater attention (see Cabrera & Tamis-LeMonda, 2013; Roopnarine, 2015; Shwalb, Shwalb, & Lamb, 2013).

Leavell, Tamis-LeMonda, Ruble, Zosuls, and Cabrera (2012) hypothesized that gender socialization would affect African American, European American, and Latino fathers' engagement in caregiving, physical play, literacy, and social visiting activities. Employing longitudinal data from the National Early Head Start Research and Evaluation Project, Leavell et al. (2012) found that, regardless of a child's gender, fathers were more involved in caregiving activities when children were two-years old, followed by caregiving and physical play at age three, and physical play at age five. This aside, the frequency of fathers' involvement in caregiving, physical play, social visiting, and literacy activities decreased over time. But consistent with Lavell et al.'s hypothesis, fathers of sons were more likely to engage in physical play activities, while fathers of daughters were more likely to engage in literacy activities regardless of child age. Race/ethnicity moderated the level of father involvement in caregiving, physical play, social visiting, and literacy activities with children. That is, Latino fathers were less likely to engage in caregiving activities than were African American and European American fathers, and African American and Latino fathers were more likely to participate in social visiting activities with their child than were European American fathers. Gender socialization also moderated the level of engagement by African American fathers; African American fathers of sons showed higher levels of engagement in caregiving, social visiting, and physical play activities compared with African American fathers of daughters.

Hofferth (2003) investigated racial-ethnic differences in father involvement in two-parent families analyzing data from the 1997 Child Development Supplement to the Panel Study of Income Dynamics. In a sample of 1,229 African American, European American, and Hispanic

American fathers and their children under the age of 13, father involvement was conceptualized as the number of hours in a week that fathers spent engaging in caregiving activities such as “changing diapers,” “selecting pediatrician and making appointments,” and “playing with children” (p. 194). Results indicated that the mean number of hours African American fathers were involved with their children were lower than those obtained for European and Hispanic American fathers. More specifically, African American fathers reported spending less time eating meals with and reading to children than fathers did in the other groups.

It is unclear whether the above mentioned racial-ethnic differences in paternal involvement are due to socioeconomic status, living in disadvantaged neighborhoods, fathers’ residential status, couple relationship status (romantic, cohabiting, visiting) and quality, not seeking help for mental health problems, incarceration history, or economic risk factors. A study by Cabrera, Ryan, Mitchell, Shannon, and Tamis-LeMonda (2008) sheds further light on racial-ethnic differences in nonresident father involvement with young children. These researchers assessed fathers’ accessibility, engagement, and responsibility using a sample of 249 European American, 482 African American, and 152 Hispanic American families from the Early Head Start Research and Evaluation Project. Results from hierarchical regression analysis revealed that mothers’ household income, intergenerational household structure (whether parents, grandparents, or other relatives lived with mother), and father resources (work status, and education level) were significantly associated with fathers’ engagement level, and that European American fathers were more likely to be engaged with their children than were African American and Hispanic American fathers. However, when co-resident partner status and parental relationships were entered into the model, racial-ethnic differences in father engagement disappeared, which might indicate that there are several other variables factoring into fathers’

engagement with their children, more so than belonging to a specific racial-ethnic group. This assertion receives support from a study conducted by Fouts, Roopnarine, Lamb, and Evans (2012). They examined the role of socioeconomic status and ethnicity on infant-caregiver interactions together. Based on extensive observations of infant and caregiver behaviors, it was reported that the pattern of paternal interactions with infants was equal across African American and European American families.

Taking into consideration that recent studies have demonstrated that diverse aspects of fathers' engagement with their children contribute to children's cognitive and prosocial skills, self-regulation, and internalizing and externalizing behaviors (McWayne, Downer, Campos, & Harris, 2013), it is important to discuss what other factors play a role in fathers' engagement with their children. Using a sample of 2,289 fathers from the Fragile Families and Child Well-being Study, Stykes (2015) investigated the longitudinal effect of economic capital, relational capital, and vision of masculinity on fathers' engagement in verbal interaction with their young children. It should be noted that economic capital refers to fathers' employment status and gains in educational attainment, and relational capital refers to fathers' relationship status, child co-residence, mothers' satisfaction with fathering, and fathers' risky substance use. Fathers' gain in educational attainment and living with a child most of the time were positively associated with fathers' engagement, whereas living with a different partner, being single, mothers' satisfaction with fathering, father's risky substance use, and father's incarceration status were negatively associated with fathers' engagement in verbal interaction with their young children.

Fagan and Palkovitz (2007) considered a risk and resilience approach in their examination of nonresident fathers' involvement with their one-year-old children using data from the Fragile Families and Child Well-being Study. In their analysis, resilience variables

were conceptualized using four items: “involvement of the father’s own father,” “attendance at religious services,” “frequency of child visits with paternal grandparents,” and “fathers’ current employment.” The risk variables were conceptualized using nine indicators, such as: “low-quality mother-father relationship,” “number of nonresident biological children,” “the establishment of legal paternity of the child,” “payment of formal and informal child support,” “whether father currently has charges pending against him,” “whether the father had ever been incarcerated,” “in the past month whether father has at least five alcoholic drinks in one day,” “fathers’ use of marijuana,” and “fathers’ use of cocaine, crack, speed, LSD, heroin, or other drugs” (p. 483). Fathers’ age, acquaintance relationship with the mother, and risk index were negatively associated with father involvement. By contrast, the resilience index was positively associated with father involvement. Furthermore, fathers’ relationship status with the mother moderated the association between risk index and father involvement. That is, the level of association between the risk index and father involvement was greater for fathers who were not in any kind of relationship with the mother compared to fathers who were in any kind of relationship with the mother.

Similarly, Fagan et al. (2009) investigated the effect of risk and resilience trajectories on fathers’ involvement by using a sample of 549 fathers and their children from the Fragile Families and Child Well-being study. Risk, resilience, and paternal involvement were assessed at baseline, and at the first- and third-year follow-up. Fathers’ non-resident status and mother-father relationship quality were assessed at the first- and third-year follow-up. The results showed that a high level of baseline risk was indirectly linked to a lower level of paternal involvement at year three via a higher level of risk and non-residence status trajectories. A higher level of baseline resilience was indirectly linked to a higher level of paternal involvement at year



three, via resilience trajectories and mother-father relationship quality. Risk at year one was negatively associated with mother-father relationship quality, which in turn, decreased the level of paternal involvement at year three. Contrary to prediction, trajectories of mother-father relationship quality did not mediate the associations between risk trajectories and paternal involvement. Nonetheless, fathers' risk factors (e.g., unemployment, alcohol or drug use, incarceration) could present unavoidable barriers to mother-father interactions.

### **Interventions and Fathering**

As evident in meta-analyses and rigorous research evaluations, intervention programs have short-term and long-term positive effects on parental mental health, various dimensions of parent-child relationship, and couple relationship quality (Chazan-Cohen et al., 2007; Compas et al., 2015; Poole et al., 2014; Valdez et al., 2011). This notwithstanding, there is limited research on the effectiveness of parenting and relationship skills intervention programs on fathering and childhood development. This could be attributed to low father participation in intervention programs and the costs associated with these programs (see Fagan & Palm, 2015). Low father participation could be due to an overwhelming focus on low-income men who live under difficult circumstances and in unstable relationships. Because these men are at increased risk for difficulties in their relationships and parenting, they face multiple challenges in their daily lives that may prevent them from devoting time to sustained interventions. In this section, I review some of the findings on intervention programs that have focused on fathers' intrapersonal and interpersonal functioning and childhood outcomes.

Research suggests that intervention programs such as those that focus on relationship skills and marriage education were designed to help married and unwed couples form and maintain healthy relationships by improving couples' communication skills, conflict

management strategies, relationship quality, family stability, and individual functioning. These programs have implications for co-parenting and fathers' involvement with children (Blanchard, Hawkins, Baldwin, & Fawcett, 2009; Cowan et al., 2009; Rienks, Wadsworth, Markman, Einhorn, & Etter, 2011; Wilcox, Doherty, Glenn, & Waite, 2005). Although several assessments of intervention programs have mainly focused on middle-class, married, and non-minority couples in the US, there are a few attempts to tease out the effectiveness of couple, marriage, and relationship skills education programs among low-income couples from diverse racial/ethnic backgrounds. For instance, a meta-analysis by Hawkins and Erikson (2015) explored the effectiveness of couple and relationship education programs on relationship satisfaction, quality, and stability, commitment, communication and conflict resolution, physical and psychological aggression, and co-parenting quality by controlling study design, program characteristics, and program participation levels as well as participants' income, education, marital status, and relationship distress. The results for one-group/pre-post studies revealed that couple and relationship skills education programs had a positive impact on co-parenting, communication skills, and relationship satisfaction and quality. Further, the impact of couple and relationship skills education was stronger for low-income ethnic minority couples, suggesting that the efficacy of intervention programs might vary for different racial/ethnic groups (Stanley et al., 2014). This was contrary to other intervention studies that found that couple and relationship skills education program effects were invariant across racial/ethnic groups (Cowan, Cowan, Pruett, Pruett, & Wong, 2009; Cowan, Cowan, Pruett, Pruett, & Gillette, 2014; O'Halloran, Rizzolo, Cohen, & Wacker, 2013).

Overall, existing research suggests that parenting intervention programs can also promote several facets of fathers' parenting among low-income families (Magill-Evans, Harrison,

MacPhail, & Kimak, 2008; Cowan et al., 2009). In a global overview of interventions for fathers across countries, Panter-Brick et al. (2014) discerned that intervention programs have focused on a wide array of issues: father-infant attachment, infant-caretaker interactions, fathers' involvement in school, positive parenting strategies, father-child play, physical and mental health, parenting stress and aggravation, anger control, harsh parenting, parents' awareness of child abuse and neglect, domestic violence and sexual abuse, alcohol and drug use, couple relationship quality, and co-parenting in terms of enhancing family functioning and child well-being. Participating in parenting programs appear to enhance fathers' sensitivity and cognitive stimulation (Benzies, Magill-Evans, Harris, McPhail, & Kimak, 2008), father-child interactions (Julion, Breitenstein, & Waddell, 2012), fathers' understanding of child development (Lawrence, Davies, & Ramchandani, 2013), and the quality of mother-father relationships (Cowan et al., 2009), while also lessening paternal distress (Roy & Dyson, 2010) and family conflicts (Fletcher, 2009).

A few researchers have evaluated the effectiveness of intervention programs that aim to improve father involvement with their newborn child during the transition to fatherhood by targeting couples who were expecting their first child. In a study using a randomized experimental design, Doherty, Erikson, and LaRossa (2006) investigated the role of group education intervention on the quality of father-child interactions and father involvement with their children. The program recruited 165 married or cohabiting couples who were expecting their first child. The intervention group received 8 parenting classes. The results from repeated-measures analysis of variance revealed that at 6-months postpartum, fathers in the intervention group showed more warmth and emotional support, intrusiveness, positive affect, dyadic synchrony, and increases in overall quality of father involvement, and workday involvement than

fathers in the control group. But the intent to treat estimates showed significant differences between intervention and control groups only for warmth and emotional support, dyadic synchrony, and workday involvement. In somewhat similar work by Benzies et al. (2008), it was also found that parenting education programs increased father-child interactions among fathers who were least involved with their children.

There is further evidence from Early Head Start and Head Start research studies that parenting programs promote father-child interactions (Raikes & Belotti, 2006). Limitations such as the lack of randomization and control groups due to the ethical aspects of providing services to families in need aside, these early childhood father intervention programs have positive effects on paternal parenting and a wide variety of father-child interactions. As an example, Fagan and Iglesias (1999) designed a quasi-experimental study to evaluate the impact of Head Start programs on father involvement. They reported that a high dosage intervention group that consisted of fathers who participated in more than 21.5 hours of intervention program curricula demonstrated an increasing amount of father-child involvement compared to the control group. Moreover, children in the high dosage intervention group demonstrated a greater level of mathematics readiness compared to control group children and children in the low dosage intervention group. From these results, it is possible that the efficacy of intervention programs might depend on the treatment dosage of programs.

In related work, the impact of intervention programs on parent-child interactions, couple relationships, and parental depressive symptoms seems equivocal. Cowan et al. (2009) examined the impact of the Supporting Father Involvement (SFI) study, which is a three-arm randomized controlled trial that recruited 289 low-income Mexican American and European American families across four California counties. Families were randomly assigned to either a

16-week group session for couples, a 16-week group session for fathers, or a 1-time informational meeting. Group sessions focused on the importance of fathers' positive involvement with their children. Pre-intervention, post-intervention after 2-month completion of the assignment, and a post-intervention follow-up after 11-month completion of the assignment were conducted. The results showed better outcomes in the areas of fathers' psychological involvement with children, fathers' involvement in caregiving activities, couple satisfaction, and lower parenting stress among fathers who were in the fathers' group as compared to those in the couples' group, and control group. However, a replication attempt of the SFI program among low-income Mexican American and African American families failed to show any significant differences between controls, couples' group, and fathers' group in terms of father-child interactions, parenting stress, quality of marriage, child hyperactivity, social isolation, and internalizing symptoms in children (Cowan et al., 2014). Additionally, in their comparative meta-analytic review, Fletcher, Freeman, and Matthey (2011) used a sample of 28 published journal articles to examine the effectiveness of the Triple P-Positive Parenting Program, which was designed to improve positive parenting practices and reduce children's behavioral difficulties. These researchers reported that the intervention program showed a significant positive effect on paternal parenting practices, but the magnitude of effect was smaller for fathers than it was for mothers.

In view of the substantial negative effects of intimate partner violence on father-child relationships and children's socio-emotional and behavioral adjustment, several intervention programs have been developed for fathers who perpetrate intimate partner violence. There is ample evidence to suggest that intimate partner violence does not occur in isolation and, in fact, co-occurs with other types of abusive behavior, such as hostility, physical and emotional abuse

of children, and child neglect (Kimber et al., 2015; Quillet-Morrin et al., 2015). Scott and Crooks (2007) evaluated the effectiveness of the Caring Dads: Helping Fathers Value Their Children Program that was designed to prevent fathers' abusive behaviors towards their partner and children. The pretest-posttest evaluation of the participants of the 17-week group intervention program revealed that overall fathers showed significant mean reduction in hostility, denigration and rejection of children, and angry arousal to child and family situations. Mean reductions were found in total stress, emotional unavailability and unresponsiveness, hostility, denigration and rejection of children, angry arousal to child and family situations in a subsample of fathers who demonstrated hostility toward their children. Although the lack of randomization limits the generalizability of these findings, Caring Dads is still a promising intervention program that demonstrates the benefits of educating fathers to end hostile father-child and father-mother interactions.

In two other intervention programs, The Young Fathers and Responsible Fathers Programs, that did not directly aim to reduce fathers' depression nor assess the impact of the interventions, Fitzgerald, Roy, Anderson, and Letiecq (2012) found that fathers who had scored above 16, which was the clinical cut-off for depression on the Center for Center for Epidemiological Studies Depression Scale (CES-D; Radloff, 1977), experienced more interpersonal difficulties than those who had less depressive symptoms. Fathers who were deemed clinically depressed by CES-D cut-off scores were more likely to ever be convicted of a felony, shout, yell, throw things, hit their partner, be convicted of spousal abuse, have substance abuse, and be unemployed, and they were less likely to visit and be satisfied with the amount of visitation with their child than those who were not determined clinically depressed. These findings suggest that a higher level of depression was intertwined with intimate partner violence,

substance abuse, and co-parenting problems each having the potential of nullifying the positive effect of parenting intervention programs.

### **General Strengths and Limitations**

Taken together, the aforementioned review suggests that economic disadvantage and paternal depressive symptoms are potential impediments to desirable father-child relationship and positive socio-emotional and behavioral outcomes in children. Of equal importance are findings on the role that fathers' relationship and non-residential status, per-capita income, receiving public assistance, co-parenting, fathers' education, child gender, and race/ethnicity play in determining the associations between father-child interactions and children's adjustment problems (Bishai, 2013; Cabrera et al., 2008; Hofferth, Pleck, Goldscheider, Curtin, & Hrapczynski, 2013; Samms-Vaughan, 2005; Vogel et al., 2006). The push to better understand the different factors that influence father-child relationships and childhood development has been accompanied by efforts at the local and national levels in the United States to develop intervention programs to address the impact of economic disadvantage and poor neighborhood and home environments on children's social and cognitive development. By and large, intervention programs have been found to help increase father involvement with children, which, in turn, has enhanced family processes and child development in beneficial ways. The intervention studies reviewed herein highlight the salubrious effects of diverse fathering intervention programs on paternal functioning, parenting, and childhood development (Bradley, Shears, Roggman, & Tamis-LeMonda, 2006; Benzies et al., 2008; Cowan et al., 2009; Panter-Brick et al., 2014).

There are some major strengths to the studies reviewed above on economic disadvantage, paternal depressive symptoms, paternal sensitivity, and fathering interventions. Notably, some

of them have large representative samples and a few have examined parenting and economic hardship longitudinally with multiple assessment techniques (e.g., observations, questionnaires, standardized tests). A number have employed process models that examined mediating and moderating roles of different proximal and distal family factors on parenting and childhood outcomes. Still, the corpus of studies on economic hardship, depressive symptoms, paternal interactions with children, and childhood outcomes seem fragmented with very little consensus on the links between paternal risk factors and childhood outcomes. The paucity of data on the associations between paternal risk factors, the socio-affective aspects of paternal engagement and key childhood outcome variables makes it difficult to draw concrete conclusions about paternal risk factors and children's adjustment across diverse ethnic and cultural groups.

Turning to fathering intervention, several studies were designed as randomized controlled trials and had large representative samples as well. Yet others employed a quasi-experimental design that included pretest and post-test measures only to examine different program effects on parenting processes. The effectiveness of intervention programs was generally assessed by comparing the participants in the treatment group and control group, regardless of whether participants were actually receiving the intervention programs. As with the studies on economic hardship, paternal depressive symptoms, and childhood outcomes, the effects of intervention programs on father-child interactions, partner relationship quality, and parental mental health remain sketchy due to a lack of randomization and control groups and low father participation in intervention programs. Further, little is known about the effects of intervention programs on the associations between paternal mental health and childhood outcomes in large samples during the early childhood years.



This study builds on prior work in the following manner. First, it examined the mediational role of fathers' depressive symptoms and fathers' engagement in caregiving activities, social and cognitive activities, and physical play on the associations between paternal economic hardship and children's internalizing and externalizing behaviors by using data from eight sites of the Building Strong Families study that included urban and rural samples.

Assessing the associations between paternal mental health and childhood outcomes via paternal parenting in low-income families can help us identify risk and protective factors in everyday socialization of young children prior to formal entry into schooling. In this regard, this study introduced critical dimensions of paternal involvement such as social and cognitive activities, caregiving activities, and physical play to assess how paternal involvement ameliorate or exacerbate the strength of the pathways from paternal economic hardship and depressive symptoms to children's internalizing and externalizing behaviors across racial-ethnic groups.

Second, it focused on two primary issues—the economic circumstances and mental health of fathers—that affect men's relationships with children and childhood outcomes, while taking race-ethnicity into account. A close reading of the literature on economic risk factors and fathering suggests that the variability of financial strain across racial-ethnic groups underestimates the effect of family economic hardship on proposed family and child outcomes. Likewise, the socio-demographic characteristics of fathers, such as their education level or residential status, show variability across racial-ethnic groups, and are often related to paternal mental health and influence the level of paternal involvement (Roggman, Bradley, & Raikes, 2013). Teasing out racial-ethnic group similarities and differences in paternal risk factors and childhood outcomes should offer better insights into the discrepancy in findings between

economic hardship and mental health indicators and advance our understanding of the effect of fathers' economic hardship and mental health on parenting and childhood outcomes.

Finally, this study attended to other difficulties in intervention research by taking into consideration the attrition and drop-out rate in testing the efficacy of intervention on low-income fathers. Using data from a randomized controlled trial, this study employs a multi-group analysis to determine whether the receipt of parenting and relationship skills education classes moderates the associations between economic hardship, paternal depressive symptoms, paternal involvement and children's behavioral difficulties across African American, European American, and Hispanic American father-child dyads. In other words, this study examines variations in pathways of associations between economic hardship, paternal depressive symptoms, paternal involvement, and children's behavioral difficulties across compliers and non-compliers of the intervention group, and controls. That is, fathers who were assigned to, and participated in the BSF parenting or relationship skills education classes were referred to as compliers of the intervention program, whereas fathers who were assigned to, but did not participate in the BSF parenting or relationship skills education classes were referred to as non-compliers in the intervention program. Because neither the non-complier nor control group received any BSF program curricula voluntarily or involuntarily, the non-complier group might be different than the control group fathers in important ways and merit consideration as a separate group. Factors such as maternal service receipt or maternal gatekeeping (Rienks et al., 2011), residential patterns, relationship instability, and entry into new unions with other partners may all have a hand in why non-compliers refused to attend relationship skills education classes. The next chapter lays bare the theoretical and conceptual models that helped to frame the

research questions, formulate the hypotheses, construct the model that was tested, and the statistical method that was used to determine pathways of associations across study variables.

### **Chapter 3: Theoretical Framework**

After Lamb et al. (1985) developed one of the earliest models of paternal involvement, others have proposed related models and frameworks on fathers' involvement with young children. These include, but are not limited to father work (Dollahite, Hawkins, & Brotherson, 1997), generative fathering (Hawkins & Dollahite, 1997) fathers as resource providers (Amato, 1998), and father presence (Krampe, 2009). There has also been a revision to the Lamb et al. (1985) model that pays more attention to the socioemotional aspects of parent-child involvement (e.g., warmth and sensitivity) and some have constructed process models that detail moderating and mediating factors between paternal involvement and child outcomes (Cabrera et al., 2007a).

This chapter focuses on conceptual models and theories that attempt to explain the components of father involvement that directly or indirectly affect children's social, emotional, behavioral, and cognitive development, such as attachment theory and paternal involvement frameworks (Ainsworth, 1967; Bowlby, 1969; Cabrera et al., 2007a; Lamb et al., 1985; Pleck, 2010), the bio-ecological systems model (Bronfenbrenner, 1995), the family stress model (Conger et al., 1992; 1993), and the risk and resilience framework (Fagan & Palkovitz, 2007; Fagan et al., 2009; 2014). Only the basic components of these models and theories that are relevant to this study are discussed and their significance for the selection of measures and the development of the overall model to be tested are outlined next. More detailed discussions of these models and theories are found in detail elsewhere (Ainsworth, 1967; Bowlby, 1969; Bronfenbrenner, 1995; Cabrera et al., 2007a; Conger et al., 1992; Fagan et al., 2009; Lamb et al., 1985; Pleck, 2010).

## **Family Stress Model**

The family stress model provides insights into the indirect association between family economic risk factors and children's wellbeing via paternal parenting. In their pioneering study, Conger et al. (1993) posited that when parents experience economic hardship, they will be more likely to show depressive symptoms, which in turn, affects their ability to provide optimal parenting. Poor parenting then imparts negative influences on children's social and cognitive functioning. Parents' awareness of their financial strain is considered to be a stressor that tends to augment parental ineffectiveness via undermining spousal relationship quality (Elder, Eccles, Ardel, & Lord, 1995). Sparse economic resources and circumstances deteriorate parents' ability to fulfill children's needs and demands, which contributes to parental stress and ineffective childrearing strategies (McConnell, Breitzkreuz, & Savage, 2011). The persistence and intensity of financial difficulties also reduce parental self-efficacy and competence, which can elevate their aggression and hostility toward their children (Elgar, Mills, McGrath, Waschbush, & Brownridge, 2007).

A range of studies has tested the family stress model by utilizing large cross-sectional and longitudinal data sets (Belsky, Bell, Bradley, Stallard, & Steward-Brown, 2006; Nievar et al., 2014). Leinonen et al., (2002) examined the family stress model in a sample of 527 parents and their school-aged children in Finland. They found that economic hardship, which consisted of income level, income change and work situation, created general and specific economic pressures for both mothers and fathers, which were associated with higher levels of anxiety and social dysfunction symptoms in mothers and depressive symptoms and anxiety in fathers. Sequentially, mothers' anxiety was associated with lower levels of the fathers' perception of spousal support, whereas fathers' anxiety was associated with higher levels of the mothers'

perception of spousal hostility. Fathers' anxiety was also associated with their non-involved and punitive parenting behavior, and fathers' social dysfunction symptom was associated with non-involved parenting. Mothers' anxiety was associated with non-involved parenting, and mothers' depressive symptoms were associated with authoritative parenting. Additionally, fathers' perception of spousal support was linked to fathers' authoritative, non-involved and punitive parenting, whereas mothers' perception of spousal hostility was linked to punitive parenting.

Several studies have investigated whether family stress theory can extend beyond its application to middle-class European American families. Using a sample of African American parents and their school-aged children, Conger et al. (2002) found that the pathways of associations between economic hardship and children's behavioral difficulties via parental mental health and parenting were no different from those determined for European American families. Another study by Delgado et al. (2013) also provided evidence of invariant pathways for different racial/ethnic groups by showing the adverse impact of experiencing financial difficulties on parenting, family processes, and children's adjustment among low income Mexican-origin families living in the United States.

The abovementioned and other results (e.g., Hunt, Caldwell, & Assari, 2015; Neppl, Jeon, Schofield, & Donnellan, 2015) fully support the family stress model, which underscores the susceptibility of family dynamics and paternal involvement processes to economic hardship and pressure. It is within the context of cascading effects of economic factors on different aspects of family relationships and childhood development that this study focused on the direct and indirect associations between economic disadvantage and mental health and paternal involvement and children's behaviors. As proposed by the family stress model, family disadvantage is seen as affecting personal and interpersonal functioning in fathers which then

influences childhood development. Economic disadvantage is a salient predictor variable in this study.

### **Paternal Involvement Frameworks: Warmth and Sensitivity**

Historically, the construct of paternal involvement has been defined by three main dimensions: engagement (direct father-child interactions), accessibility (time or amount of father-child interactions), and responsibility (arranging resources) (Lamb et al., 1985). However, scholars have argued that the operationalization of paternal involvement should incorporate other aspects of father involvement, such as affection, childrearing beliefs and attitudes, and perception of caregiving (Cabrera, Tamis-LeMonda, Bradley, Hoffert, & Lamb, 2010). Thus, building on Lamb et al.'s (1985) early paternal involvement model, Pleck (2010) revisited the construct of paternal involvement by considering quality dimensions of involvement and redefining the term paternal involvement as the interrelation of its three main domains of “positive engagement activities,” “warmth and responsiveness,” and “control,” and the two subdomains of “indirect care” and “process responsibility.” Positive engagement activities refer to father-child activities (e.g., social and cognitive play, reading, physical play) that support favorable childhood development rather than total paternal engagement (Pleck, 2010). The warmth and responsiveness and control domains intersect with Baumrind's (1967) authoritative parenting style and refer to fathers' parenting behavior during father-child interactions, such as showing affection, hugging, monitoring, and engagement in decision making (Pleck, 2010). Indirect care refers to “activities that parents do for the child but not with the child” (Pleck, 2012), whereas process responsibility addresses “taking initiative and monitoring what is needed” (Pleck, 2012, p. 245). Even though indirect care and process responsibility have received little explicit attention in the fathering literature, Pleck (2012) suggested that material

indirect care, which is defined as providing goods and services, has implications for childhood development due to its direct connection to child life issues, and it should be distinguished from generating income.

In light of the focus on the qualitative dimensions of paternal involvement (see volumes by Cabrera & Tamis-LeMonda, 2013; Lamb, 2010; Roopnarine, 2015; Shwalb et al., 2013), this study included caregiving activities, play, and social and cognitive activities with children into the models that were tested. Parent-child play behaviors, social and cognitive involvement with children, and sensitive and responsive caregiving during every day childrearing are all linked to children's social and cognitive skills in early and middle childhood (Roopnarine, 2011; Roopnarine & Davidson, 2015). Positive paternal engagement could possibly mediate the negative effects of economic disadvantage and paternal mental health on children's behavioral difficulties. In some studies (Mendez, Durtschi, Nepl, & Stith, 2016; Knerr, Gardner, & Cluver, 2013), positive parental engagement mediated the associations between harsh parenting and children's social and cognitive skills.

### **Attachment Theory**

That children form attachments to fathers has been demonstrated several decades ago in a series of seminal studies by Lamb (1977; 1978; 1980; 2002). For both mothers and fathers, it is the consistency and predictability in displays of warmth and sensitivity during early parent-child interactions that are central to the formation of close emotional ties to parents (Ainsworth, 1967; Bowlby, 1969). Attachment theory suggests that fathers are also primary attachment figures and that the early father-child relationship has a salient role in the development of social and cognitive skills in children (Cox, Owen, Henderson, & Margland, 1992; Lamb, et al., 1985). The basic tenet of attachment theory is that fathers' emotional attentiveness to children's needs



makes a significant contribution to children's social development that then enables them to develop adequate peer and other relationships with diverse individuals in their cultural communities (Lamb, 2002). The development of secure emotional bonds relies on fathers' ability to read and process children's cues in an attentive, reliable, and consistent manner (Cabrera, Tamis-LeMonda, Bradley, Hofferth, & Lamb, 2000).

Traditionally there has been an overwhelming focus on mother-child attachment relationship (Ainsworth, 1989; Atkinson et al., 2000; Moran, Forbes, Evans, Tarabulsky, & Madigan, 2008; Posada et al., 1999). Today there is increasing focus on the determinants of father-child attachment and the role of father-child attachment in fostering children's development (Bretherton, 2010; Palm, 2008; 2014). For instance, Hoffman (2011) examined the importance of father-child attachment in order to inform fatherhood and parenting programs and suggested that intervention programs that target infant-father relationships may promote the father's awareness of infant signals, which can strengthen the father-child bond by building trust and communication. A few studies investigated (e.g., Palm, 2014) diverse factors, such as paternal sensitivity in play, fathers' perception of their role in children's lives, maternal gatekeeping, marital conflict and conflict resolution between partners, and socioeconomic factors, including living arrangement with partner and child, economic stability, job stability, and financial strain that are associated with early father-child relationships. Moreover, in their systematic review of longitudinal studies, Sarkadi, Kristiansson, Oberklaid, and Bremberg (2008) concluded that nurturing fathering can impede offspring behavioral problems, and consistent father involvement with the focal child tends to improve children's cognitive skills, thereby suggesting that different aspects of the father-child relationship have a substantial impact on children's and adolescents' socio-emotional and cognitive development over time.

In as much as studies have established links between father-child attachment and childhood development, the factors that mediate and moderate father-child relationships and childhood development are only now beginning to take shape (see Lamb, 2010; Roopnarine, 2015). When it comes to risk factors and paternal engagement and children's development, the data are rather thin. Because of the importance of sensitively attuned caregiving for children's social adjustment across cultures (Khaleque & Rohner, 2012) and the attention to engaged fathering and childhood development worldwide for advancing the developmental potential of children (Plantin, 2015), fathers' caregiving activities, social and cognitive engagement with children, were included as mediators in the present study. Likewise, physical play has been suggested as a predominant activity between fathers and children in certain groups in North America and has been advanced as providing social avenues for the development of attachment relationship to fathers (Paquette, 2004). Accordingly, physical play was entered as mediator in the conceptual model as well.

### **Parental Process Models**

A bulk of the early fathering studies focused on fathers' presence and the amount of time fathers spent interacting with their children. Of late, researchers have been vigorously exploring positive paternal engagement activities, warmth and responsiveness, and appropriate limit setting, practices that are connected to healthy child development (Cabrera, Shannon & Tamis-LeMonda, 2007). Daniel, Madigan and Jenkins (2015) examined the longitudinal associations between paternal warmth and maternal warmth and children' prosocial behaviors in a sample of 381 mother-father-child triads from Canada. They found that paternal warmth at 18 months of age was positively associated with paternal warmth at 54 months of age via paternal warmth at 36 months of age. Maternal warmth at 18 months of age was positively associated with maternal

warmth at 54 months of age via maternal warmth at 36 months of age. Children's prosocial behavior, maternal and paternal warmth at 18 months of age were linked to prosocial behavior at 36 months of age, which in turn was associated with children's prosocial behavior at 54 months of age after controlling for child age and gender, maternal and paternal education, and family assets and income.

Along with the paternal involvement frameworks discussed above, Cabrera et al. (2007a) introduced a multidimensional model that highlights the salience of considering mediated and moderated relationships to dissect the impact of paternal involvement in children's development while considering fathers' diverse sociodemographic characteristics and family structures. Their heuristic model proposes that fathers' relationship with their parents, social, cultural, and biological characteristics shape fathers' involvement in children's social, emotional, physical, and cognitive development via a complex set of interrelationships of father and mother characteristics, parental psychopathology, and family contextual factors (Cabrera et al., 2007b).

In their pursuit of teasing out the complexity of factors that contribute to the nature of father-child relationships, Hofferth et al. (2013) examined the role of family structure in paternal involvement utilizing secondary data from the 1997 Child Development Supplement for the Panel Study of Income Dynamics. In a sample of 2,223 children and their fathers, the study classified family types as children who live with two biological parents, a biological mother and a stepfather, a biological father and another caregiver, and a biological father and no other caregiver. In their analysis, family type, paternal characteristics (health status, depression level, education, the number of hours at work, age), child and family characteristics (child age and gender, child's health status, family income, race/ethnicity), and fathers' attitudes were included as independent variables, whereas paternal engagement, warmth, control, rule discussion, and

weekly time in hours and minutes that fathers engaged in caregiving, play/championship, and teaching achievement were included as dependent variables. The descriptive analysis indicated that fathers of children who lived with two biological parents, and a biological father and no other caregiver were more likely to be older, demonstrate more paternal warmth and less control as compared to those who lived with a biological mother and a stepfather, and a biological father and another caregiver. Fathers of children who lived with only a biological father showed more paternal attitudes, engaged in more teaching and play activities, had higher educational attainment, and lower income levels as compared to fathers in other family structures.

### **Bronfenbrenner's Bio-ecological Model**

In accordance with paternal involvement frameworks and models, the bio-ecological systems framework considers context specific familial and individual level factors on family functioning and children's social and cognitive competence. As such, the bioecological model and conceptualizations of parenting process models (e.g., Belsky, 1984; Darling & Steinberg, 1993) emphasize the complex interplay of inter- (e.g., marriage and spousal relationships) and intra-personal factors (e.g., parental mental health) on parenting and childhood functioning. The bio-ecological model was instrumental in conceptualizing and designing the BSF study because of its proposed strength in connecting issues of person, process, context, and time and their interactions in delineating factors that aid and impede developmental processes. Take for example, the constraints that economic hardship can impose on parents' ability to provide optimal home environments and implement appropriate parenting practices (Evans, Wells, & Moch, 2003). In this regard, exposure to economic risk factors, such as poverty, unemployment, residential crowding, and income loss, has been found to compromise the quality of parenting behaviors (Fauth, Leventhal & Brooks-Gunn, 2007). Supporting evidence for the latter comes

from the Parents' Fair Share (PFS) Program, which targeted low income non-custodial fathers who have difficulty paying child support (Miller & Knox, 2001). The program provided peer support (e.g., positive parenting, anger management) and training for employment and job searches in order to increase child support and paternal involvement. The evaluation of the PFS program demonstrated that fathers who were the most disadvantaged (e.g., unemployed, little or no previous job experience, less than high school degree) were more likely to find a job and earn an income compared to other fathers in the program. The net effect was that obtaining a job enabled fathers to pay child support and increase the number of visits to a child.

As stated already, there is some evidence to suggest that the pathways of associations between family level variables such as dimensions of parents' relationship quality and psychological wellbeing and children's socioemotional development are parallel across racial/ethnic groups (Conger et al. 2002; Delgado et al., 2013). These findings have been challenged by researchers who place more emphasis on the developmental niche and cultural practices (e.g., LeVine, 1975; Super & Harkness, 1997; Whiting & Whiting, 1975). Studies emerging out of psychological anthropology have described distinct parenting patterns and involvement with children across cultural communities. Given that variations in patterns of childrearing and childhood outcomes have been recorded for racial-ethnic groups in the United States recently (e.g., Dede Yildirim & Roopnarine, 2015), the pathways of associations between distal (e.g. socioeconomic status, race/ethnicity) and proximal factors (e.g. interpersonal and intrapersonal factors, psychopathology) and childhood outcomes may not be invariant across the groups included in this investigation.

## **Risk and Resilience Perspectives: Economic Disadvantage**

Risk and resilience perspectives argue that fathers' multiple risk factors, such as unemployment or unstable employment, income insecurity, alcohol or drug use, residential and relational instability, housing crowdedness, intrapersonal functioning, and low levels of education can influence paternal involvement, couple relationship quality, and children's social adjustment (Fagan & Palkovitz, 2007; Fagan et al., 2009). It is instructive that the existing literature suggests that fathers' risk factors predict fathers' involvement with children over time, while resilience factors mediate the links between the risk factors and fathers' involvement with children (Fagan & Palkovitz, 2007; Fagan et al., 2009). Low-income fathers are more likely to live in disadvantaged neighborhoods, face financial strain, unstable employment or unemployment, and relationship instability. These factors predispose fathers to being absent or becoming uninvolved in young children's lives (Tamis-LeMonda & McFadden, 2010). Ultimately, the lack of paternal involvement and economic investment in children affect the quality of children's lives as well. As laid out in the previous chapter, children who grow up in impoverished home and neighborhood environments are at greater risk for behavioral difficulties and school failure than those who grow up in environments with adequate material resources (Mrug & Windle, 2009) and within families who have good pair-bond stability regardless of whether they co-habit or are in visiting relationships (Carlson & McLanahan, 2010).

It might be tempting to conclude that the prevalence of non-involved or absent fathers is higher among certain ethnic-racial groups due to the embedded features of economic and social disadvantages with minority status. Researchers (e.g., Roopnarine, 2007) have pointed out the value of understanding the fragmentation of the independent effects of fathers' race/ethnicity and risk factors on fathers' involvement with children. Few studies have determined the effects of

race/ethnicity and economic disadvantage and other risk factors across ethnic groups simultaneously, especially as they pertain to fathering and childhood outcomes (see Parke et al., 2004). It is possible that there are different cultural pathways of associations between paternal personal factors, parenting, and economic disadvantage and childhood outcomes across different ethnic/cultural groups. In light of risks associated with poor neighborhood and home environments, it would be of interest to determine which factors serve a protective function against economic hardship and poor paternal interpersonal functioning and childhood social skills. Identifying protective factors that move away from deficit models of social functioning that have historically pathologized families who live in difficult circumstances capitalizes on the preventative science approach to dealing with family dysfunction (see Apteekar & Oliver, 2016).

Overall, resilience models and the preventative science approach embrace evidence-based parenting and relationship skills education programs that target the reduction of the risk factors by helping to build and sustain desirable relationship between couples and by enhancing effective parenting strategies among families from diverse racial/ethnic and socio-economic backgrounds. An exemplary initiative is the Supporting Father Involvement (SFI) program that provided services to couples who were in contact with the Child Welfare System for domestic violence, child abuse (including physical, emotional, and sexual abuse), child neglect, and parental absence (Pruett, Pruett, Cowan, & Cowan, 2016). The SFI program aimed to enhance positive father-child relationships, fathers' involvement with children, and parenting alliances between couples by employing a culturally sensitive curriculum either in English or Spanish. The impact assessment at 18 months post intervention revealed that the program improved parents' childrearing competencies and positive co-parenting, decreased harsh and authoritarian parenting and violent problem solving strategies between couples (Pruett et al., 2016). The

effects of the SFI program were similar across African American, European American, and Hispanic American families (Pruett et al., 2016).

## **Summary**

In short, these models and theories and accompanying research findings suggest that different aspects of economic disadvantage and paternal depressive symptoms can negatively impact paternal involvement and children's adjustment. Ostensibly, this points to the importance of unraveling potential risk factors for young children's socio-emotional and behavioral development. It is also important to understand whether these risk factors are equally distributed across racial-ethnic groups and which intervention programs are helpful in reducing the effect of economic disadvantage and paternal depressive symptoms on paternal involvement and on children's social and cognitive development in different cultural groups.

## **Development of the Model and Selection of Measures**

The confluence of the major tenets of the frameworks and models discussed above assisted in the development of the empirical models that were tested and the selection of measures. Because parental depressive symptoms and economic hardship are associated with poor parenting outcomes, the overall model zeroes in on these factors as major constraints on paternal engagement with children. As Gershoff et al. (2007) asserted, assessing the effect of family income on parental stress and parenting behavior without considering subjective indicators of economic hardship produces spurious results. In their analysis, the family stress model was tested with and without economic hardship. They found that the association between family income and parental stress was negative when economic hardship was not included in the model, whereas the direction of direct effect changed when economic hardship was added to the model. Specifically, the association between family income and economic hardship became



negative and the association between family income and parental stress became positive, which lends support to the notion that economic hardship influences paternal parenting. Thus, both objective and subjective indicators of economic well-being, namely fathers' income and economic hardship were utilized in this study to obtain information as to the extent to which economic well-being indicators affect paternal parenting behaviors via paternal depressive symptoms.

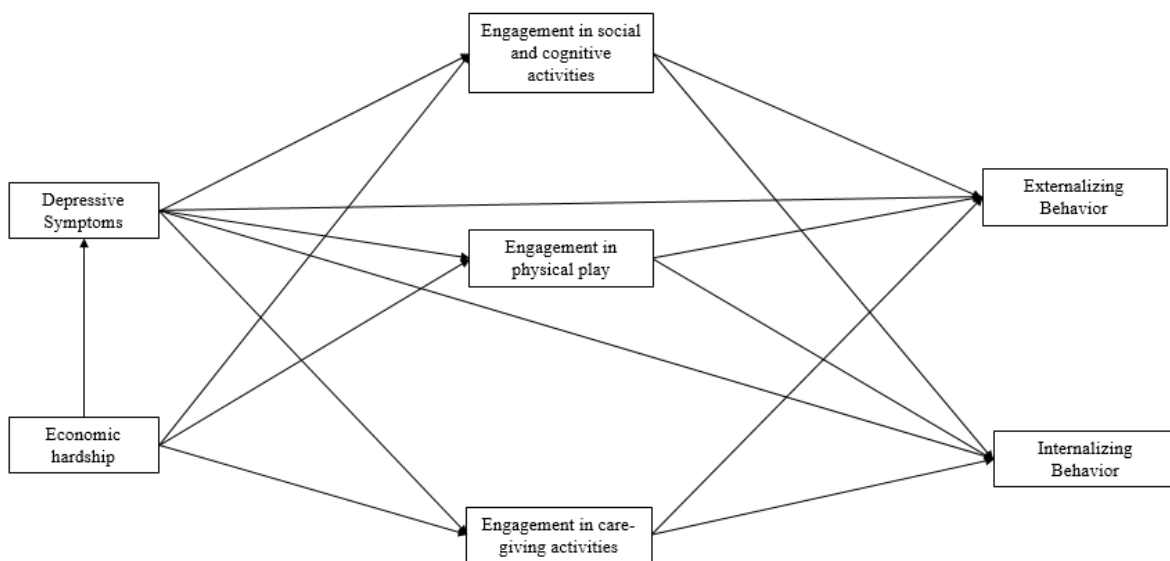
Research suggests that parental depressive symptoms are associated with lower quality of parent-child interactions, ineffective communication, and insensitivity to children's needs and demands, which are related to children's social, emotional, and behavioral skills (Goodman, 2007). Positive parent-child interaction, warmth, and sensitivity have been found to attenuate the strength of the detrimental effect of parental depression on children's behavioral difficulties (Sellers et al., 2014; Westbrook & Harden, 2010). Cabrera et al. (2007a) and Pleck (2010) have focused on sensitively attuned father-child activities as key to healthy father-child relationship and favorable child development outcomes. Accepting the importance of parental warmth and sensitively attuned interactions for optimal childhood development, this study included the qualitative aspects of paternal involvement such as social and cognitive activities, physical play, and caregiving activities as key mediators between paternal economic risks, paternal depressive symptoms, and children's internalizing and externalizing behaviors across racial-ethnic groups.

Childhood behavioral skills were chosen as outcome measures because of their importance for children's transition to school, for building successful early peer relationships, and for navigating early academic tasks (Ladd, Herald, & Andrews, 2006). Numerous studies have shown that across cultural and ethnic groups, children who exhibit high levels of internalizing and externalizing behaviors have more adjustment difficulties and face academic

challenges (e.g., academic competence, reading, and literature skills), and later adjustment problems (Moilanen, Shaw, & Maxwell, 2010). Furthermore, internalizing and externalizing behaviors during childhood have been associated with psychopathological symptoms and juvenile delinquency during adolescence (Bornstein, Hahn, & Haynes, 2012).

### Research Questions and Hypothesis

Figure 1. Conceptual model



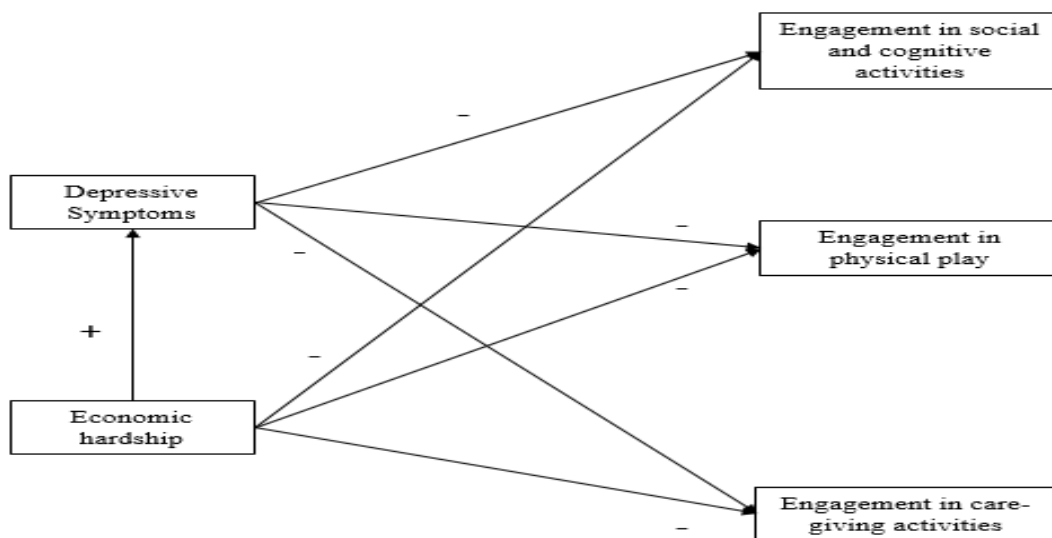
Using principles within paternal involvement frameworks (Cabrera et al., 2007a; Lamb et al., 1985; Pleck, 2010), family stress theory (Conger et al., 1992; 1993), the bio-ecological systems model (Bronfenbrenner, 1995), attachment theory (Ainsworth, 1967; Bowlby, 1969; Lamb, 1977;), and the risk and resilience framework (Fagan & Palkovitz, 2007; Fagan et al., 2009) as guides, this study examined how economic hardship and paternal mental health are related to young children’s internalizing and externalizing behaviors, indirectly through paternal involvement in caregiving, play, and social and cognitive activities in African American,

European American and Hispanic American father-child dyads (Figure 1). This study tested the following hypothesis:

**Research Question 1.** Are there differences in the strength of the associations between economic hardship and children’s internalizing and externalizing behaviors via paternal depressive symptoms and fathers’ engagement in physical play, social and cognitive activities, and caregiving activities between compliers and non-compliers of the intervention group and the control group?

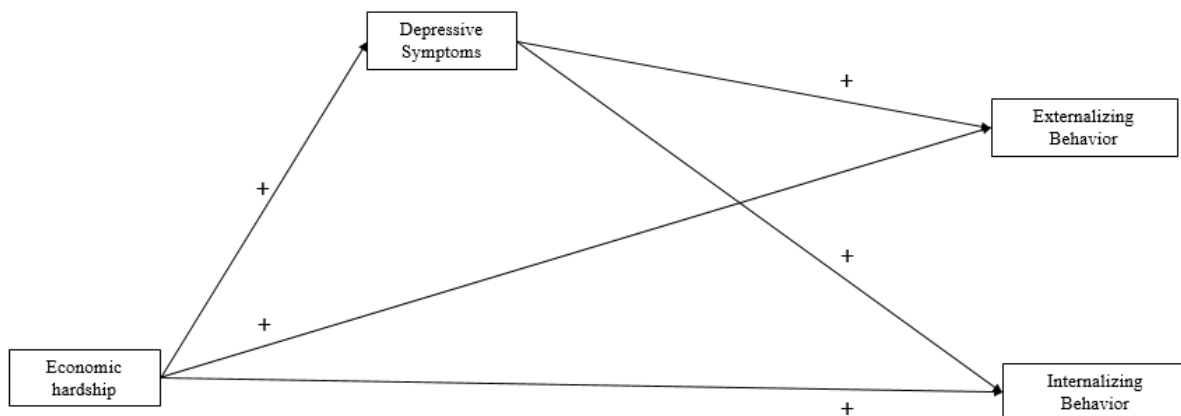
Hypothesis 1a. Consistent with previous research (Neppl et al., 2015; O’Hara & Fisher, 2010; Wadsworth et al., 2013), it is expected that economic hardship will be positively associated with paternal depressive symptoms, which, in turn, will be negatively associated with fathers’ engagement in physical play, social and cognitive activities, and caregiving activities (Figure2).

Figure 2. The direct and indirect associations between economic hardship, paternal depressive symptoms, and engagement in physical play, social and cognitive activities, and caregiving activities (Hypothesis 1a)



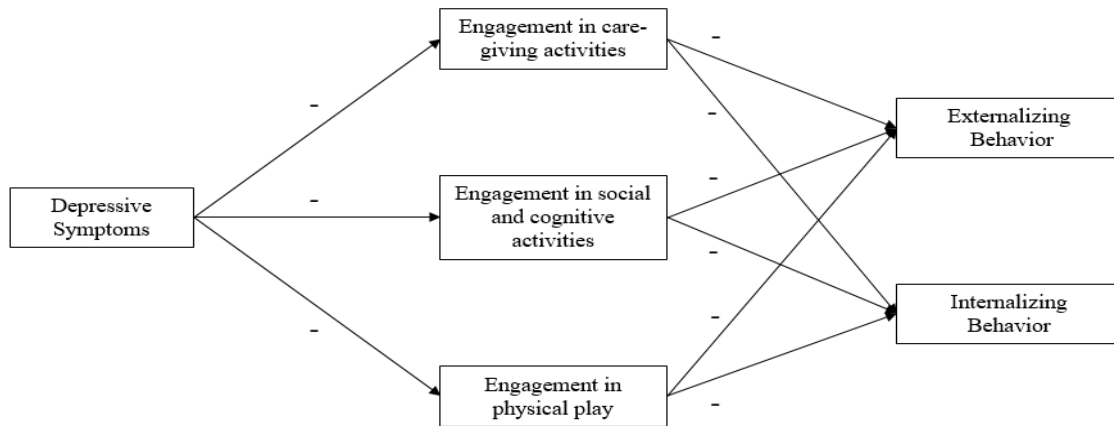
Hypothesis 1b. It is also expected that higher levels of economic hardship and paternal depressive symptoms will be linked to higher levels of internalizing and externalizing behaviors in children (Newland et al., 2003; Parke et al., 2004) (Figure3).

Figure 3. The direct and indirect associations between economic hardship, paternal depressive symptoms and internalizing and externalizing behaviors (Hypothesis 1b)



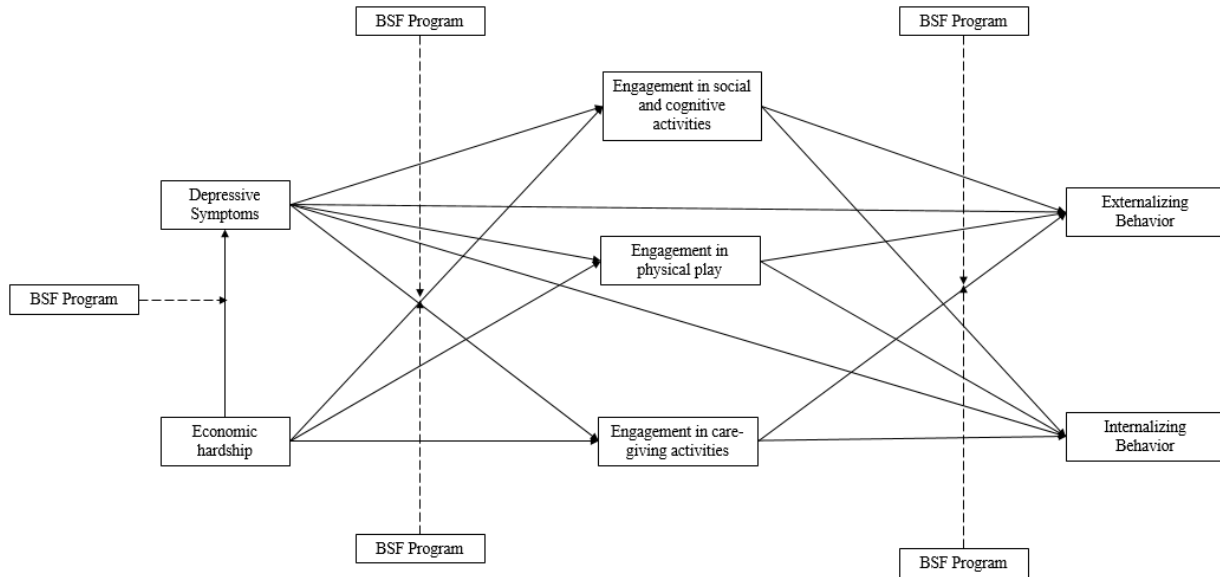
Hypothesis 1c. Further, it is expected that higher levels of paternal depressive symptoms will be linked to lower levels of fathers' engagement in physical play, social and cognitive activities, and caregiving activities, which in turn, will be negatively associated with internalizing and externalizing behaviors (Jia, Kotila, & Schoppe-Sullivan, 2012) (Figure 4).

Figure 4. The indirect associations between paternal depressive symptoms and internalizing and externalizing behaviors via paternal engagement in physical play, social and cognitive activities, and caregiving activities (Hypothesis 1c)



Hypothesis 1d. It is expected that the strength of the associations between economic hardship and children’s internalizing and externalizing behaviors via paternal depressive symptoms and fathers’ engagement in physical play, social and cognitive activities, and caregiving activities will vary across complier, non-compliers, and control groups (Pruett et al., 2016). Specifically, the associations between economic hardship and children’s internalizing and externalizing behaviors via depressive symptoms will be stronger for the non-complier and control groups compared to the complier group, whereas the strength of the associations between economic hardship, depressive symptoms, and children’s internalizing and externalizing behaviors via paternal engagement in physical play, social and cognitive activities, and caregiving activities will be weaker for the non-complier and control groups compared to the complier group (Figure 5).

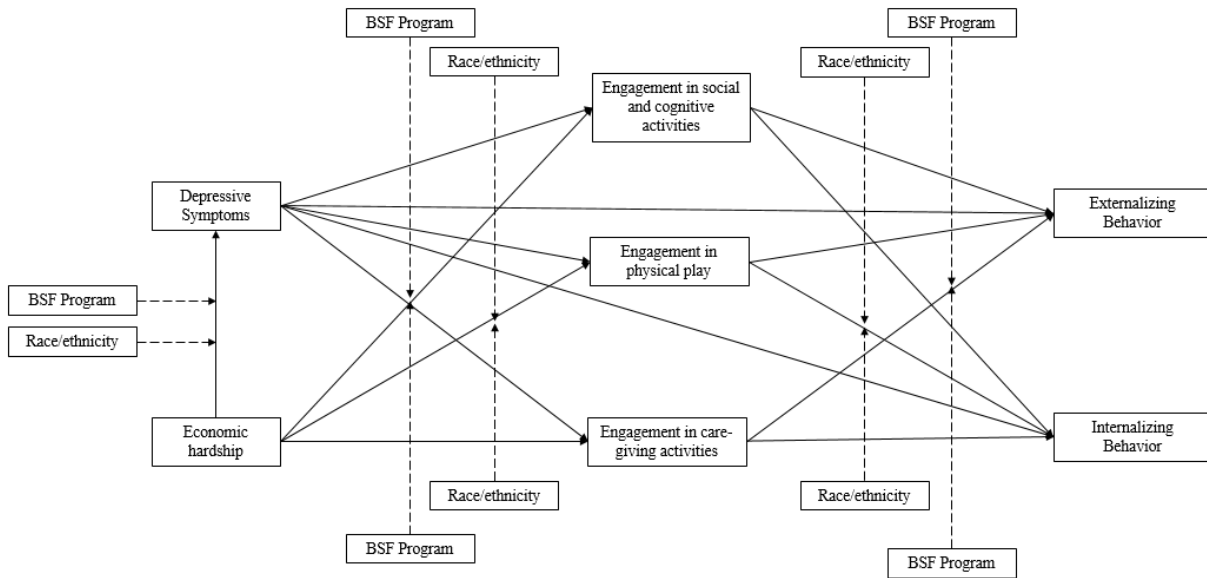
Figure 5. Direct and indirect associations between study variables by BSF program participation status



**Research Questions 2.** Does race/ethnicity moderate the associations between economic hardship and children’s internalizing and externalizing behaviors via paternal depressive symptoms and fathers’ engagement in physical play, social and cognitive activities, and caregiving activities across complier, non-complier, and control groups?

Hypothesis 2. Based on results from previous studies (Conger et al, 2002; Delgado, et al., 2013; Westbrook & Harden, 2010), the association between economic hardship and children’s internalizing and externalizing behaviors via paternal depressive symptoms and fathers’ engagement in physical play, social and cognitive activities, and caregiving activities among compliers, non-compliers, and the control group is expected to be equivalent across European American, African American and Hispanic American families (Figure 6).

Figure 6. Direct and indirect associations between study variables by BSF program participation status and race/ethnicity



## Chapter 4: Methods

### Sample

The sample was drawn from the Building Strong Families (BSF) project. The BSF project was a multisite study sponsored by the Administration for Children and Families, in the U.S. Department of Health and Human Services (Wood, Moore, Clarkwest, Killewald, & Monahan, 2012). The BSF project was designed to implement and evaluate relationship skills education programs that aim to improve the wellbeing of low-income unmarried couples and their children. Participating couples had to meet the following criteria: (a) both members agreed to be included in the study; (b) the couple was romantically involved; (c) the couple was expecting a baby or had a baby under 3 months; (d) the couple was unmarried at the time the baby was conceived; and, (e) both members were at least 18 years of age. When selected, couples were randomly assigned to either a local BSF group (N=2,533) or a control group (N=2,549). The eight local BSF programs were located in Atlanta, Georgia (N=930); Baltimore, Maryland (N=602); Baton Rouge, Louisiana (N=695); Orange and Broward counties, Florida (N=695); Houston, Texas (N=405); Allen, Marion and Lake counties, Indiana (N=466); Oklahoma City, Oklahoma (N=1,010); and San Angelo, Texas (N=342). The BSF programs offered group-based sessions on skills for healthy relationship and marriage for couples aiming to improve relationship and marriage stability and satisfaction. The sites use either 42 hours of The Loving Couples Loving Children or Love's Cradle curriculum or 30 hours of the Becoming Parents for Low-Income, Low-Literacy Couples curriculum for relationship education classes (Wood, Moore, & Clarkwest, 2011). These curricula included components that focused on communication, conflict management, affection, intimacy, trust, and commitment, the transition to parenthood, parent-infant relationship, stress and postpartum depression, and family finances.



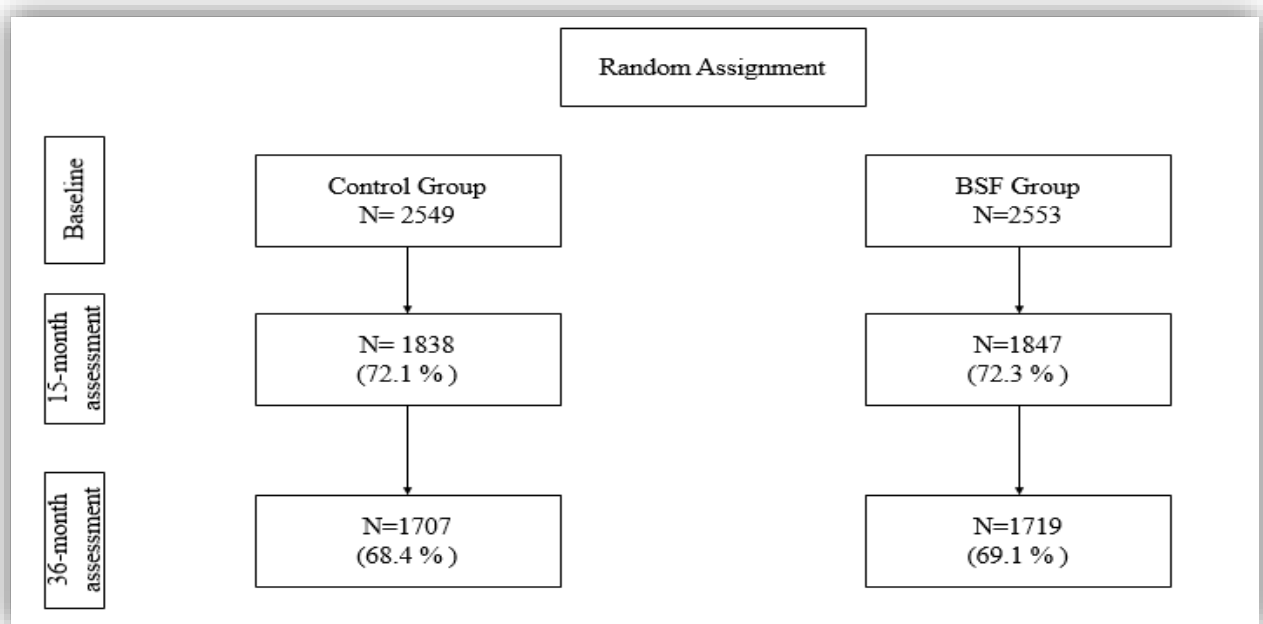
The BSF program conducted telephone surveys at 15 months and 36 months after the random assignment. The response rate for the 15-month survey and 36-month survey were 73% (N= 3685) and 69% (N= 3426) for fathers (see Figure 7).

The sample was restricted to fathers who a) were identified as being White/non-Hispanic, African American, and Hispanic American, b) indicated that the baby is still alive at the 15-month assessment, and c) lived with his child at least some of the time. These selection criteria resulted in a sample of 3,045 fathers and their young children. Table 1 presents data describing the sample characteristics across the eight sites at baseline for the BSF participant and control groups. Of the sample fathers, 19.9 % were European Americans, 50.1 % were African Americans, and 30 % were Hispanic Americans. Among all, 6.7 % were married, 56.2 % were cohabiting (full time), and 37.4% were either cohabiting part time or not cohabiting at baseline. The fathers' incomes ranged from less than \$4,999 to more than \$35,000, with fathers reporting an average income of between \$10,000- \$14,000. The mean age of fathers at baseline was 25.3 years (SD = 6.20 years) with 47.8% of fathers reporting having a high school diploma, and 17.6% a GED or equivalent qualification. The primary language was English for 85.3% of fathers (for 14.6% Spanish was the primary language). Comparisons conducted on fathers who participated in the 15- and 36-month surveys and those who did not in the 15- and 36-month surveys revealed no significant differences on several demographic characteristics (e.g., age, education, income, romantic relationship) (see Table 2).

Table 2. Comparison of missing data

	Missing Data: Economic Hardship		Missing Data: Depressive Symptoms		Missing Data: Father Involvement		Missing Data: Behavior Problem	
	$\chi^2$ (n, df)	Sig.	$\chi^2$ (n, df)	Sig.	$\chi^2$ (n, df)	Sig.	$\chi^2$ (n, df)	Sig.
Fathers' Education	3.698 (3018, 3)	.269	4.339 (3018, 3)	.227	5.065 (3018, 3)	.167	.218 (3018, 3)	.975
Child Sex	1.037 (3045, 1)	.309	.536 (3045, 1)	.468	1.011 (3045, 1)	.315	.352 (3045, 1)	.553
Relationship Status	.144 (3045, 1)	.930	3.333 (3045, 2)	.189	12.053 (3045, 2)	.002	.902 (3045, 2)	.637
Random Assignment	2.770 (3045, 1)	.096	.161 (3045, 1)	.668	.311 (3045, 1)	.577	.621 (3045, 1)	.431
Race/Ethnicity	1.826 (3045, 2)	.401	3.020 (3045, 2)	.221	.385 (3045, 2)	.825	3.316 (3045, 2)	.190
Primary Language	.329 (3044, 2)	.848	2.874 (3044, 2)	.238	.336 (3044, 2)	.845	.214 (3044, 2)	.899
Employment Status	.469 (3039, 2)	.791	2.283 (3039, 2)	.319	1.369 (3039, 2)	.504	2.778 (3039, 2)	.249

Figure 7. The BSF study profile



## Measures

### Adult Measures

*Paternal Depressive Symptoms.* Depressive symptoms were measured by a 12-item version of the Center for Epidemiologic Studies Depression Scale (CES-D, Radloff, 1977). At the 36 month survey, fathers were asked to report the frequency of experiencing depressive symptoms in the past week on a four-point response scale ranging from rarely or none of the time (0) to most or all of the time (3). Examples of items are: “I was bothered by things that usually don’t bother me,” “I could not shake off the blues even with help from my family or friends,” “I had trouble keeping my mind on what I was doing,” “I felt depressed,” and “I could not get going.” Responses across all items are summed to create a composite score; the possible range of scores is between 0 and 36, where a higher score represents greater depressive symptoms. The CES-D has been validated in a nationally representative sample of married couples and has been shown to have good reliability (Cabrera, Hoffert, & Chae, 2011). The internal consistency of CES-D in the present study was also good with a Cronbach’s alpha of .92.

*Paternal Involvement.* Father involvement was measured via 12 daily activities that aim to assess three dimensions of socio-cognitive activities with children: fathers’ engagement in caregiving activities, fathers’ engagement in physical play, and fathers’ engagement in cognitive and social play. Fathers’ engagement in caregiving activities consisted of three items: “helped child to get dressed,” “changed child’s diaper or helped him/her use the toilet,” and “fed child or gave him/her something to eat.” Four items were used to assess fathers’ engagement in cognitive and social play and five items assessed fathers’ engagement in physical play. Items for engagement in cognitive and social play included: “sung songs with child,” “read or looked at books with child,” “told stories to child,” and “played games or with toys with child.” For

engagement in physical play, items consisted of: “rolled a ball, tossed a ball, or played games with a ball with child,” “took child for a ride on your shoulders or back,” “playfully turned child upside down or tossed her or him up in the air,” “played chasing games with child,” and “played outside in the yard, a park, or a playground with child.” At the 36 month follow-up survey, fathers reported the frequency of their engagement with the focal child during the past month using one of six responses (not at all=0, rarely=1, a few times a month=2, a few times a week=3, about once a day=4, and more than once a day=5). Item scores were added to form a total score for each measure.

In prior work that employed these scales at the national level (e.g., Fragile Families and Child Wellbeing Study and the National Evaluation of Early Head Start Study) internal consistency was good (Anderson, Aller, Piercy, & Roggman, 2015). In the BSF study, the internal consistency for fathers’ engagement in caregiving activities was .90, for fathers’ engagement in physical play it was .89, and for fathers’ engagement in cognitive and social play it was .91.

*Economic Hardship.* Fathers were asked to report their experience of economic difficulties within the past 12 months using three-binary response questions (1=yes, 0=no) at the 15 month survey. The items are: “You could not pay the full amount of the rent or mortgage that you were supposed to pay,” “Service was turned off by the water, gas, or electric company, or the oil company would not deliver oil because you could not afford to pay the bill,” and “You were evicted from your home or apartment because you could not pay the rent or mortgage.” Of the sample fathers, 32.1 % were reported to have difficulty paying the full amount of the rent or mortgage, 14.8 % were reported to have difficulty paying bills, and 5.6 % reported being evicted. A composite score was created by summing all of the responses across items.

## Childhood Outcome Measures

*Behavior Problems.* Because it has been established that the impairment of healthy child development can lead to later adjustment problems in children (Connell & Goodman, 2002), fathers and mothers were asked to rate their children's behavior problems using 26 items from a modified version of the Behavior Problem Index (BPI) (Zill, 1985; Peterson & Zill, 1986) at the time of the 36 month assessments. The BPI is a well-standardized behavioral measure describing children's total internalizing and total externalizing behaviors. Items are rated on a three-point scale from (0) never true to (2) often true of the child. Examples of items for internalizing behavior are: "feels or complains that no one loves him/her," "is too fearful or anxious," "has difficulty concentrating or cannot pay attention for long," and for the externalizing behaviors items include: "bullies or is cruel or mean to others," "cheats or tells lies," "breaks things on purpose or deliberately destroys his/her own or another's things," "has very strong temper or loses it easily," and "is restless or overly active or cannot sit still." Composite scores were computed by summing the average of mothers' and fathers' responses across the internalizing and externalizing behavior items, respectively. In their large nationally representative sample study, Guttmanova, Szanyi, and Cali (2008) found good internal consistency for internalizing and externalizing behaviors with Cronbach's alpha coefficients of .78 and .89, respectively. In the current study, internal consistency was also good: .83 for internalizing behavior and .84 for externalizing behavior.

## Covariates

Because family structure, race-ethnicity, household crowdedness, and socio-economic status are associated with co-parental relationships, spousal/partner relationships and fathers' involvement with and the nature of father-child relationships (Palkovitz, Fagan, & Hull, 2013;

Poole, Speight, O'Brien, Connolly, & Aldrich, 2014; Roggman et al., 2013), the following variables were considered as covariates.

*Family Structure.* Three sets of dummy coded variables were created to assess family structure from the 15-month assessments: father lived with the focal child's mother all of the time (not married) (0=no, 1=yes), father lived with the focal child's mother some of the time (0=no, 1=yes), and father was married to the focal child's mother (0=no, 1=yes).

*Other parent, child and household characteristics.* Fathers were asked to report on their and their children's age (in years), the number of children in the household, education level (at least high school, GED, or equivalence=1), and child gender (1=boy).

*Program Participation and Content.* The BSF program offered parenting and relationship skills education classes to the study participants (OPRE Report, 2012, 28C). The BSF programs had three main components; individual-level support from family coordinators, instruction in skills for healthy relationships and marriage, and assessment and referral to family support services. For the healthy relationship and marriage component, eight sites of BSF programs implemented one of the three different programs: Loving Couples, Loving Children (Gottman & Gottman, 2005), Love's Cradle (Ortwein & Guerney, 2005), and the Becoming Parents Program (Jordan, 2005). The BSF sites selected one of the three programs based on their organizational structure, resources, and the needs of the community they served. These sites delivered relationship skills education that focused on communication, conflict management, affection, intimacy, trust, and commitment, and parent-infant relationship. Across the eight sites of the BSF program, the classes ranged from 30 to 42 hours. The BSF sites also selected how to implement the family coordinator and support services component. Thus, the role of the family coordinator differed by BSF site. BSF program sites offered various incentives or gifts for

program participants. Further, in order to reduce barriers for program participation, all sites offered childcare or reimbursement for childcare expenses, transportation, meals and snacks. Regardless of how many hours of classes were offered, fathers who attended at least one session of the relationship skills education classes were classified as compliers, whereas fathers who did not attend any of the classes were classified as non-compliers. Among fathers who were in the BSF program group, 44.9 % did not attend any sessions and 50.1% attended at least one session of the parenting or relationship skills education classes.

### **Analytical Strategies**

#### **Missing Data**

Data were screened to assess the distribution of scores across variables and to determine missing response patterns. Missing data assumptions were examined in order to find its association with the outcome variables using fathers' socio-demographic characteristics at baseline. According to Rubin (1976), there are three missing data mechanisms: missing completely at random (MCAR), missing at random (MAR), and missing not at random (MNAR). The MNAR assumption refers to the probability that missing data depends on unobserved variables and cannot be ignorable. The MCAR refers to an unsystematic missingness, which refers to the probability that missing data on one variable does not depend on observed or unobserved variables. Under the MCAR, missing data can be completely ignorable. The MAR assumption refers to the probability that missing data on one variable does not depend on unobserved variables, which suggests that missing data might be related to some covariates. However, if an analytical approach includes essential socio-demographic variables, the estimated values for missing cases will be unbiased under the MAR assumption. In order to assess whether the missing data depends on some covariates in the BSF selected sample, comparisons were

conducted between fathers who responded and those who did not respond to the 15-month and 36-month assessments on baseline socio-demographic characteristics (Table 2). Of the sample fathers, between 0.1% and 9.7% did not respond to the 36-month assessment. There were no significant differences between fathers who responded and did not respond to the 15-month and 36-month assessments on baseline socio-demographic characteristics. Therefore, multiple imputation was employed using Bayesian estimations, as suggested by Enders (2010). The Bayesian approach addresses the missing data as unknown parameters, which allows for an estimate of the probability distributions. The R statistical programming environment (R Development Core Team, 2012) was used for data imputations. The Bayesian Bootstrap Predictive Mean Matching multiple imputation method within the R packages of “Baboon” (Meinfelder & Schnapp, 2015) was used to create 20 sets of imputed datasets.

### **Measurement Model**

A Bayesian confirmatory factor analysis was employed to assess the accuracy of the measurement model across European American, African American, and Hispanic American families. The Bayesian approach addresses each parameter in the model, unknown and random, and provides a distribution of values for population parameter instead of a true value. According to Muthen and Asparuhov (2012), the underlying substantive theory of confirmatory factor analysis can be represented more adequately with the Bayesian approach due to its flexibility of allowing approximate zero cross-loadings. In other words, a traditional confirmatory factor analysis assumes there are no cross-loadings or that the cross-loadings are exactly equal to zero, which assumes the equality of factor loadings across groups. The Bayesian approach allows for a small number of cross-loadings and constrains some cross-loadings to be approximately equal (see Muthen & Asparuhov, 2012 for a detailed and technical discussion).



Two sets of analyses were conducted to test measurement invariance for each of the measures across African Americans, European Americans, and Hispanic Americans. First, the least restrictive model, in which the magnitude of factor loadings, intercepts, and variances were allowed to vary across groups, was assessed. Next, the most restrictive model, in which the magnitude of factor loadings, intercepts, and variances were constrained to be equal across groups, was assessed. Based on posterior predictive model fit, the partial measurement invariance was assessed to investigate the difference between groups. Fathers' depressive symptoms, engagement in caregiving activities, engagement in physical play, and engagement in social and cognitive activities, along with fathers' economic hardship and children's internalizing and externalizing behaviors were included into multiple group confirmatory factor analysis across the three groups.

As described by van de Schoot et al. (2014), model accuracy was investigated with posterior distribution by using the Markov Chain Monte Carlo (MCMC) method. MCMC is a stochastic simulation technique *“for estimating by simulation the expectation of a statistic in a complex model. Successive random selections form a Markov chain, the stationary distribution of which is the target distribution. The Gibbs sampler is a special case in which the proposal distributions are conditional distributions of single components of a vector parameter. It is particularly useful for the evaluation of posterior distributions in complex Bayesian models”* (Gilks, 2005). Multiple chains of the Gibbs sampler was requested and comprised 50,000 iterations, where the first 25,000 will be discarded as burn-in and the remaining 25,000 will be used to estimate the posterior distribution. Chain convergence was monitored by using potential scale reduction factor (PSR), in which PSR less than 1.01 indicates model convergence, and trace and density, autocorrelation, and posterior predictive checking scatter plots were reported.

Non-informative priors were used and model fit was assessed by using Posterior Predictive P-value (PPP), and a 95% confidence interval for difference between the observed and replicated chi-square value. A Chi-square value around zero with 95% Credible Intervals that encompasses zero and a PPP value around .50 indicate good model fit, whereas larger chi-square values with 95% Credible Intervals that do not encompass zero and a PPP value less than .05 indicate poor model fit (Zyphur & Oswald, 2013). Posterior means, posterior standard deviations, and 95% credible intervals were computed and are reported.

### **Group Comparison**

A Bayesian random effect ANOVA-like model was employed to assess the difference between the BSF complier, non-complier, and control groups on the paternal and child variables across the eight BSF intervention sites. For paternal variables, five comparisons were conducted by using paternal depressive symptoms, economic hardship, and fathers' engagement in physical play, social and cognitive activities and caregiving activities. For child variables, two comparisons were conducted by using children's internalizing and externalizing behavior scores. The "BANOVA" package (Dong & Wedel, 2016) within R programming was used and posterior means, posterior standard deviations, and 95% credible intervals, trace and density plots are reported. Chain convergence was monitored by the Geweke and the Heidelberg and Welch convergence diagnostics. The Geweke diagnostics test for equality of the means of the first and last part of a Markov chain and the Heidelberg and Welch diagnostics test the null hypothesis that the sampled values come from a stationary distribution.

### **Path Analysis**

In order to examine whether compliance status moderated the associations between paternal economic hardship and children's internalizing and externalizing behaviors via paternal

depressive symptoms and engagement with children, two sets of analyses were conducted across compliers, non-compliers, and control groups. First, the least restrictive model was assessed, in which the magnitude of intercepts, slopes, and variances were allowed to vary across groups. Next, the most restrictive model was assessed, in which the magnitude of intercepts, slopes, and variances were constrained to be equal across groups. Paternal economic hardship and the covariates were entered in the model as exogenous variables, whereas children's internalizing and externalizing behaviors were entered as endogenous variables. Fathers' depressive symptoms, engagement in physical play, social and cognitive activities, and caregiving activities were entered as mediators in the model. Bayesian estimates were used in the least restricted and fully restricted models. Although the Bayesian method increases computational time due to its iterative sampling technique, Yuan and McKinnon (2009) argue that Bayesian analysis has many advantages over frequentist estimates for testing indirect effects, such as calculating credible intervals for indirect effects and not imposing restrictive normality assumptions on sampling distribution. The Bayesian approach also provides a range of estimates, which protects against overstating unlikely results compared to traditional mediation approaches (van de Schoot et al., 2014).

Multi-group Bayesian path analysis modeling was also employed to assess whether race/ethnicity moderated the associations between paternal economic hardship and children's internalizing and externalizing behaviors via paternal depressive symptoms and engagement with children. In addition to the compliance status, the model was tested with race/ethnicity categories. To examine the total, direct and indirect effects, the convergence criteria for MCMC chains were assessed. Model fit was assessed by using Posterior Predictive Checking (PPC), and 95% credible interval for the difference between the observed and replicated chi-square value.

Posterior means, posterior standard deviations, and 95% credible intervals were computed and are reported. Trace and density, autocorrelation, and posterior predictive checking scatterplots were constructed.

## Chapter 5: Results

This chapter begins with an assessment of cultural equivalence of the main measures employed in this study, after which, the methods of analysis and the findings are presented below each of the hypothesis tested. For convenience and to better interpret Bayesian statistical parameters, the posterior parameter trace plots are presented in the appendices and the posterior predictive checking scatterplots and distribution plots, and distributions of posterior parameters are presented in text.

### Measurement Model

#### Depressive Symptoms and Father Involvement

A Bayesian confirmatory factor analysis was conducted to assess the factor structure of paternal depressive symptoms and the father involvement measures across European American, African American, and Hispanic American fathers by using non-informative priors for factor loadings ( $N \sim 0, 0.01$ ) and informative, small variance priors for cross loadings and residual covariances. Four factors in the model were specified: 12 items used to assess depressive symptoms, 3 items used to assess father involvement in caregiving activities, 4 items used to assess father involvement in social and cognitive activities, and 5 items used to assess father involvement in physical play. The least restrictive model (Model 1a), in which the magnitude of factor loadings, intercepts and variances were allowed to vary across groups, showed a poor predictive model fit. The 95% CIs for the difference between the observed and replicated chi-square values did not cover zero [1000.562, 1296.203] and the posterior predictive p-value was 0.000. In the matching scatterplot, the majority of the points did not plot along the 45 degree line, indicating an unsatisfactory model fit for the observed data. The most restrictive model showed a better predictive model fit (Model 1b). The 95% CIs for the difference between the

observed and replicated chi-square values covered zero [-63.519, 65.965] and the posterior predictive p-value was 0.500, both indicating good predictive model fit for a fully constrained model. Figure 8 and 9 present the posterior predictive checking scatterplot and distribution plots for Model 1b. The model in which all parameters held equal across groups showed good MCMC convergence. The model convergence was reached after 400 iterations (PSR < 1.01). The posterior parameter trace plots and autocorrelation plots indicated good convergence in distribution. The model fit comparison indicated the factor loadings did not differ by racial-ethnic groups. Factor loadings, posterior standard deviations, and 95% credible intervals for the 12 items used to assess depressive symptoms, 3 items used to assess father involvement in caregiving activities, 4 items used to assess father involvement in social and cognitive activities, and 5 items used to assess father involvement in physical play are presented in Table 3. Factor loadings range from .51 to .77 on the depressive symptoms scale, .42 to .83 on the paternal engagement in social and cognitive activities scale, .57 to .90 on the paternal engagement in caregiving activities scale, and .60 to .73 on the paternal engagement in physical play scale.

Figure 8. Model 1b: Bayesian posterior predictive checking scatterplot

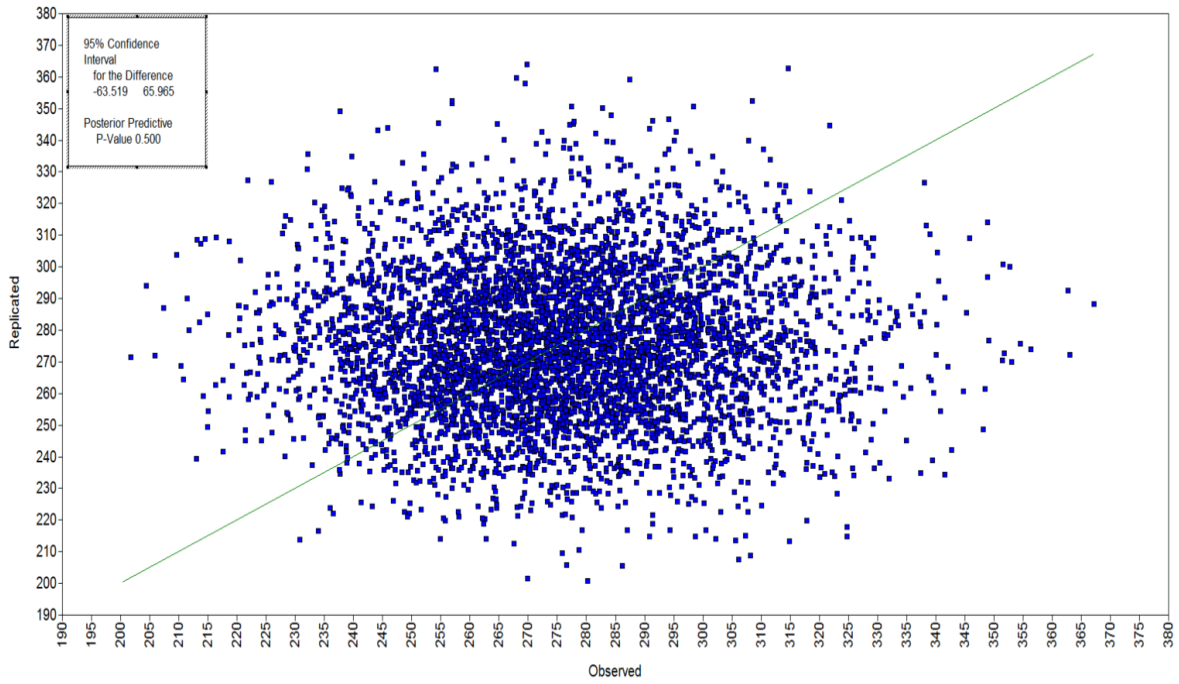


Figure 9. Model 1b: Bayesian posterior predictive checking distribution plot

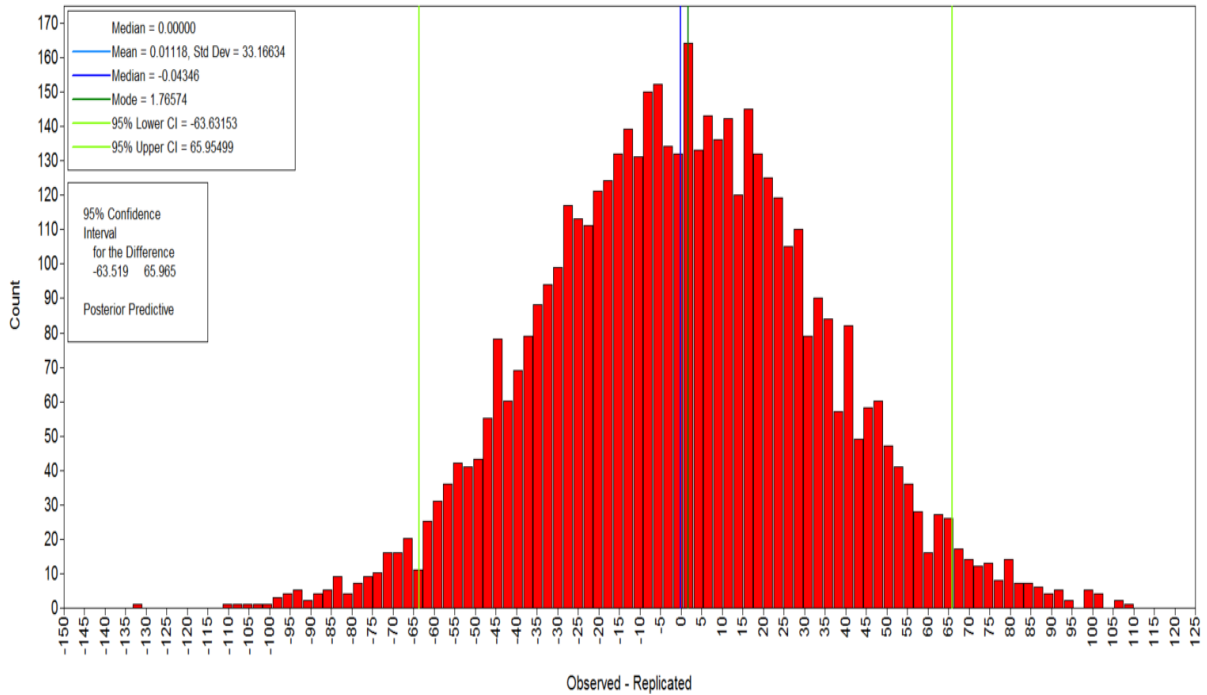


Table 3. Model 1b: Factor loadings

Depressive Symptoms	Standardized Lambda	Posterior S.D	95 % Credible Intervals	
			Lower 2.5%	Upper 2.5%
Item 1	0.517	0.071	0.364	0.651
Item 2	0.615	0.058	0.487	0.722
Item 3	0.704	0.054	0.586	0.798
Item 4	0.678	0.057	0.561	0.779
Item 5	0.761	0.049	0.648	0.844
Item 6	0.545	0.098	0.326	0.720
Item 7	0.545	0.057	0.435	0.656
Item 8	0.683	0.068	0.545	0.809
Item 9	0.695	0.053	0.588	0.795
Item 10	0.723	0.056	0.606	0.828
Item 11	0.770	0.052	0.655	0.857
Item 12	0.685	0.051	0.575	0.773
Engagement in social and cognitive activities				
Item 1	0.764	0.110	0.513	0.952
Item 2	0.809	0.088	0.621	0.969
Item 3	0.836	0.086	0.662	1.000
Item 4	0.429	0.116	0.217	0.681
Engagement in caregiving activities				
Item 1	0.744	0.096	0.553	0.931
Item 2	0.905	0.086	0.708	1.052
Item 3	0.578	0.102	0.395	0.793
Engagement in physical play				
Item 1	0.638	0.111	0.412	0.848
Item 2	0.760	0.115	0.510	0.965
Item 3	0.600	0.153	0.302	0.905
Item 4	0.739	0.101	0.512	0.921
Item 5	0.660	0.127	0.336	0.871



## Economic Hardship

Similarly, a Bayesian confirmatory factor analysis was conducted to assess the factor structure of paternal economic hardship across European American, African American, and Hispanic American fathers by using noninformative priors for factor loadings. A one factor model with three categorical indicators was specified. The unconstrained model showed a poor predictive model fit (Model 2a). The 95% CIs for the difference between the observed and the replicated chi-square values did not cover zero (1291.328, 1406.203, respectively) and the posterior predictive p-value was 0.000. The fully constrained model showed a better predictive model fit (Model 2b). The 95% CIs for the difference between the observed and replicated chi-square values covered zero [-68.462, 78.987] and the posterior predictive p-value was 0.482, both indicating good predictive model fit for a fully constrained model. Figure 10 and 11 present the posterior predictive checking scatterplot and distribution plots for Model 2b. The model fit comparison also indicated that the factor loadings did not differ by racial-ethnic groups. The matching scatterplot indicated satisfactory model fit for the observed data. The fully constrained model showed good MCMC convergence and the model convergence was reached after 600 iterations (PSR <1.010). The factor loadings range from .62 to .98 for the economic hardship measure (Table 4).

Table 4. Model 2b: Factor loadings

Economic Hardship	Standardized Lambda	Posterior S.D	95 % Credible Intervals	
			Lower 2.5%	Upper 2.5%
Item 1	0.981	0.118	0.824	0.993
Item 2	0.622	0.139	0.321	0.852
Item 3	0.695	0.113	0.419	0.848

Figure 10. Model 2b: Bayesian posterior predictive checking scatterplot

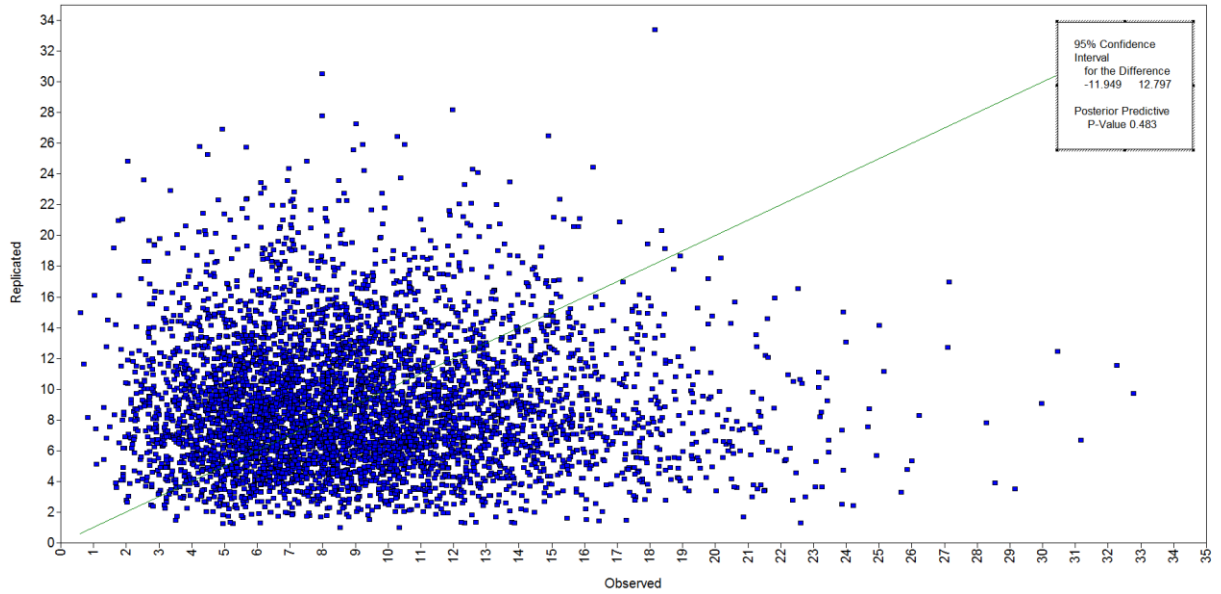
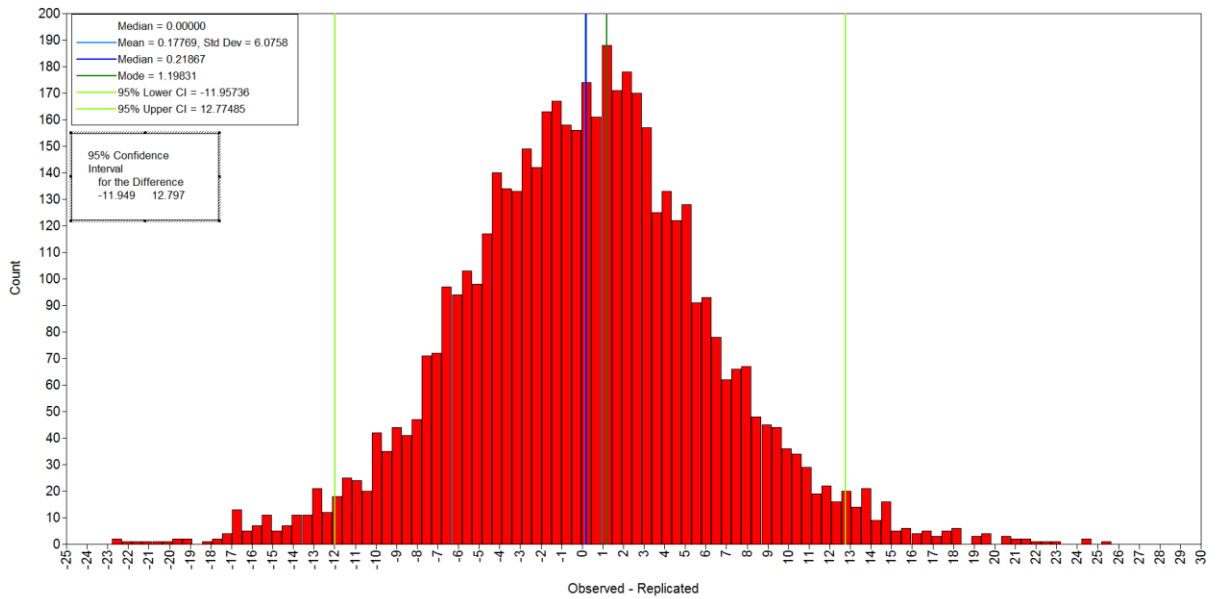


Figure 11. Model 2b: Bayesian posterior predictive checking distribution plot



## Children's internalizing and externalizing behaviors

Finally, a Bayesian confirmatory factor analysis was conducted to assess the factor structure of children's internalizing and externalizing behaviors across European American, African American, and Hispanic American fathers by using non-informative priors for factor loadings ( $N \sim 0, 0.01$ ) and informative, small variance priors for cross loadings and residual covariances. Two factors on the model were specified: 13 items representing internalizing behavior and 14 items representing externalizing behavior. The least restrictive model showed a poor predictive model fit (Model 3a). The 95% CIs for the difference between the observed and replicated chi-square values did not cover zero [1231.328, 1460.208] and the posterior predictive p-value was 0.000. The most restrictive model showed a better predictive model fit compared to the least restrictive model, it indicated good posterior prediction (Model 3b). The 95% CIs for the difference between the observed and replicated chi-square values did not cover zero (-78.351, 75.180, respectively) and the posterior predictive p-value was 0.515. One item on the internalizing behavior factor and one item on the externalizing behavior factor included zero in the 95% credible intervals in both the fully constrained and unconstrained model and were thus dropped from the analysis. After removing these items, the 95% CIs for the difference between the observed and replicated chi-square values also covered zero (-78.391, 74.731, respectively) and the posterior predictive p-value was 0.509, both indicating good predictive model fit for a fully constrained model (Model 3c). Figure 12 and 13 present the posterior predictive checking scatterplot and distribution plots for Model 3c. Model convergence was reached after 600 iterations ( $PSR < 1.01$ ) and the matching scatterplot demonstrated satisfactory model fit. The model fit comparison also indicated that the factor loadings did not differ by racial-ethnic

groups. The factor loadings range from .09 to .36 on the internalizing behavior scale and between .21 to .44 on the externalizing behavior scale (Table 5).

Figure 12. Model 3c: Bayesian posterior predictive checking scatterplot

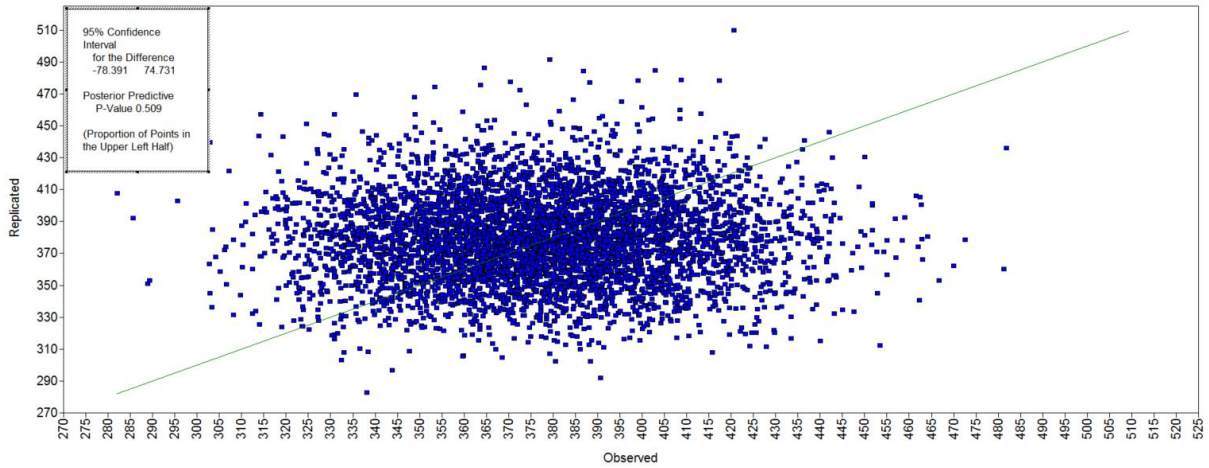


Figure 13. Model 3c: Bayesian posterior predictive checking distribution plot

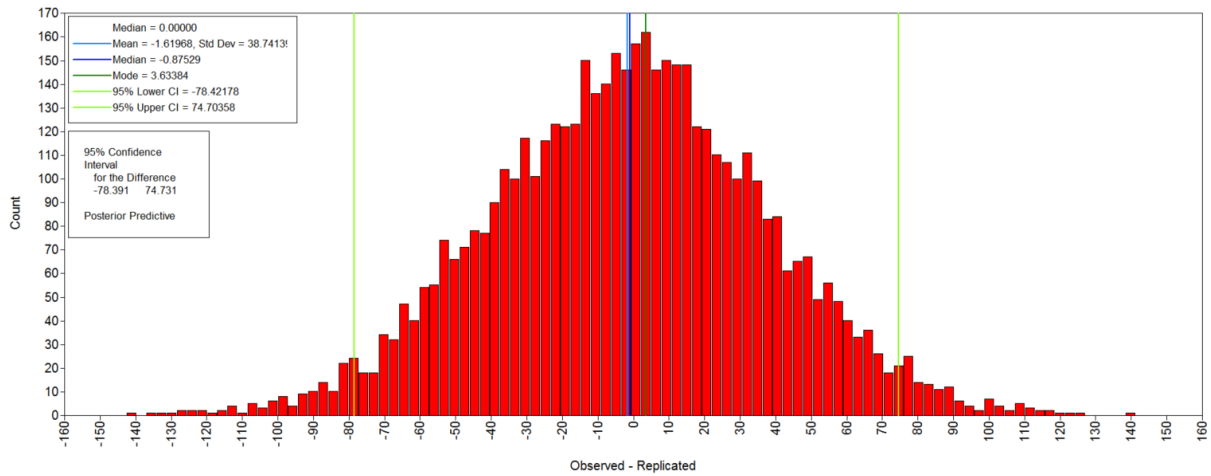


Table 5. Model 3d: Factor loadings

Internalizing Behavior	Standardized Lambda	Posterior S. D	95 % Credible Intervals	
			Lower 2.5%	Upper 2.5%
Item 1	0.096	0.035	0.030	0.170
Item 2	0.252	0.077	0.095	0.405
Item 3	0.327	0.092	0.149	0.516
Item 4	0.213	0.066	0.086	0.346
Item 5	0.089	0.023	0.045	0.134
Item 6	0.211	0.091	0.040	0.399
Item 7	0.179	0.069	0.045	0.318
Item 8	0.099	0.041	0.022	0.184
Item 9	0.184	0.059	0.071	0.304
Item 10	0.365	0.097	0.179	0.558
Item 11	0.303	0.092	0.124	0.480
Item 12	0.194	0.047	0.103	0.289
<hr/>				
Externalizing Behavior				
Item 1	0.260	0.089	0.080	0.431
Item 2	0.212	0.071	0.068	0.352
Item 3	0.340	0.082	0.176	0.497
Item 4	0.362	0.081	0.205	0.527
Item 5	0.299	0.065	0.169	0.426
Item 6	0.353	0.071	0.212	0.492
Item 7	0.231	0.092	0.045	0.413
Item 8	0.367	0.072	0.224	0.509
Item 9	0.445	0.088	0.276	0.621
Item 10	0.436	0.074	0.299	0.592
Item 11	0.432	0.080	0.277	0.593
Item 12	0.241	0.066	0.116	0.379
Item 13	0.374	0.099	0.185	0.572

## **Group Comparison**

Prior to running path analysis, a Bayesian random effect group ANOVA-like analysis (complier, non-complier, and control group) was conducted using non-informative priors to assess group differences in paternal depressive symptoms, economic hardship, and fathers' engagement in physical play, social and cognitive activities, and caregiving activities across the eight sites (see Table 6 for descriptive statistics). The correlations between paternal and child variables for compliers, non-compliers, and control groups are presented in Table 7. Table 8 shows the expected posteriori, posterior standard deviations, 95% credible intervals for posterior probability for the fixed effect and variance component of the random intercept, and the Geweke and the Heidelberger and Welch diagnostics. The 95% credible intervals covered zero indicating that there are no differences between groups on depressive symptoms, economic hardship, and paternal engagement in caregiving activities, social and cognitive activities, and physical play, or on children's internalizing and externalizing behaviors. Figures 14 through 20 present trace and density plots for economic hardship, paternal depressive symptoms, fathers' engagement in physical play, social and cognitive activities, and caregiving activities, and children's internalizing and externalizing behaviors, respectively.

Table 6. Means and standard deviations of study variables

	Non-Complier		Complier		Control	
	Mean	Std. Deviation	Mean	Std. Deviation	Mean	Std. Deviation
Economic Hardship	0.473	0.729	0.514	0.778	0.445	0.724
Depressive Symptoms	5.758	5.612	5.434	5.975	5.999	6.385
Engagement in Social and Cognitive Activities	13.540	3.713	13.297	3.871	13.328	3.856
Engagement in Caregiving Activities	11.326	3.195	11.365	3.223	11.578	3.094
Engagement in Physical Play	15.937	4.724	15.632	4.984	15.629	4.787
Internalizing Behavior	15.297	3.035	14.929	2.889	15.183	3.108
Externalizing Behavior	21.043	4.692	20.991	4.724	21.368	4.780

Table 7. Correlation between study variables

Non-complier	1.	2.	3.	4.	5.	6.
1.Economic Hardship	1.000					
2.Depressive Symptoms	.030	1.000				
3.Engagement in Social and Cognitive Activities	-.033	-.287**	1.000			
4.Engagement in Caregiving Activities	-.066	-.240**	.601**	1.000		
5.Engagement in Physical Play	-.070	-.235**	.581**	.569**	1.000	
6.Internalizing Behavior	.080	.215**	-.148**	-.155**	-.117**	1.000
7.Externalizing Behavior	.047	.145**	-.103*	-.110**	-.091*	.711**
Complier	1.	2.	3.	4.	5.	6.
1.Economic Hardship	1.000					
2.Depressive Symptoms	.117**	1.000				
3.Engagement in Social and Cognitive Activities	-.016	-.161**	1.000			
4.Engagement in Caregiving Activities	.004	-.200**	.598**	1.000		
5.Engagement in Physical Play	.043	-.147**	.647**	.605**	1.000	
6.Internalizing Behavior	.042	.170**	-.104**	-.139**	-.094**	1.000
7.Externalizing Behavior	.047	.153**	-.087**	-.106**	-.100**	.655**
Control	1.	2.	3.	4.	5.	6.
1.Economic Hardship	1.000					
2.Depressive Symptoms	.126**	1.000				
3.Engagement in Social and Cognitive Activities	-.011	-.302**	1.000			
4.Engagement in Caregiving Activities	.029	-.254**	.586**	1.000		
5.Engagement in Physical Play	.014	-.212**	.605**	.548**	1.000	
6.Internalizing Behavior	.037	.189**	-.112**	-.135**	-.060*	1.000
7.Externalizing Behavior	.082**	.169**	-.087**	-.129**	-.059*	.676**

\*\*  $p < .01$ ; \*  $p < .05$

Table 8. Bayesian ANOVA results

		Posterior Mean	Posterior Std. Deviation	Lower 2.5% CI	Upper 97.5% CI	Geweke Diagnostics	Heidelberger and Welch Diagnostic
Economic Hardship	Intercept	.477	.014	.448	.505	.416	.494
	Non-Complier	-.005	.021	-.045	.035	.393	.818
	Complier	.037	.018	.001	.073	.542	.893
Depressive Symptoms	Intercept	5.730	0.11	5.495	5.965	.047	.114
	Non-Complier	.029	.189	-.344	.396	.343	.683
	Complier	-.299	.166	-.621	.034	.533	.246
Engagement in Social and Cognitive Activities	Intercept	13.387	.072	13.250	13.524	.083	.122
	Non-Complier	.146	.115	-.079	.371	.435	.071
	Complier	-.085	.100	-.285	.113	.192	.216
Engagement in Caregiving Activities	Intercept	11.424	.060	11.313	11.546	.586	.289
	Non-Complier	-.097	.096	-.276	.096	.726	.748
	Complier	-.055	.082	-.216	.107	.619	.971
Engagement in Physical Play	Intercept	15.736	.094	15.559	15.927	.447	.841
	Non-Complier	.210	.143	-.072	.510	.099	.169
	Complier	-.108	.128	-.366	.128	.329	.850
Internalizing Behavior	Intercept	15.136	.058	15.024	15.253	.934	.772
	Non-Complier	.161	.091	-.016	.339	.522	.806
	Complier	-.207	.083	-.372	-.043	.989	.954
Externalizing Behavior	Intercept	21.136	0.00	20.960	21.307	.754	.690
	Non-Complier	-.084	.149	-.368	.231	.164	.800
	Complier	-.136	.132	-.418	.116	.341	.932



Figure 14. Trace and density plots for economic hardship

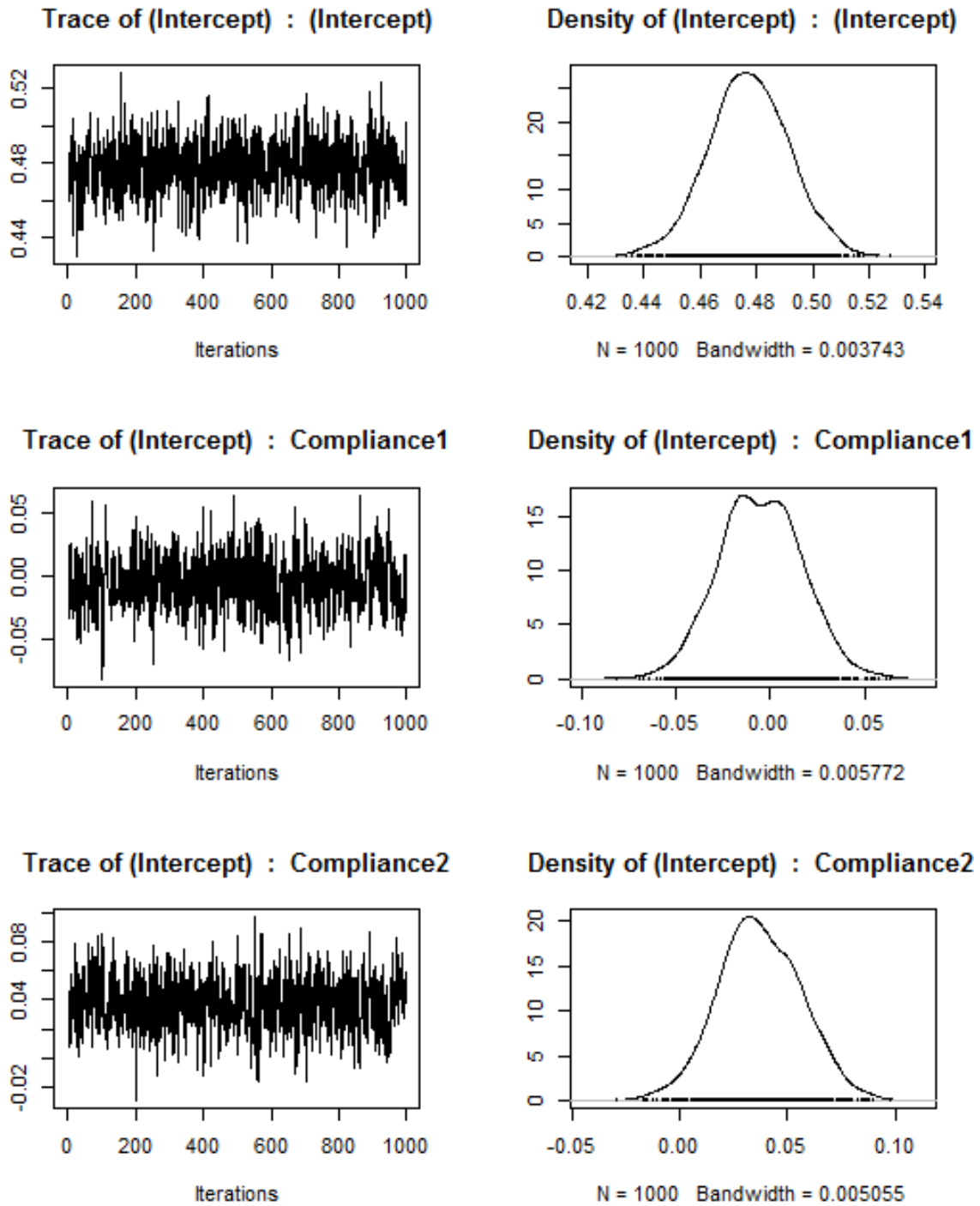


Figure 15. Trace and density plots for depressive symptoms

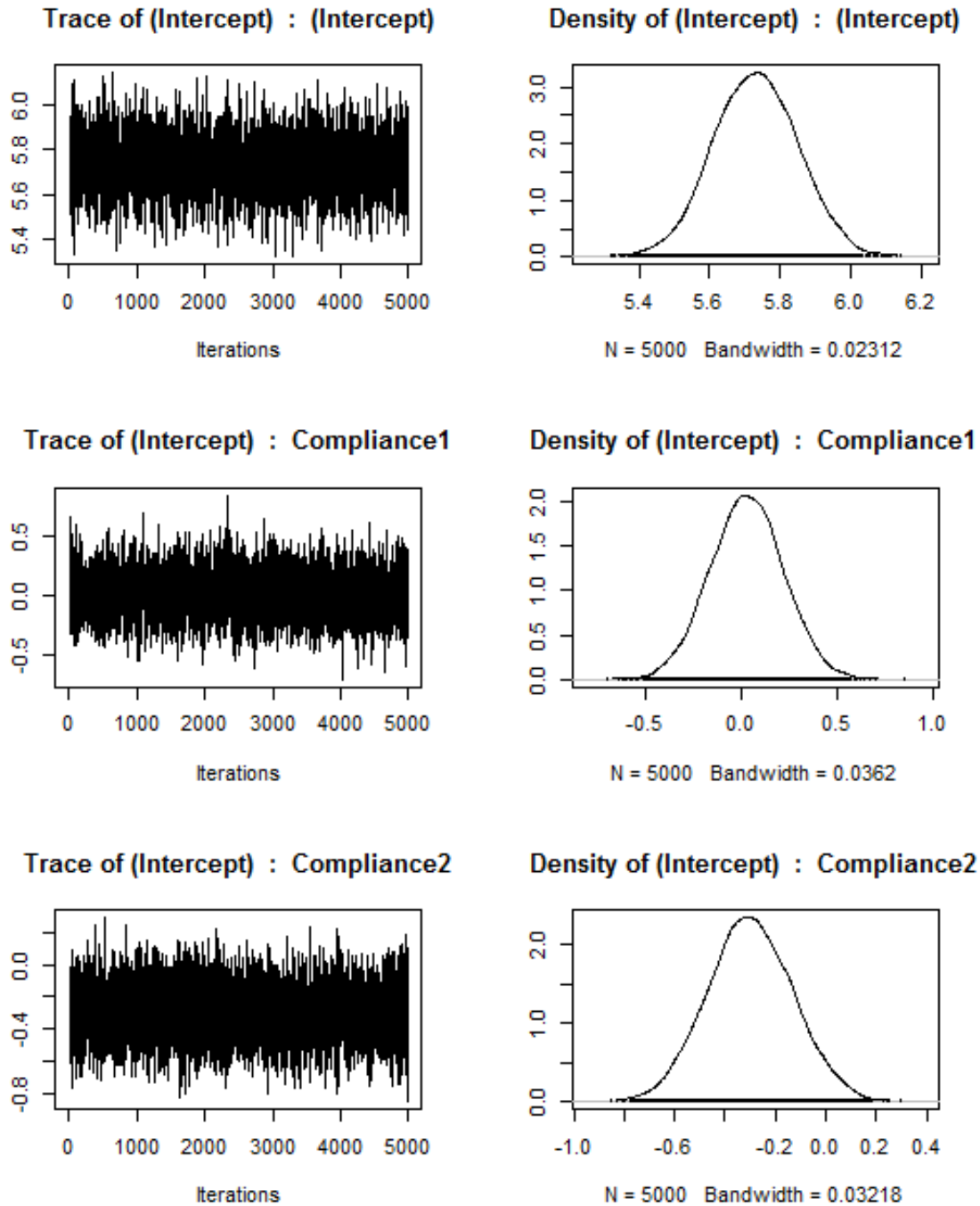


Figure 16. Trace and density plots for paternal engagement in social and cognitive activities

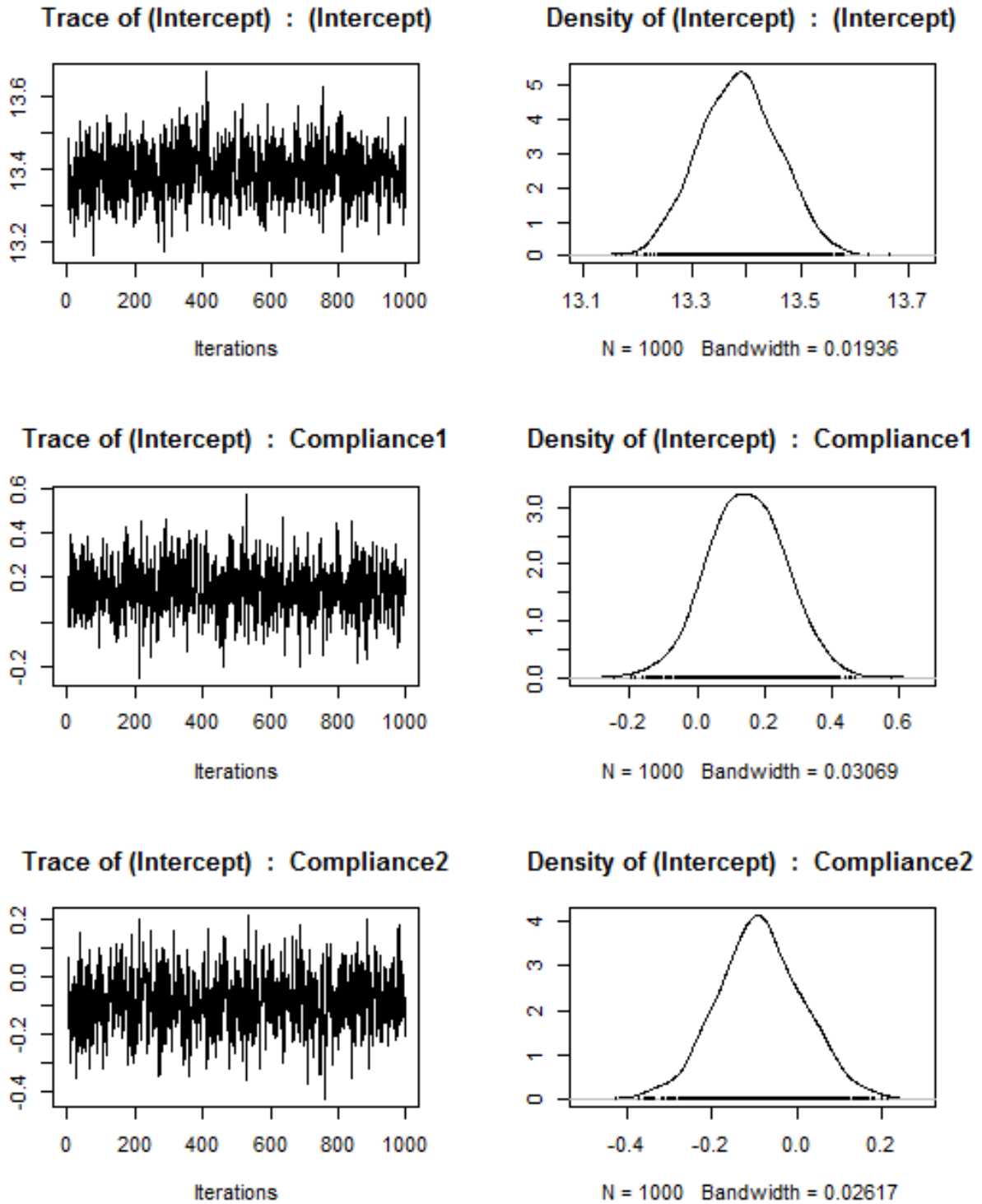


Figure 17. Trace and density plots for paternal engagement in caregiving activities

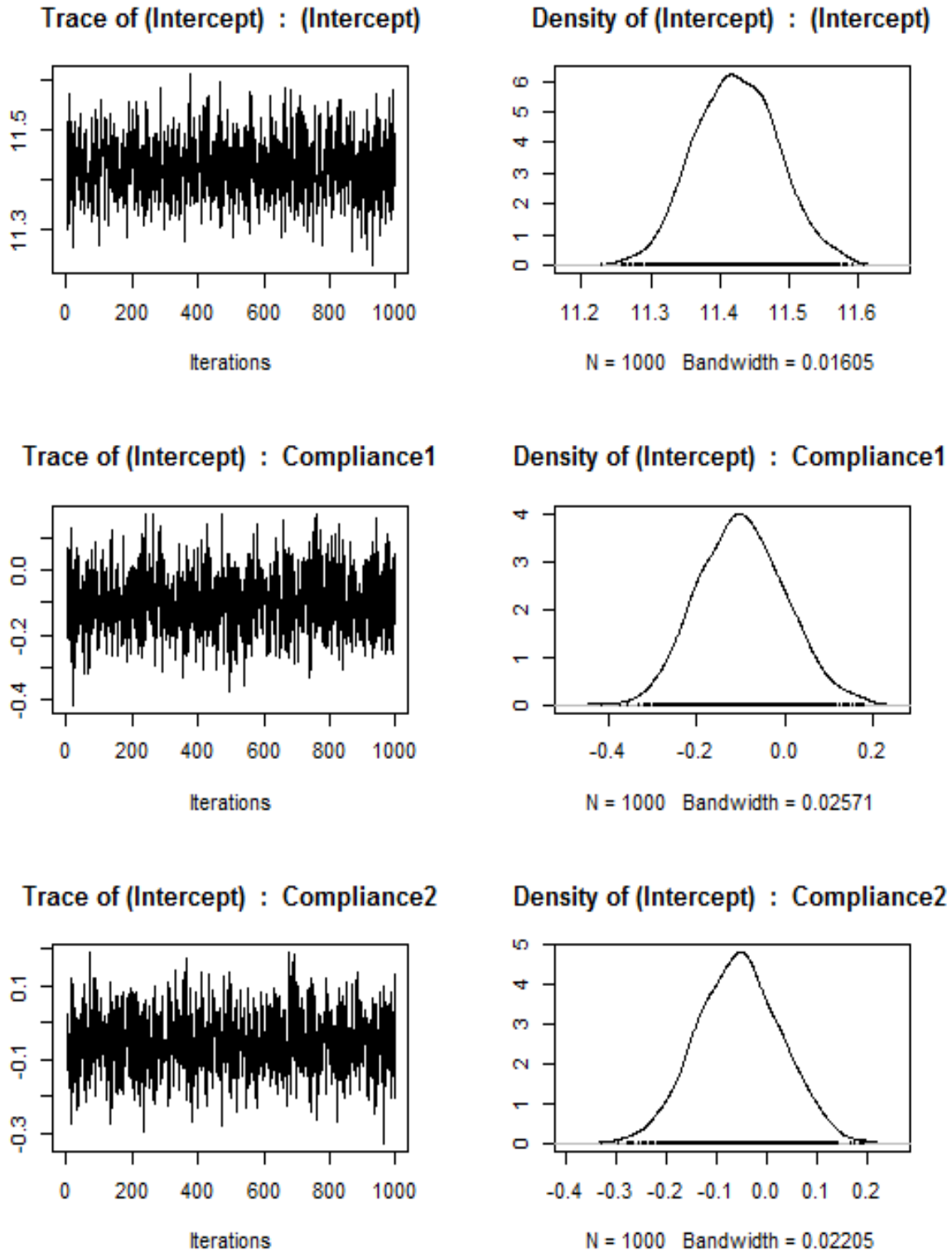


Figure 18. Trace and density plots for paternal engagement in physical play

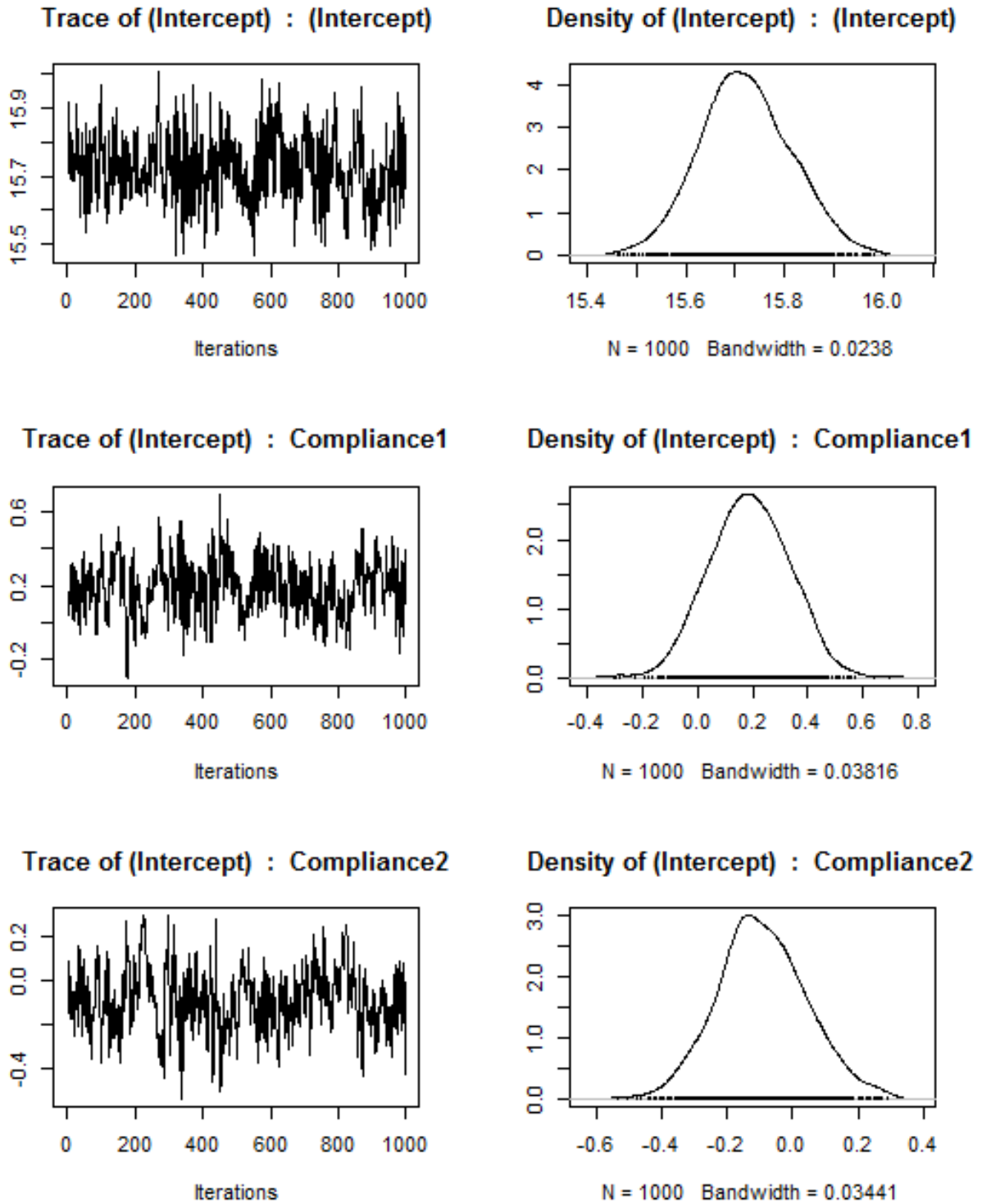


Figure 19. Trace and density plots for internalizing behavior

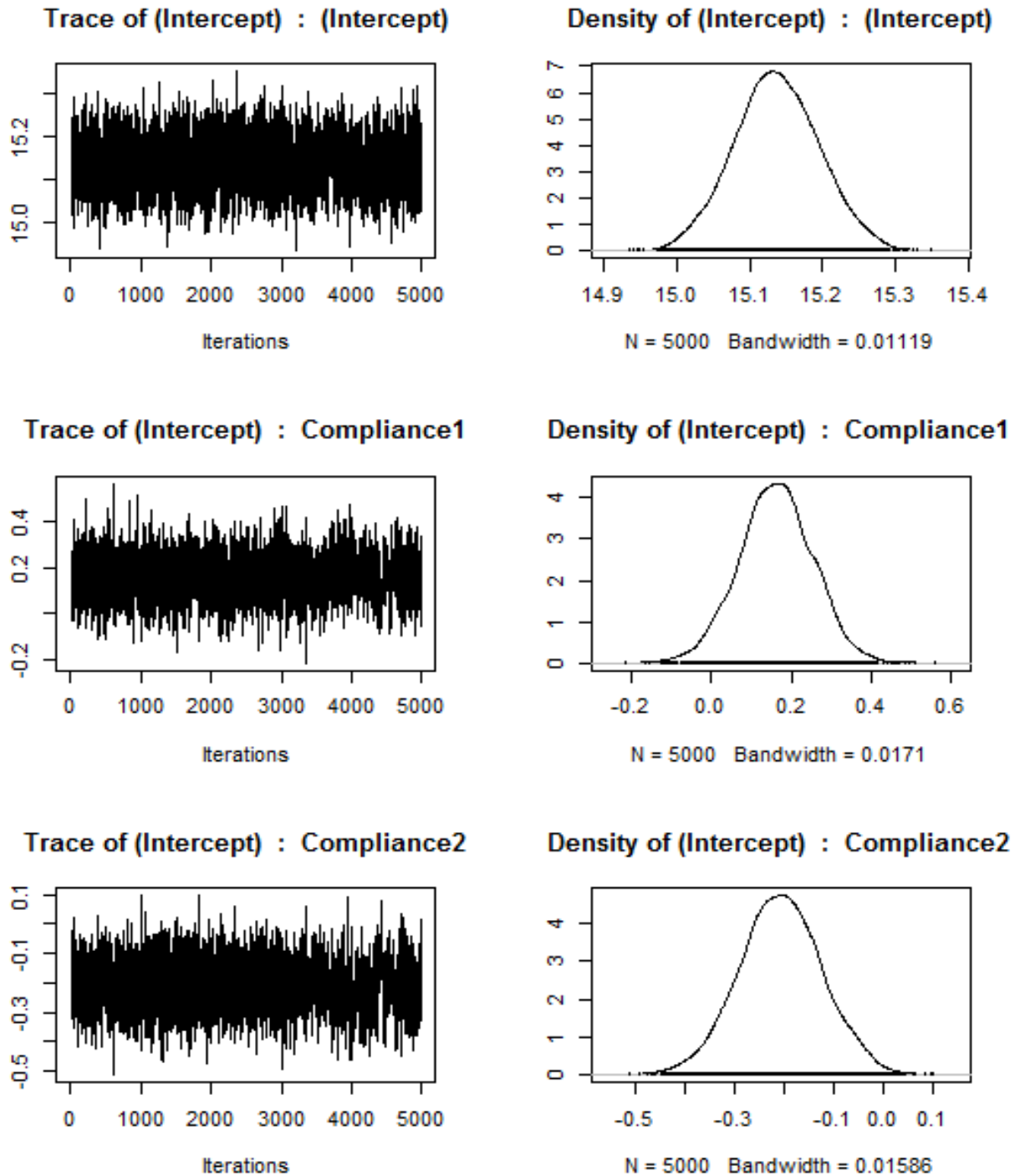
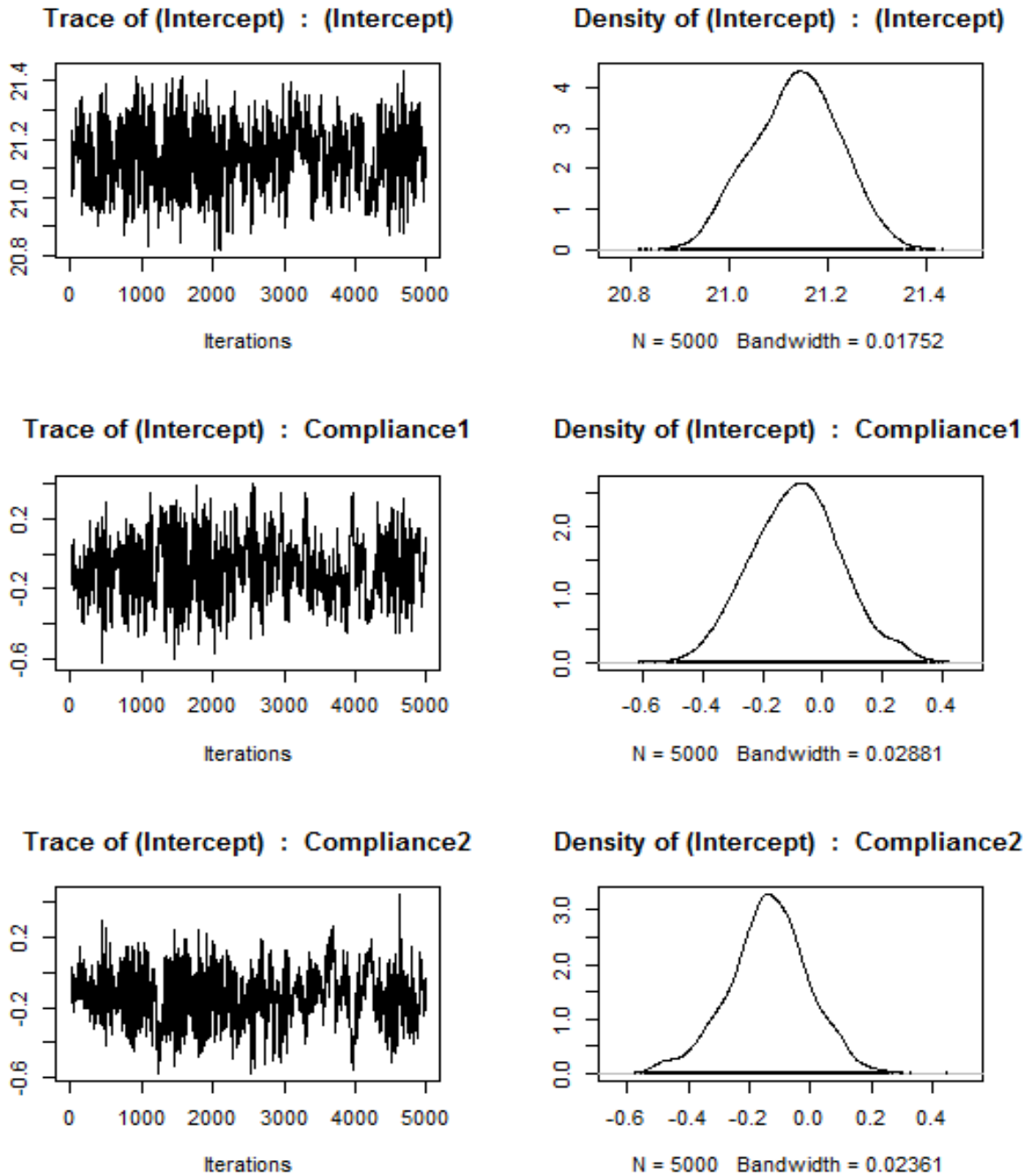


Figure 20. Trace and density plots for externalizing behavior



## Path Analysis

**Research Question 1.** Are there differences in the strength of associations between economic hardship and children's internalizing and externalizing behaviors via paternal depressive symptoms and fathers' engagement in physical play, social and cognitive activities, and caregiving activities for compliers, non-compliers, and controls?

First, a Bayesian multi-group path analysis was conducted using non-informative priors to assess the associations between economic hardship and children's externalizing behavior via paternal depressive symptoms and paternal engagement in social and cognitive activities across the complier, non-complier, and control groups. The estimates were allowed to be free across complier, non-complier, and control groups (Model 4a). The 95% CIs for the difference between the observed and replicated chi-square values for the unconstrained model covered zero [-33.029, 88.853] but the posterior predictive p-value was 0.186 indicating a poor posterior model fit. Model convergence was reached after 1000 iterations ( $PSR < 1.01$ ) and the matching scatterplot demonstrated a poor model fit. There were several pathways between variables that did not differ across groups. Consequently, the model was modified by fixing the pathways of associations between groups (Model 4b). After fixing invariant pathways, the 95% CIs for the difference between the observed and replicated chi-square values for the partially unconstrained model covered zero [-42.483, 75.063] and the posterior predictive p-value was 0.324, both indicating an acceptable posterior model fit (Figure 21-22).



Figure 21. Model 5b: Bayesian posterior predictive checking scatterplot

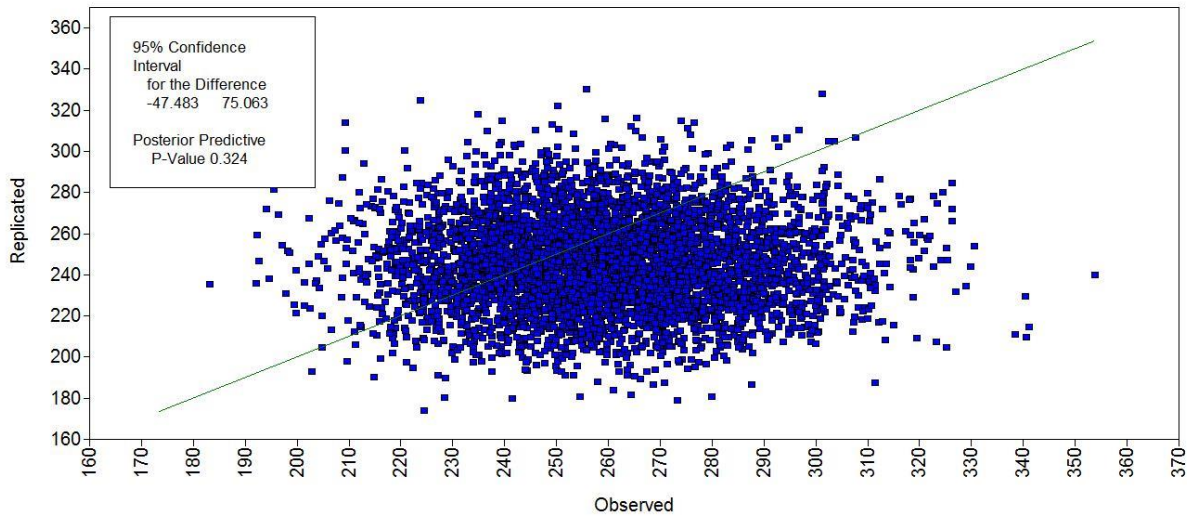
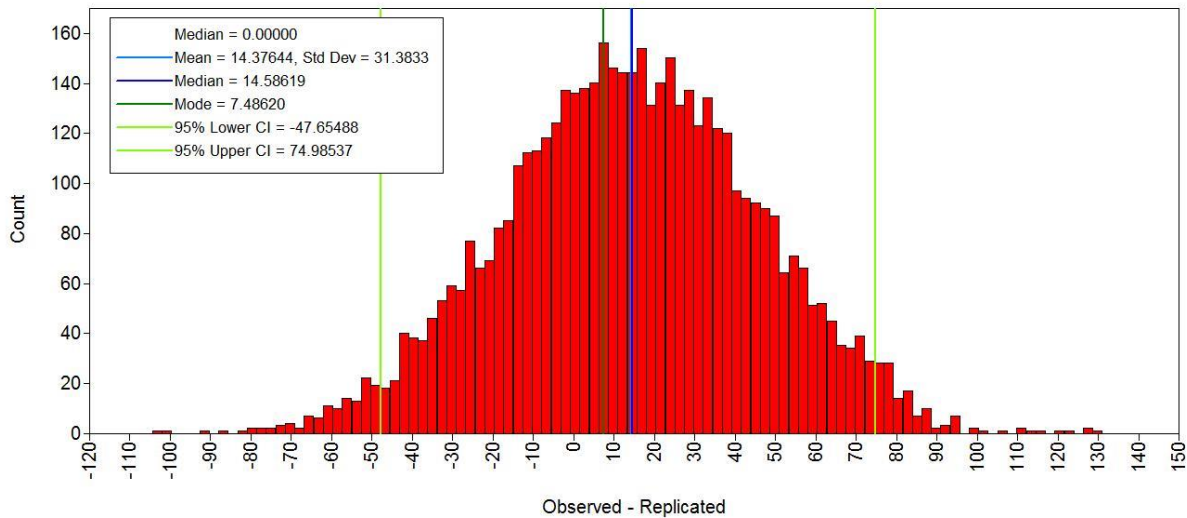


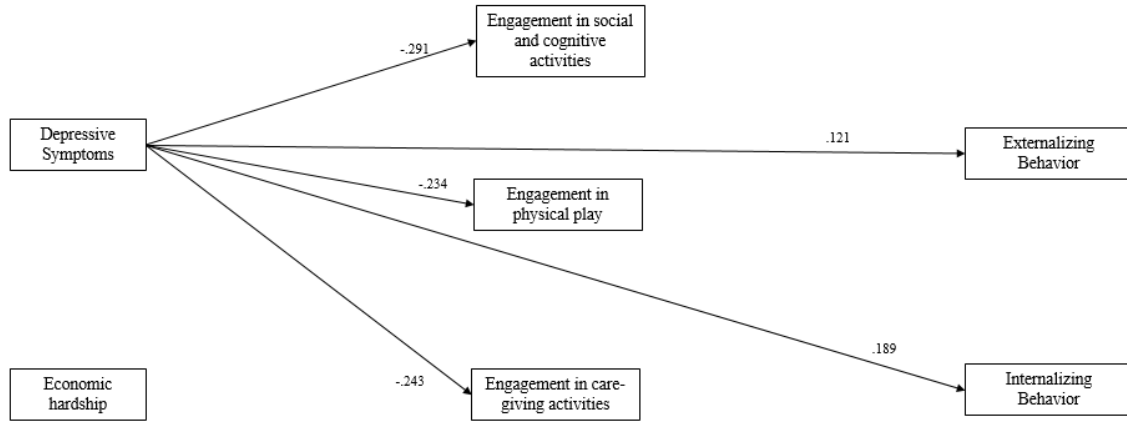
Figure 22. Model 5b: Bayesian posterior predictive checking distribution plot



Model convergence was reached after 900 iterations ( $PSR < 1.01$ ) and the matching scatterplot demonstrated a satisfactory model fit. Across all groups, the direct links between two sociodemographic variables (income/poverty ratio and fathers' education) and paternal depressive symptoms, paternal engagement in caregiving activities, social and cognitive activities, and physical play, and children's internalizing and externalizing behaviors did not differ across groups.

## The BSF Non-Complier Group

Figure 23. Direct associations between study variables for non-complier group

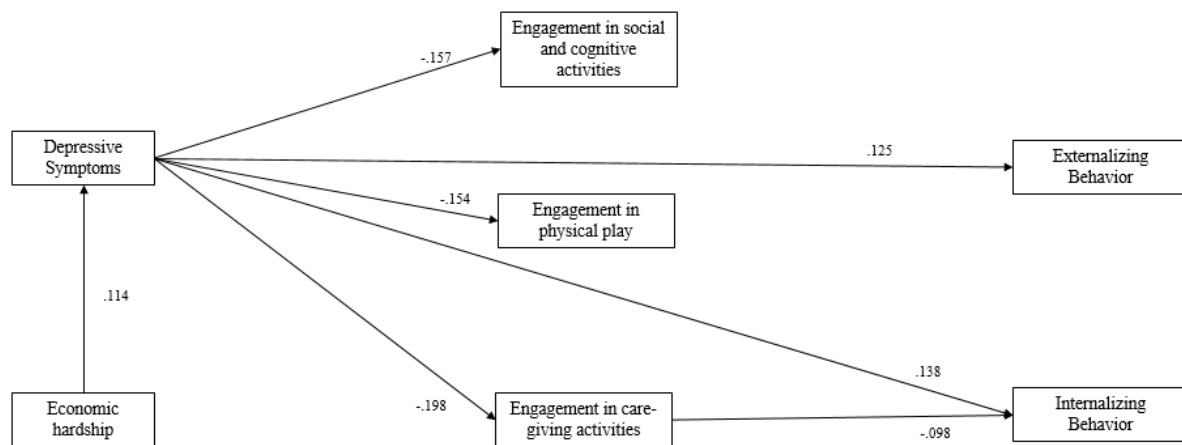


*Direct Effects.* For fathers in the non-complier group, paternal depressive symptoms were negatively associated with paternal engagement in social and cognitive activities, caregiving activities, and physical play (standardized  $\beta = -.291$ , posterior SD = .040, 95% credible intervals [-.367, -.209] (Figure 24a-b),  $\beta = -.243$ , posterior SD = .042, 95% credible intervals [-.323, -.158] (Figure 25a-b), and  $\beta = -.234$ , posterior SD = .042, 95% credible intervals [-.314, -.150] (Figure 26a-b), respectively) and positively associated with children's internalizing and externalizing behaviors ( $\beta = .189$ , posterior SD = .044, 95% credible intervals [.100, .272] (Figure 27a-b) and  $\beta = .121$ , posterior SD = .045, 95% credible intervals [.031, .209] (Figure 28a-b), respectively). Marital status and full-time cohabiting status were positively associated with paternal engagement in social and cognitive activities ( $\beta = .335$ , posterior SD = .149, 95% credible intervals [.043, .623] (Figure 29a-b) and  $\beta = .292$ , posterior SD = .125, 95% credible intervals [.045, .537] (Figure 30a-b), respectively). Full-time cohabiting status was positively associated with paternal engagement in physical play ( $\beta = .278$ , posterior SD = .128, 95% credible intervals [.026, .528] (Figure 31a-b)) and part-time cohabiting status was negatively associated with

externalizing behavior ( $\beta = -.299$ , posterior SD = .137, 95% credible intervals [-.568, -.030] (Figure 32a-b)). Children's sex was negatively associated with internalizing and externalizing behaviors ( $\beta = -.208$ , posterior SD = .079, 95% credible intervals [-.360, -.053] (Figure 33a-b) and  $\beta = -.301$ , posterior SD = .079, 95% credible intervals [-.452, -.145] (Figure 34a-b), respectively).

### The BSF Complier Group

Figure 35. Direct associations between study variables for complier group<sup>1</sup>



*Direct Effects.* For fathers in the complier group, economic hardship was positively associated with paternal depressive symptoms ( $\beta = .147$ , posterior SD = .042, 95% credible intervals [.065, .229] (Figure 36a-b)). As in the non-complier group, paternal depressive symptoms were negatively associated with paternal engagement in social and cognitive activities, caregiving activities, and physical play ( $\beta = -.157$ , posterior SD = .034, 95% credible intervals [-.222, -.091] (Figure 37a-b),  $\beta = -.198$ , posterior SD = .033, 95% credible intervals [-.262, -.132] (Figure 38a-b), and  $\beta = -.154$ , posterior SD = .034, 95% credible intervals [-.219, -.087] (Figure 39a-b), respectively) and positively associated with children's internalizing and externalizing behaviors ( $\beta = .138$ , posterior SD = .034, 95% credible intervals [.071, .204] (Figure

<sup>1</sup> The pathways of associations between the variables did not differ by dosage (high compliance vs low compliance)

640a-b) and  $\beta = .125$ , posterior SD = .035, 95% credible intervals [.056, .191] (Figure 41a-b), respectively). Paternal engagement in caregiving activities was negatively associated with children's internalizing behavior ( $\beta = -.098$ , posterior SD = .044, 95% credible intervals [-.183, -.013] (Figure 42a-b)). Marital status was negatively related to depressive symptoms and paternal engagement in caregiving activities ( $\beta = -.162$ , posterior SD = .063, 95% credible intervals [-.283, -.037] (Figure 43a-b) and  $\beta = .154$ , posterior SD = .062, 95% credible intervals [.031, .275] (Figure 44a-b), respectively). Full-time cohabiting status was associated with depressive symptoms and paternal engagement in caregiving activities ( $\beta = -.141$ , posterior SD = .068, 95% credible intervals [-.273, -.006] (Figure 45a-b) and  $\beta = .174$ , posterior SD = .067, 95% credible intervals [.042, .304] (Figure 46a-b), respectively). Part-time cohabiting status was linked to paternal engagement in caregiving activities ( $\beta = .313$ , posterior SD = .152, 95% credible intervals [.016, .608] (Figure 47a-b)).

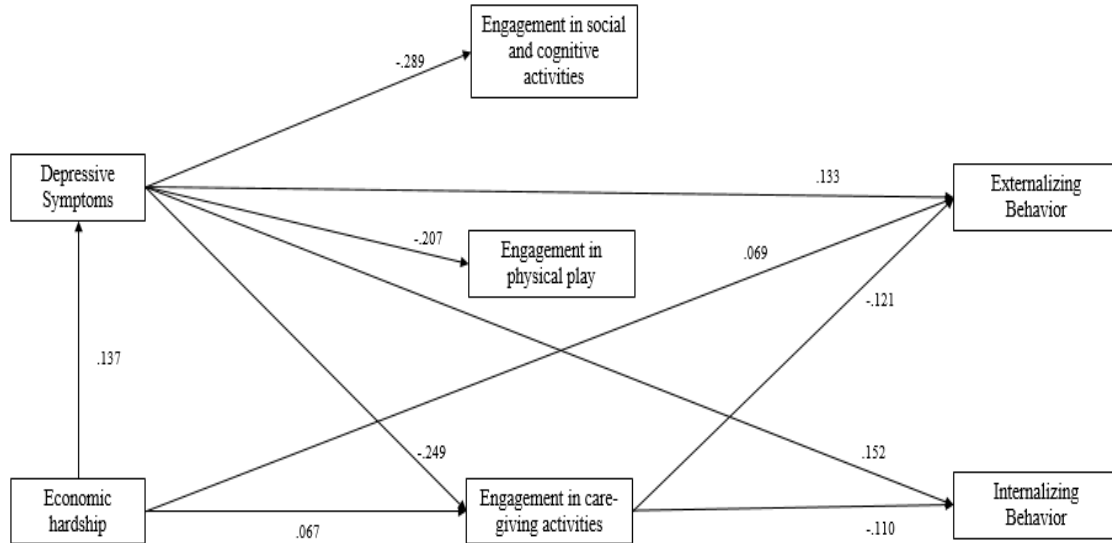
*Indirect Effects.* Economic hardship was negatively associated with paternal engagement in social and cognitive activities, caregiving activities, and physical play indirectly through paternal depressive symptoms ( $\beta_{indirect} = -.088$ , posterior SD = .033, 95% credible intervals [-.164, -.034] (Figure 48a-b),  $\beta_{indirect} = -.094$ , posterior SD = .032, 95% credible intervals [-.165, -.039] (Figure 49a-b), and  $\beta_{indirect} = -.112$ , posterior SD = .043, 95% credible intervals [-.208, -.042] (Figure 50a-b), respectively). The 95% credible intervals for the direct effect of economic hardship on paternal engagement in caregiving activities, social and cognitive activities, and physical play encompassed zero, thus paternal depressive symptoms mediated the associations between economic hardship and paternal engagement in caregiving activities, social and cognitive activities, and physical play.

Paternal depressive symptoms were positively associated with internalizing behavior indirectly through paternal engagement in caregiving activities ( $\beta_{indirect} = .009$ , posterior SD = .004, 95% credible intervals [.001, .019] (Figure 51a-b)). Given that the 95% credible intervals for the direct effect of paternal depressive symptoms on internalizing behavior did not encompass zero, paternal engagement in caregiving activities partially mediated the associations between paternal depressive symptoms and children's internalizing behavior.

Economic hardship was positively associated with internalizing and externalizing behaviors indirectly through paternal depressive symptoms ( $\beta_{indirect} = .058$ , posterior SD = .023, 95% credible intervals [.021, .110] (Figure 52a-b) and  $\beta_{indirect} = .085$ , posterior SD = .036, 95% credible intervals [.028, .168] (Figure 53a-b), respectively). Considering the 95% credible intervals for the direct effect of economic hardship on internalizing and externalizing behaviors that did not encompass zero, paternal depressive symptoms mediated the associations between economic hardship and internalizing and externalizing behaviors.

## The BSF Control Group

Figure 54. Direct associations between study variables for control group



*Direct Effects.* For fathers in the BSF control group, economic hardship was positively associated with paternal depressive symptoms, paternal engagement in caregiving activities, and children’s externalizing behavior ( $\beta = .191$ , posterior SD = .035, 95% credible intervals [.120, .259] (Figure 55a-b),  $\beta = .093$ , posterior SD = .035, 95% credible intervals [.024, .162] (Figure 56a-b), and  $\beta = .133$ , posterior SD = .026, 95% credible intervals [.083, .183] (Figure 57a-b)). Again as in the other two groups, paternal depressive symptoms were negatively associated with paternal engagement in social and cognitive activities, caregiving activities, and physical play ( $\beta = -.289$ , posterior SD = .023, 95% credible intervals [-.333, -.244] (Figure 58a-b),  $\beta = -.249$ , posterior SD = .023, 95% credible intervals [-.294, -.203] (Figure 59a-b), and  $\beta = -.207$ , posterior SD = .024, 95% credible intervals [-.253, -.160] (Figure 60a-b), respectively) and were positively associated with children’s internalizing and externalizing behaviors ( $\beta = .152$ , posterior SD = .026, 95% credible intervals [.102, .202] (Figure 61a-b) and  $\beta = .133$ , posterior SD = .026, 95%

credible intervals [.083, .183] (Figure 62a-b), respectively). Paternal engagement in caregiving activities was negatively associated with children's internalizing and externalizing behaviors ( $\beta = -.110$ , posterior SD = .033, 95% credible intervals [-.174, -.045] (Figure 63a-b) and  $\beta = -.121$ , posterior SD = .033, 95% credible intervals [-.186, -.057] (Figure 64a-b)). Number of children in the household was negatively associated with paternal engagement in social and cognitive activities and externalizing behavior ( $\beta = -.050$ , posterior SD = .021, 95% credible intervals [-.090, -.009] (Figure 65a-b) and  $\beta = -.049$ , posterior SD = .021, 95% credible intervals [-.090, -.007] (Figure 66a-b), respectively). Full-time cohabiting status was positively associated with paternal engagement in social and cognitive activities, caregiving activities, and physical play ( $\beta = .259$ , posterior SD = .089, 95% credible intervals [.084, .432] (Figure 67a-b),  $\beta = .218$ , posterior SD = .098, 95% credible intervals [.042, .395] (Figure 68a-b) and  $\beta = .213$ , posterior SD = .091, 95% credible intervals [.032, .390] (Figure 69a-b), respectively), and marital status was positively associated with paternal engagement in social and cognitive activities and caregiving activities. ( $\beta = .283$ , posterior SD = .097, 95% credible intervals [.093, .471] (Figure 70a-b) and  $\beta = .227$ , posterior SD = .098, 95% credible intervals [.034, .418] (Figure 71a-b), respectively). Paternal age was negatively associated with paternal engagement in physical play ( $\beta = -.013$ , posterior SD = .004, 95% credible intervals [-.022, -.005] (Figure 72a-b)).

*Indirect Effects.* Economic hardship was negatively associated with paternal engagement in social and cognitive activities, caregiving activities, and physical play indirectly through paternal depressive symptoms ( $\beta_{indirect} = -.212$ , posterior SD = .044, 95% credible intervals [-.302, -.130] (Figure 73a-b),  $\beta_{indirect} = -.147$ , posterior SD = .031, 95% credible intervals [-.213, -.089] (Figure 74a-b), and  $\beta_{indirect} = -.188$ , posterior SD = .042, 95% credible intervals [-.278, -.112] (Figure 75a-b), respectively). The 95% credible intervals for the direct effect of economic

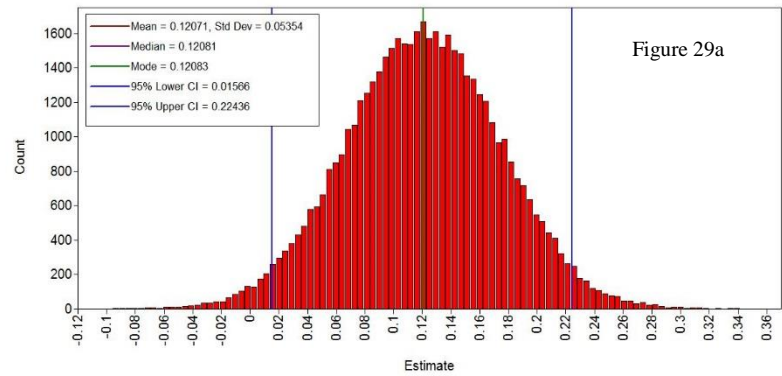
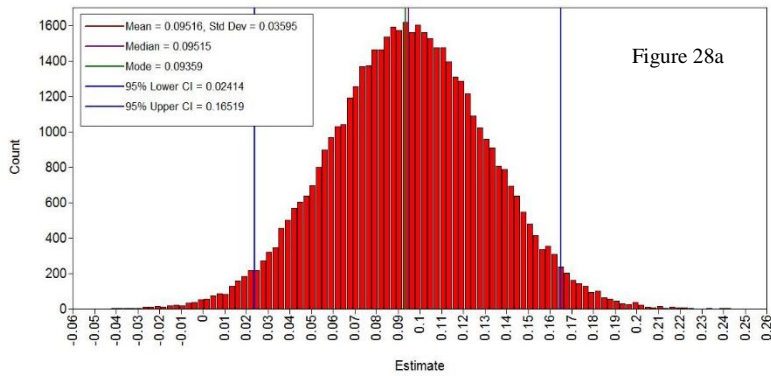
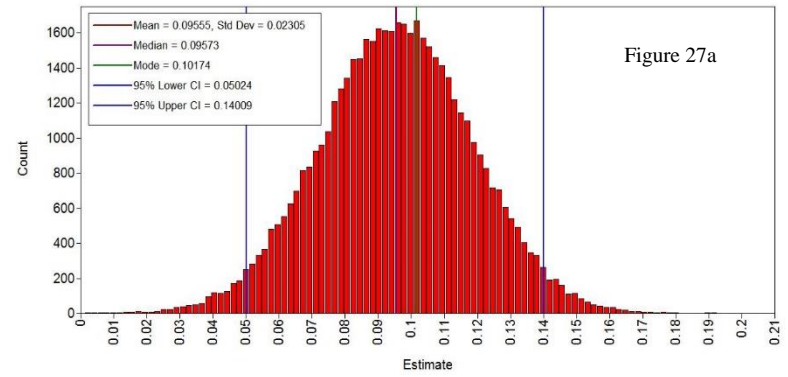
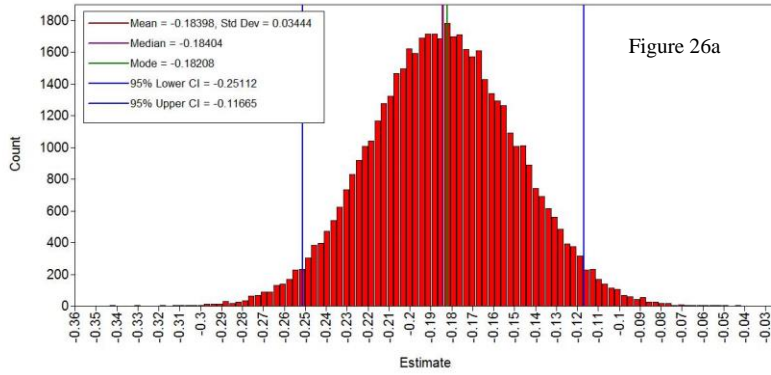
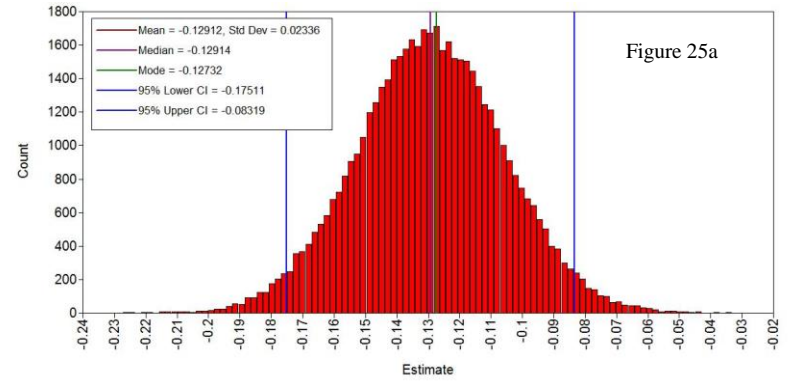
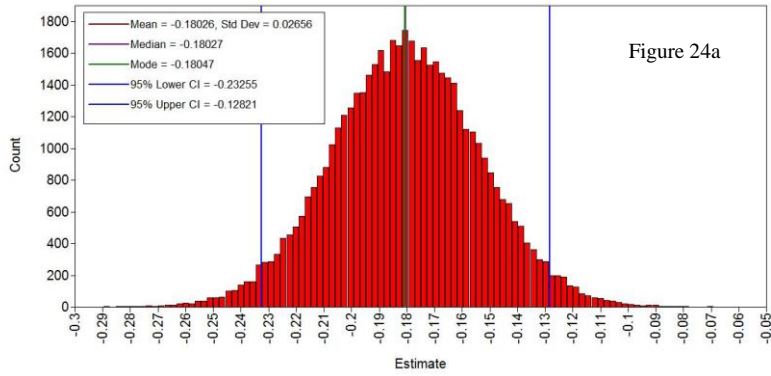
hardship on paternal engagement in caregiving activities and physical play did not encompass zero, thus paternal depressive symptoms partially mediated the associations between economic hardship and paternal engagement in caregiving activities and physical play. Given that the 95% credible intervals for the direct effect of economic hardship on paternal engagement in social and cognitive activities encompassed zero, paternal depressive symptoms mediated the associations between economic hardship and paternal engagement in social and cognitive activities.

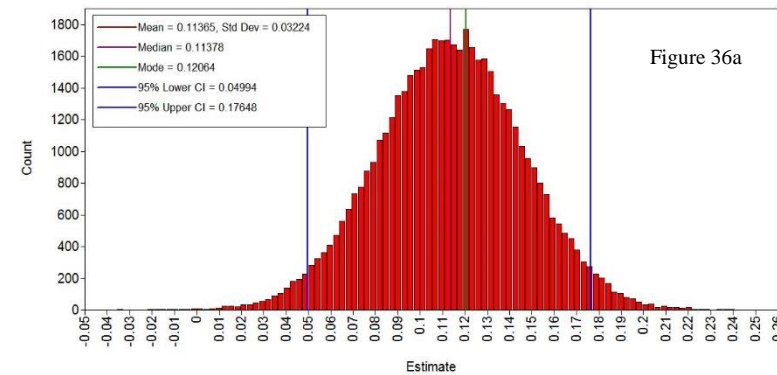
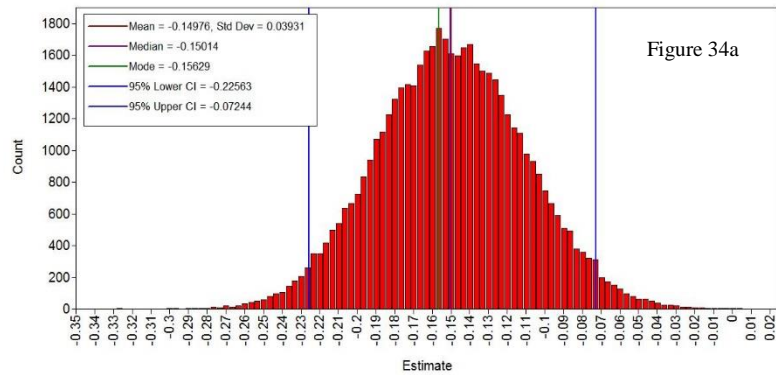
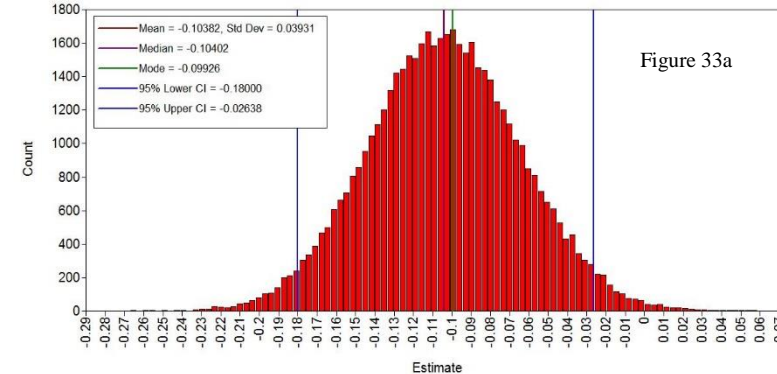
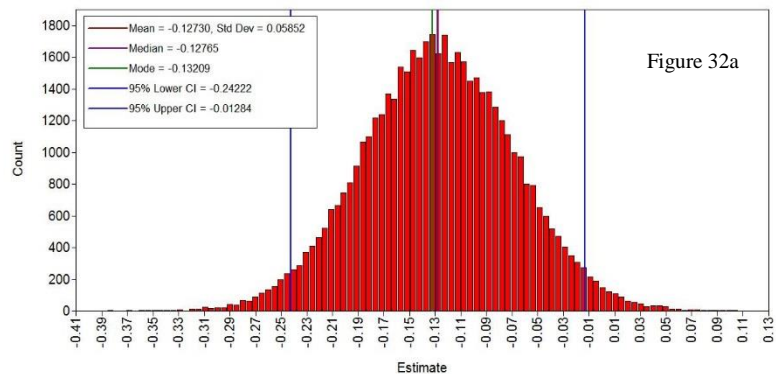
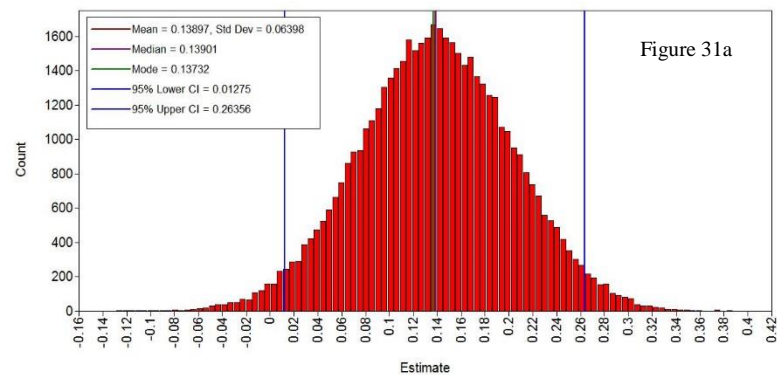
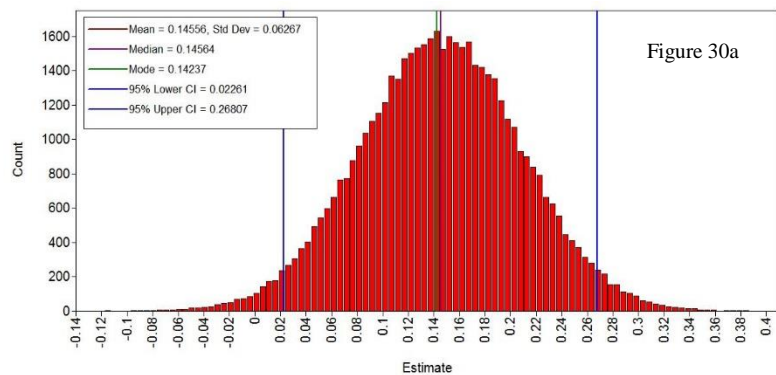
Higher levels of paternal depressive symptoms were associated with higher levels of internalizing and externalizing behaviors indirectly through paternal engagement in caregiving activities ( $\beta_{indirect} = .014$ , posterior SD = .004, 95% credible intervals [.005, .023] (Figure 76a-b) and  $\beta_{indirect} = .023$ , posterior SD = .007, 95% credible intervals [.011, .037] (Figure 77a-b), respectively). Taking into consideration that the 95% credible intervals for the direct effect of paternal depressive symptoms on internalizing and externalizing behaviors did not encompass zero, paternal engagement in caregiving activities partially mediated the associations between paternal depressive symptoms and children's internalizing and externalizing behaviors.

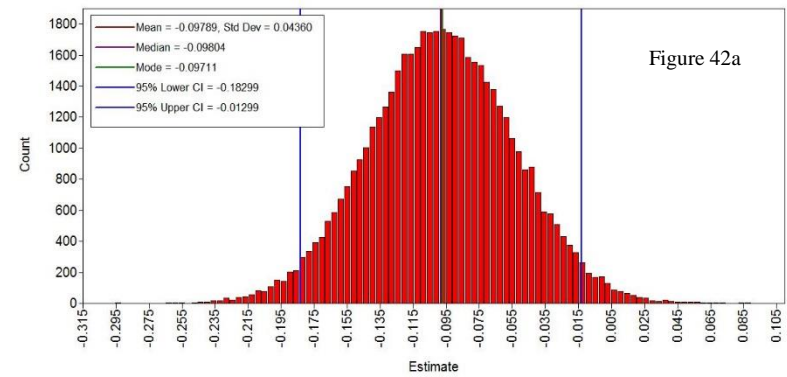
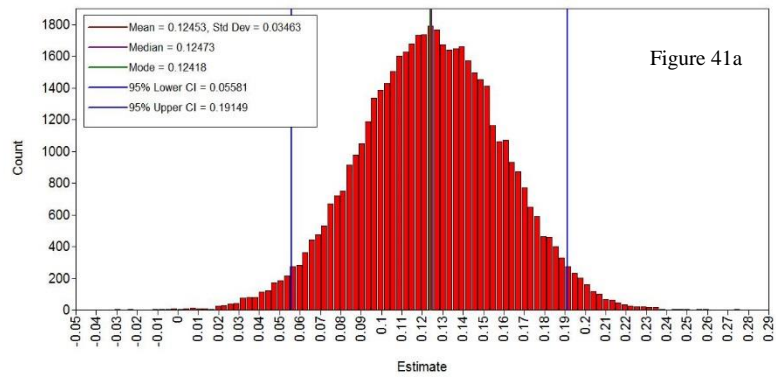
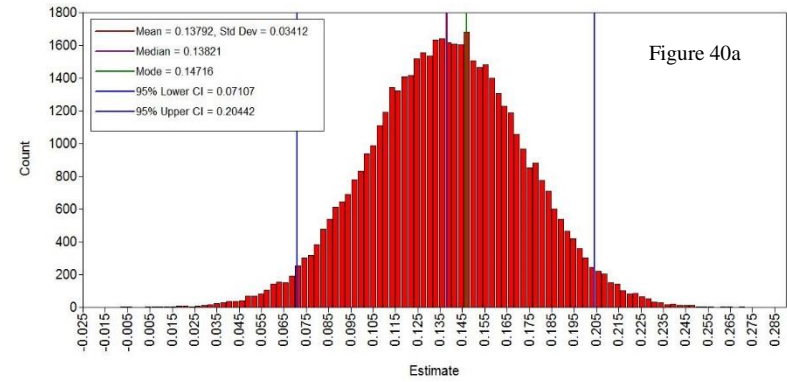
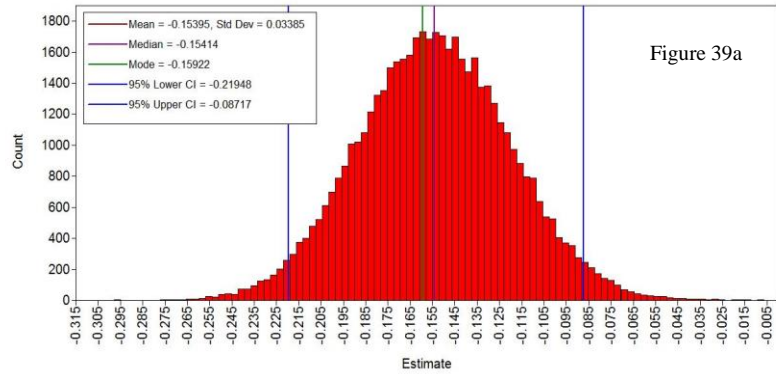
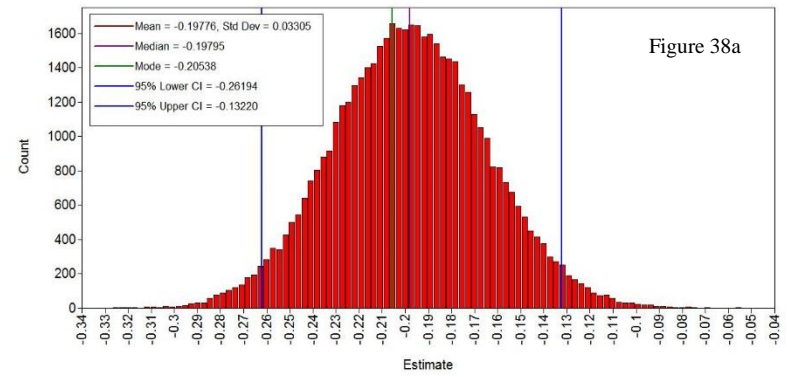
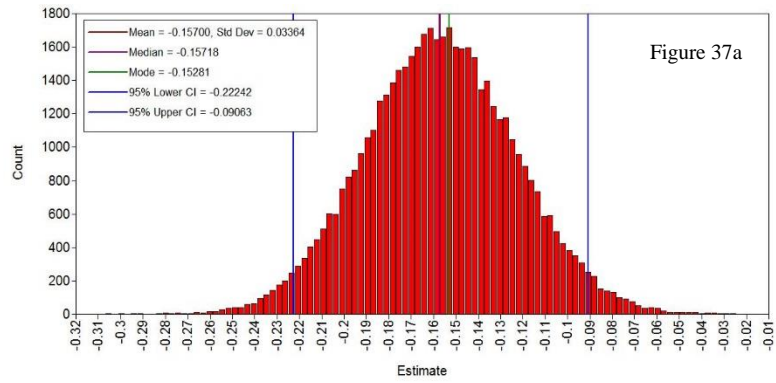
Economic hardship was positively associated with internalizing and externalizing behaviors indirectly through paternal depressive symptoms ( $\beta_{indirect} = .089$ , posterior SD = .023, 95% credible intervals [.049, .140] (Figure 78a-b) and  $\beta_{indirect} = .119$ , posterior SD = .033, 95% credible intervals [.062, .192] (Figure 79a-b), respectively). Because the 95% credible intervals for the direct effect of economic hardship on internalizing behavior encompassed zero, paternal depressive symptoms mediated the associations between economic hardship and internalizing behavior. By comparison, because the 95% credible intervals for the direct effect of economic hardship on externalizing behavior did not encompass zero, paternal depressive symptoms partially mediated the associations between economic hardship and externalizing behavior.

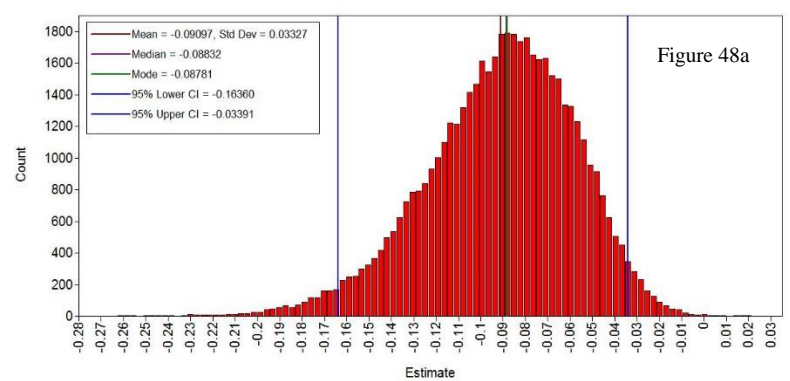
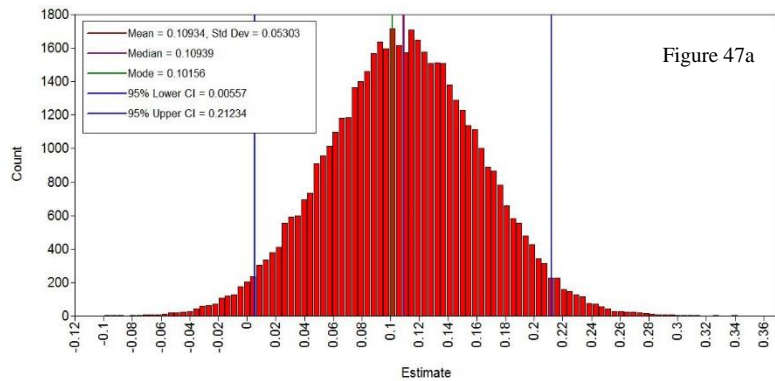
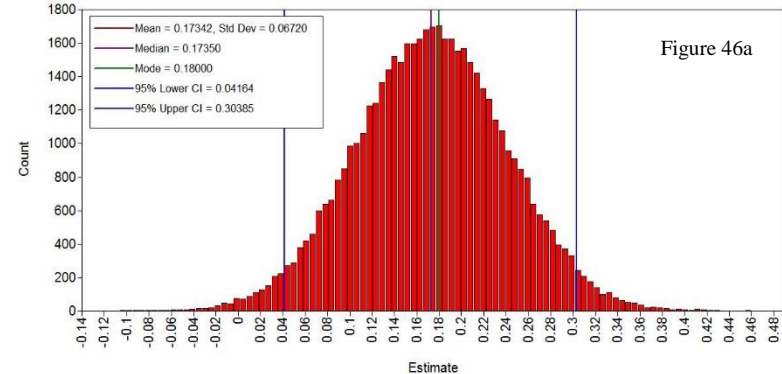
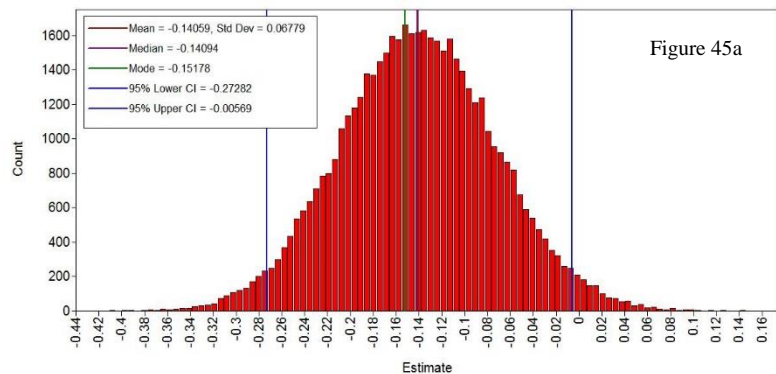
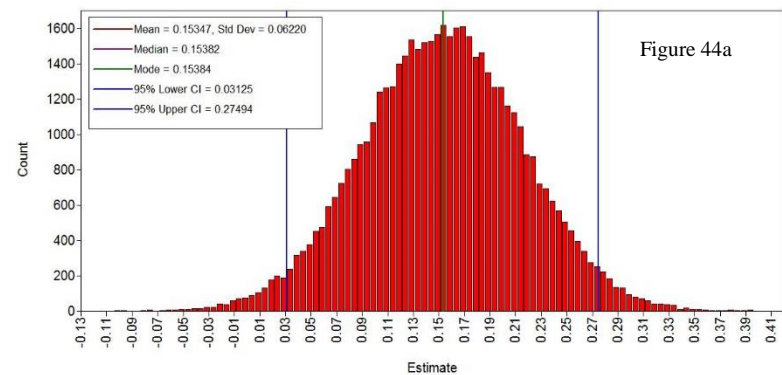
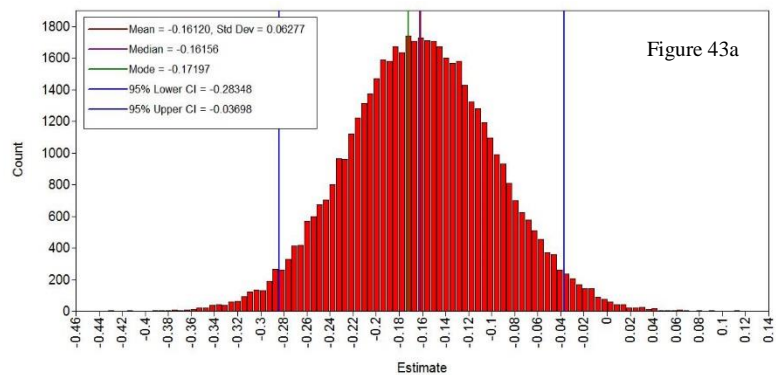


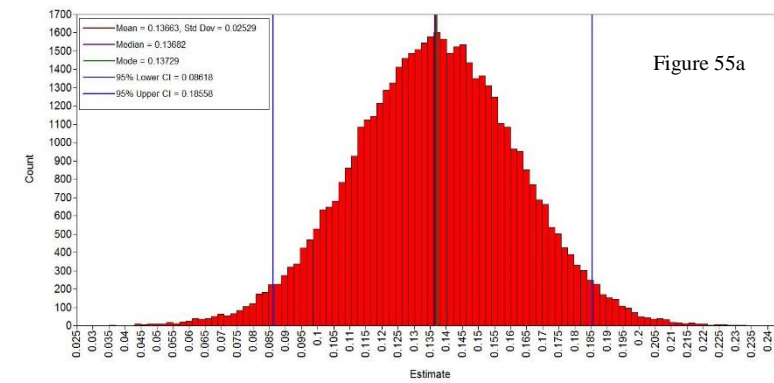
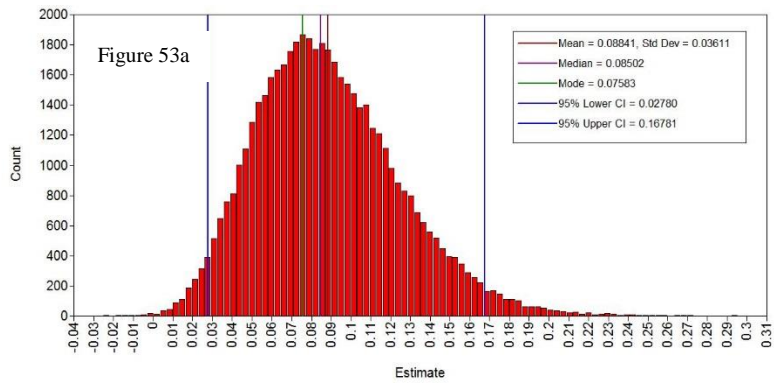
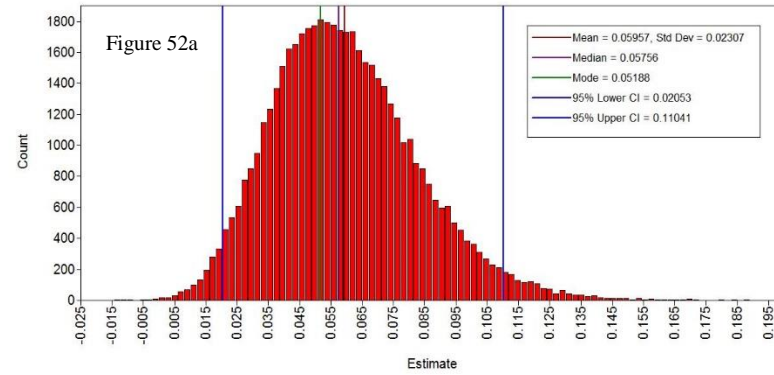
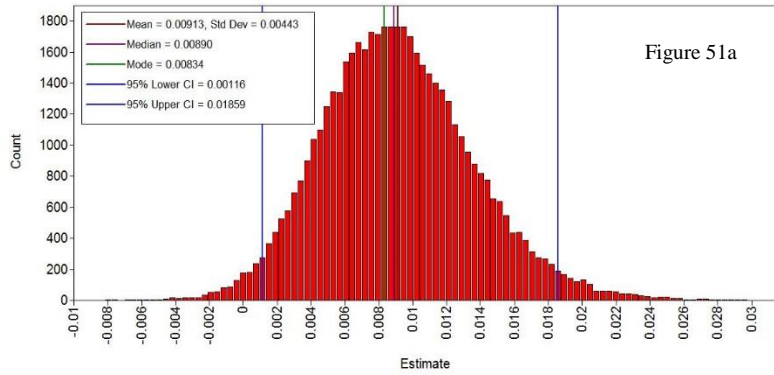
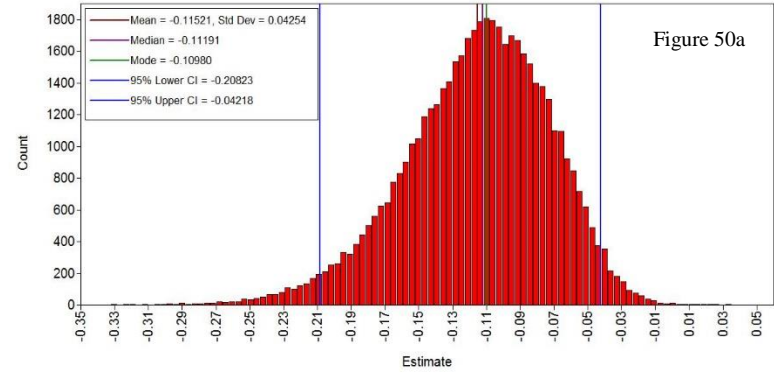
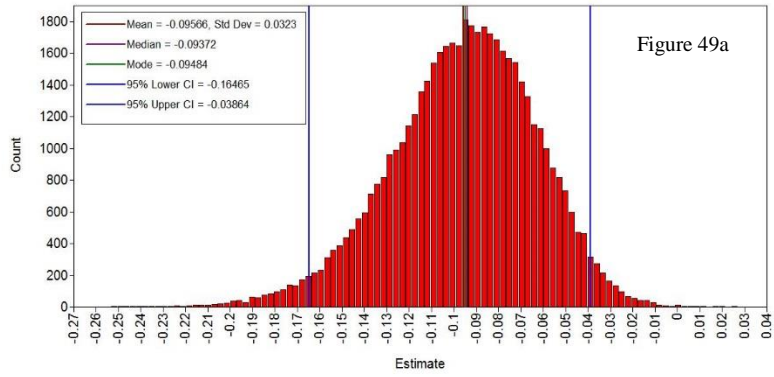
Figures 24a-79a. Posterior distributions for direct and indirect estimates

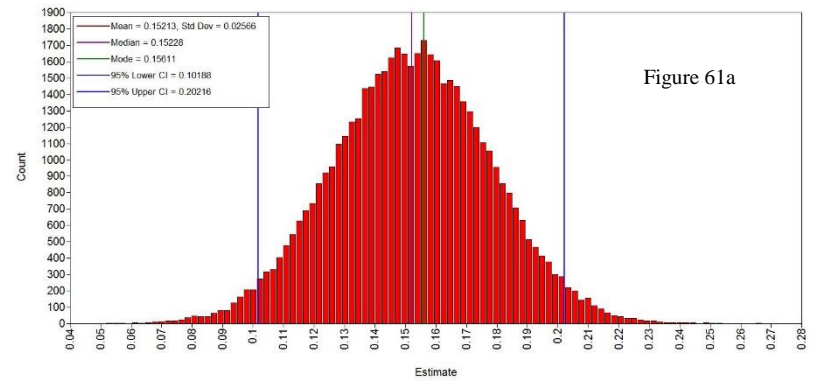
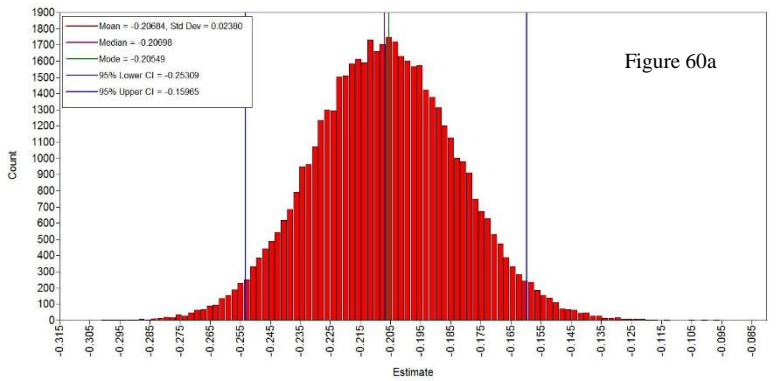
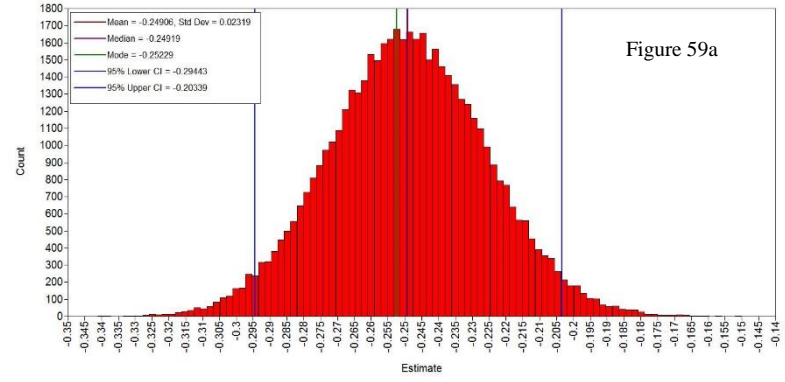
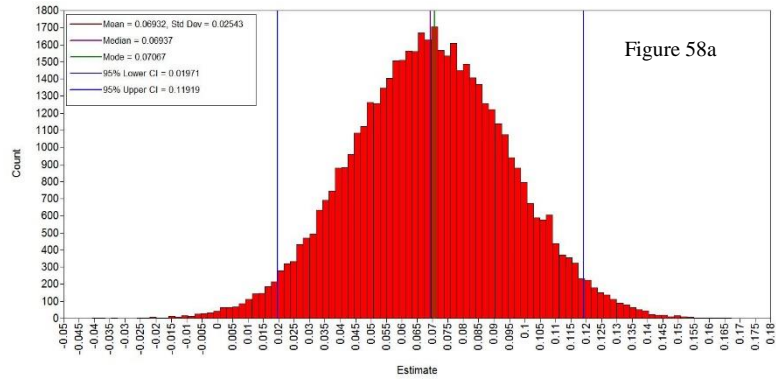
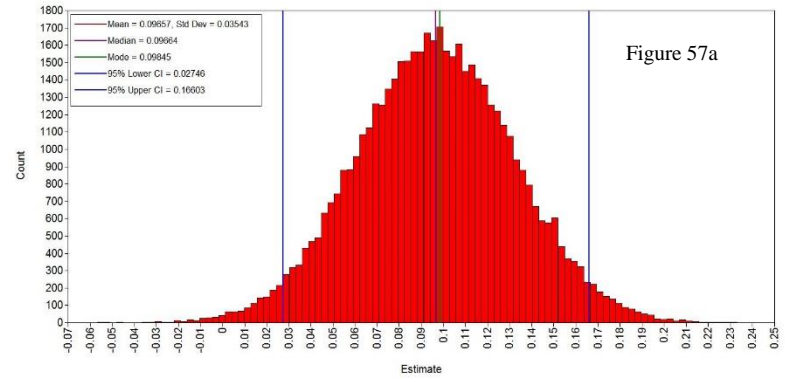
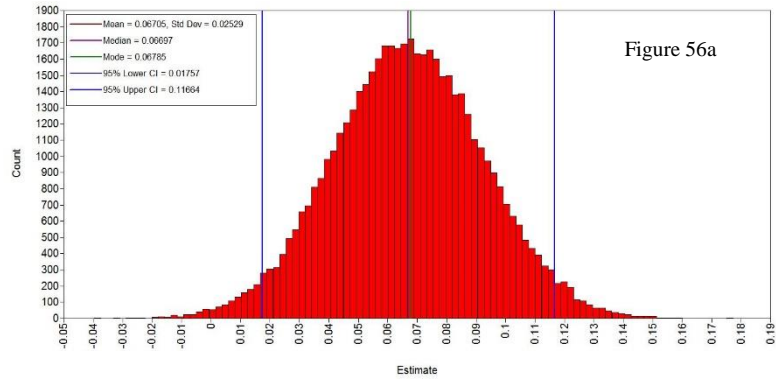


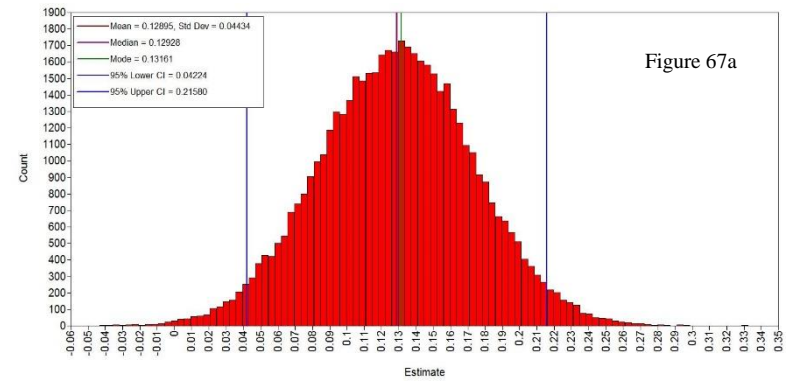
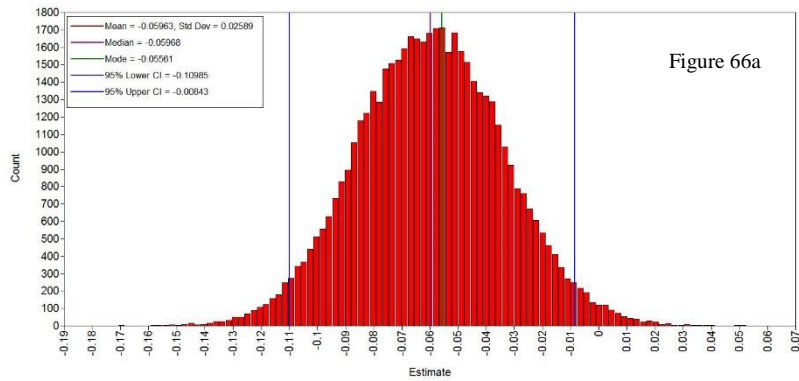
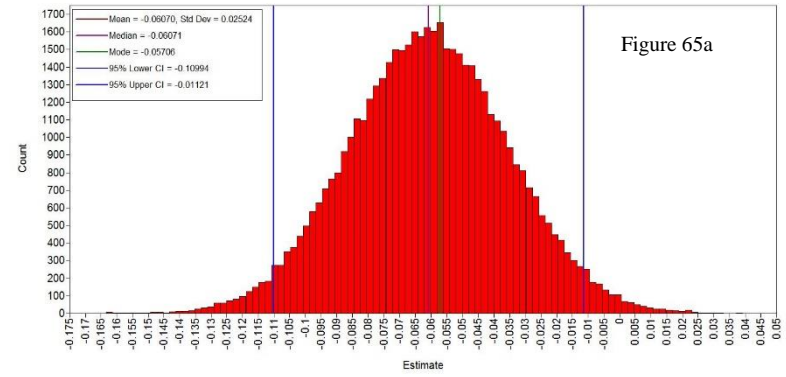
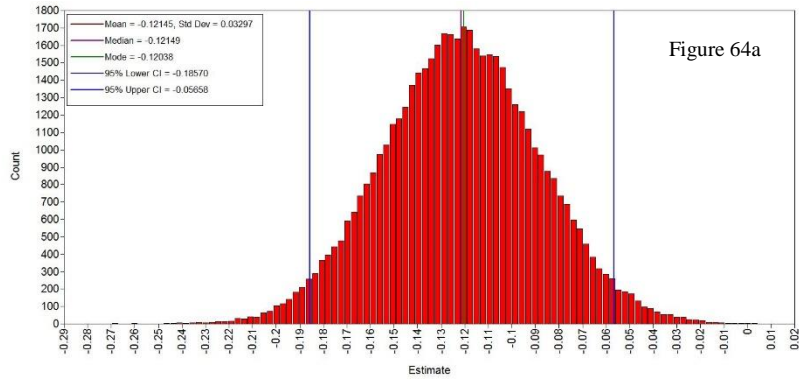
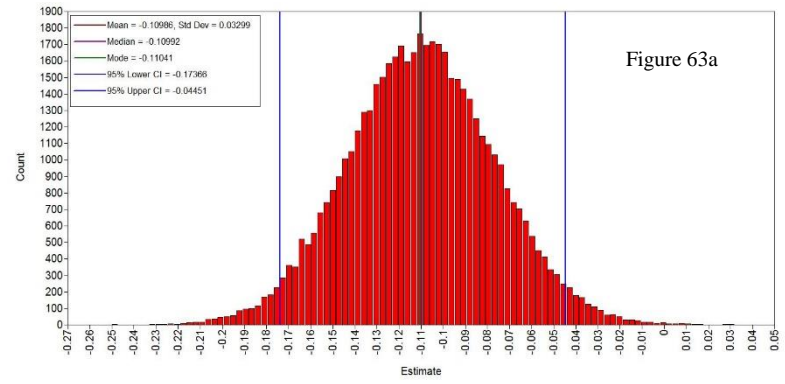
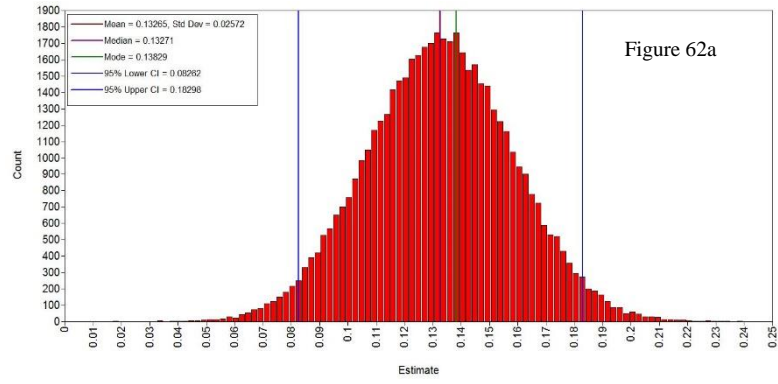


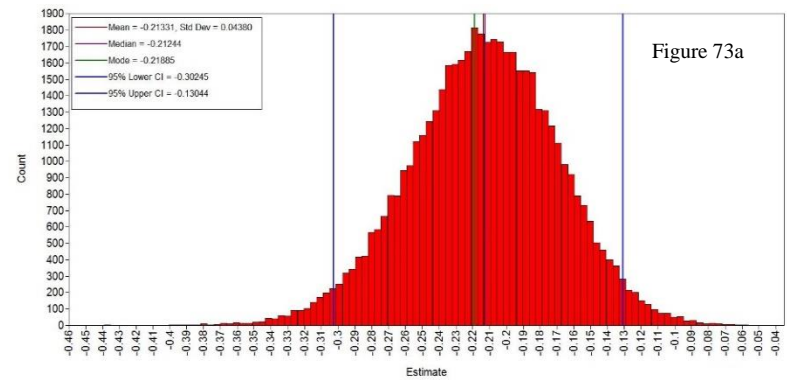
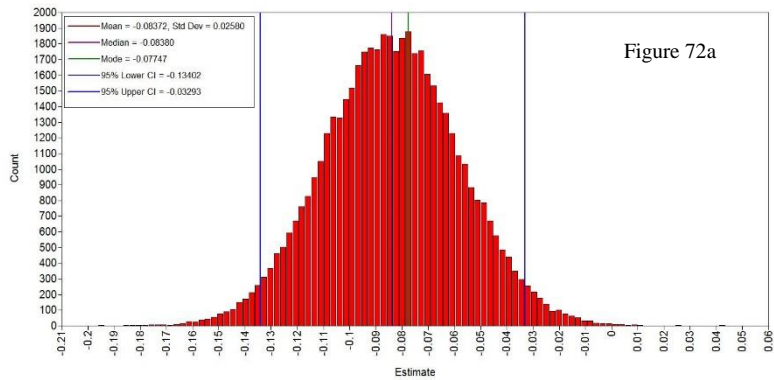
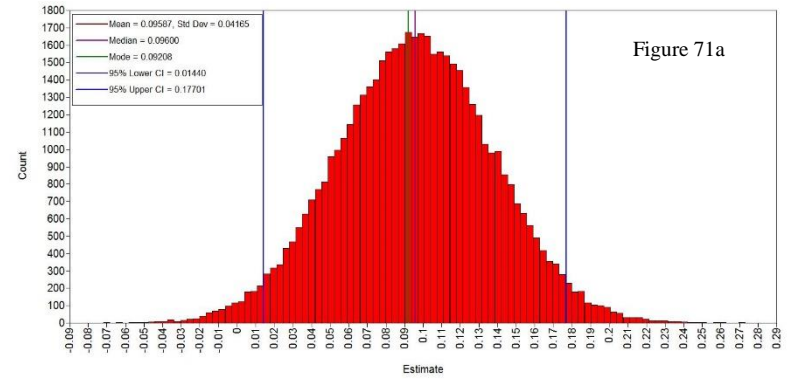
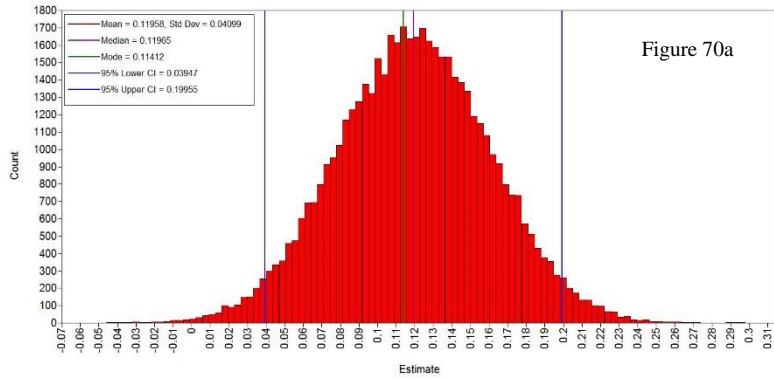
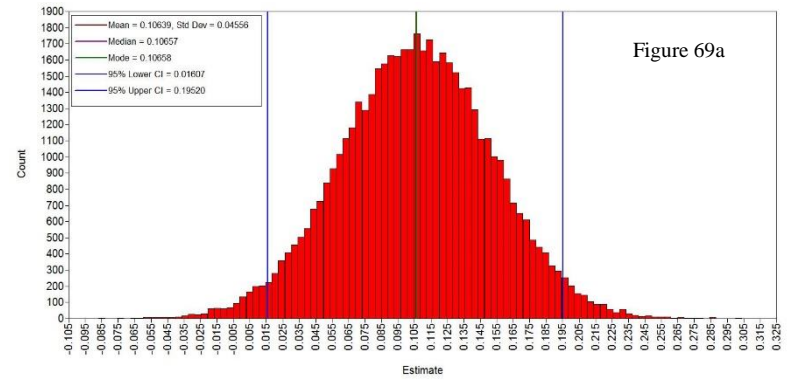
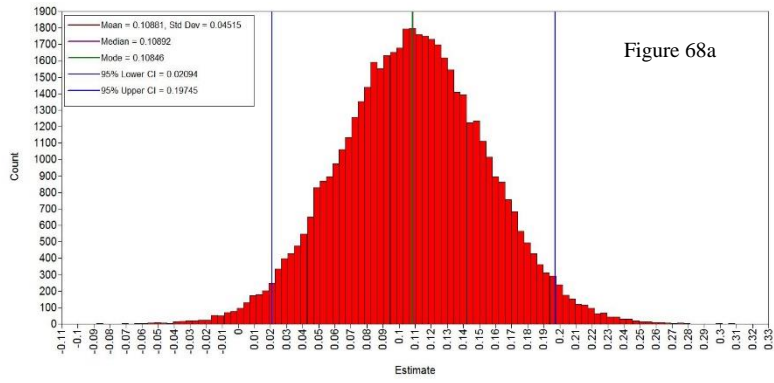




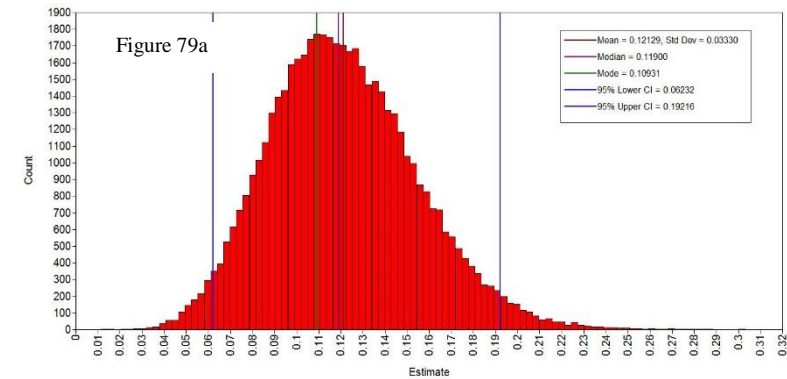
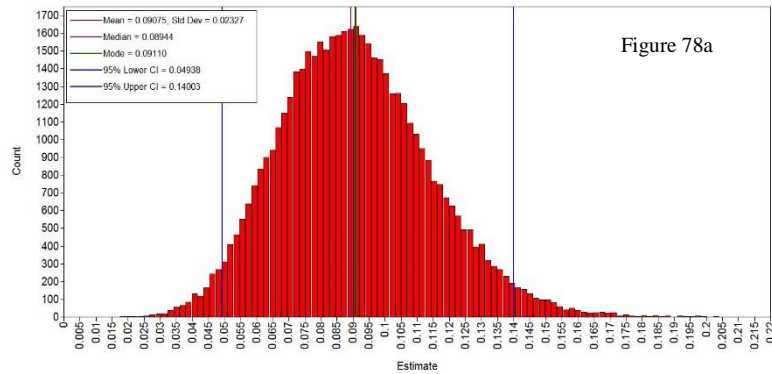
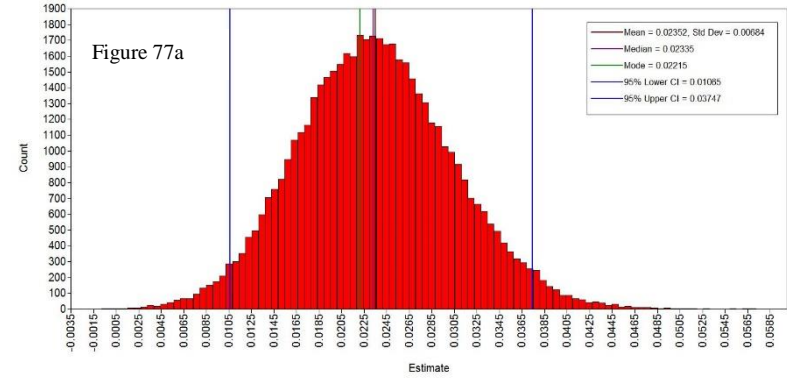
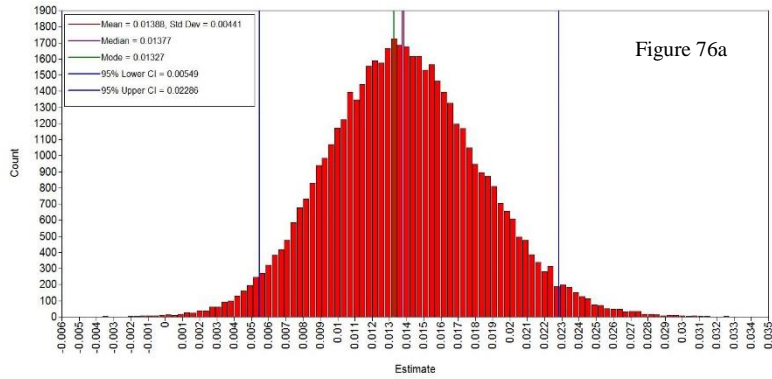
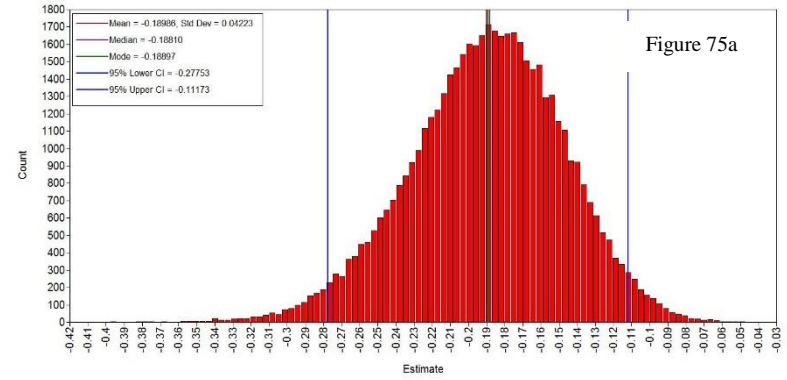
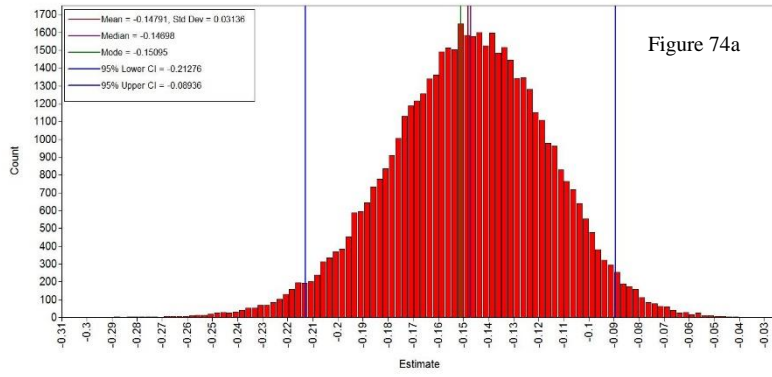












Based on findings from model 4b which suggest several pathways did not differ between group, the fully restrictive model was tested. A Bayesian path analysis was conducted using non-informative priors to assess the associations between economic hardship and children’s internalizing and externalizing behaviors via paternal depressive symptoms and paternal engagement in caregiving activities, social and cognitive activities, and physical play (Model 5). The 95% CIs for the difference between the observed and replicated chi-square values for the fully constrained model covered zero [-35.038, 34.351] and the posterior predictive p-value was 0.505, both indicating a good predictive model fit (Figure 80-81). Model convergence was reached after 400 iterations (PSR < 1.01) and the matching scatterplot demonstrated satisfactory model fit.

Figure 80. Model 5: Bayesian posterior predictive checking scatterplot

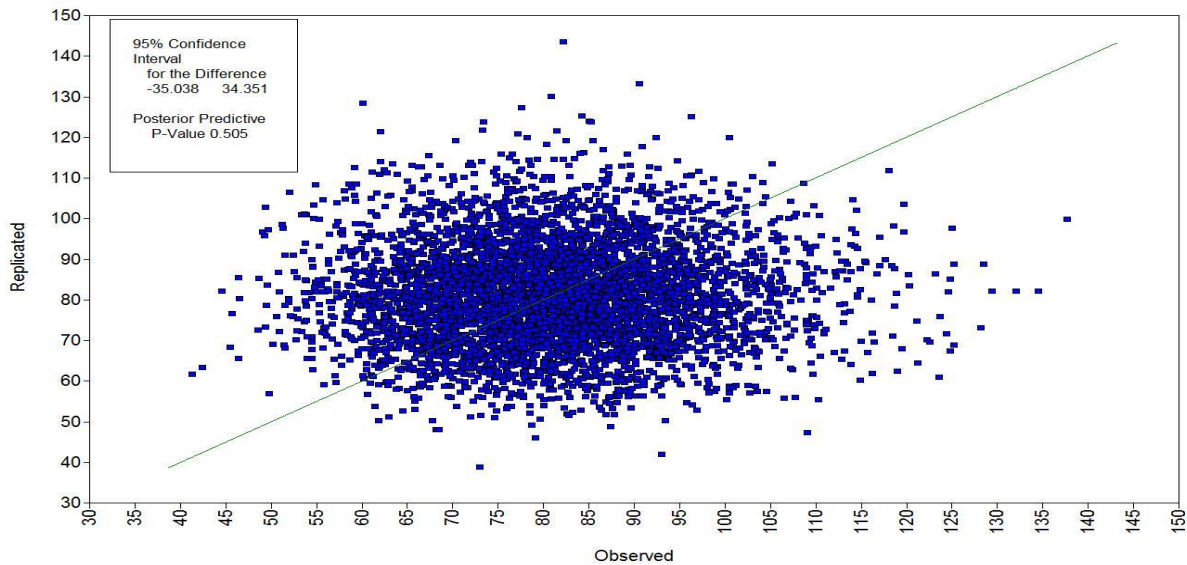
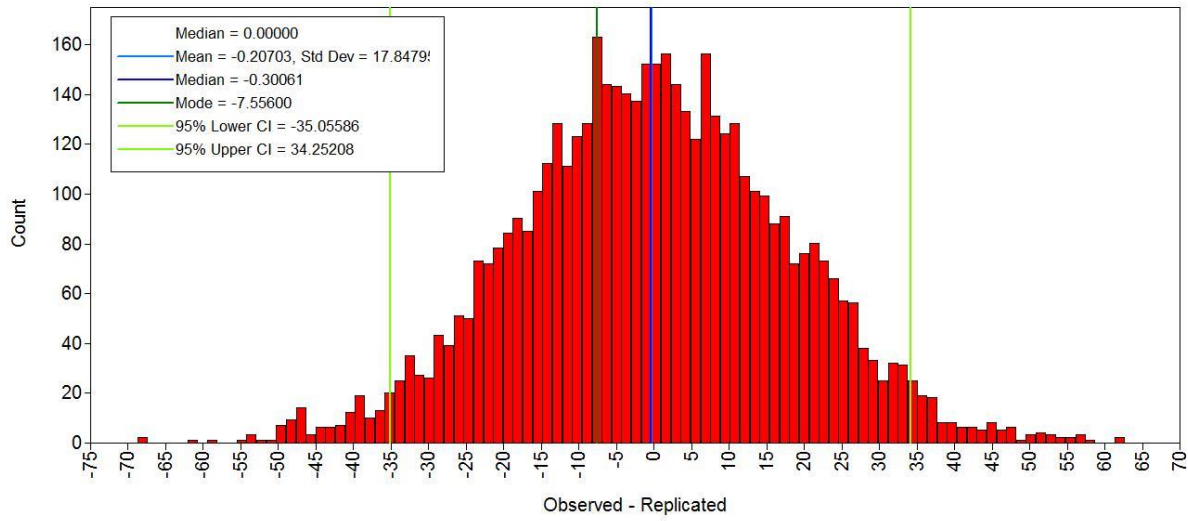


Figure 81. Model 5: Bayesian posterior predictive checking distribution plot



*Direct Effects.* Results revealed that paternal economic hardship was positively associated with paternal depressive symptoms ( $\beta = .149$ , posterior SD = .024, 95% credible intervals [.101, .196] (Figure 82a-b)) and children’s externalizing behavior ( $\beta = .069$ , posterior SD = .025, 95% credible intervals [.021, .118] (Figure 83a-b)). Marital status and full-time cohabiting status were each associated with a lower level of depressive symptoms ( $\beta = -.211$ , posterior SD = .073, 95% credible intervals [-.355, -.069] (Figure 84a-b), and  $\beta = -.198$ , posterior SD = .066, 95% credible intervals [-.328, -.069] (Figure 85a-b), respectively). Higher levels of paternal depressive symptoms were linked to lower levels of paternal involvement in social and cognitive activities with children ( $\beta = -.250$ , posterior SD = .017, 95% credible intervals [-.284, -.216] (Figure 86a-b)). Marital status and full-time cohabiting status were positively associated with paternal engagement in social and cognitive activities ( $\beta = .247$ , posterior SD = .070, 95% credible intervals [.109, .386] (Figure 87a-b) and  $\beta = .222$ , posterior SD = .064, 95% credible intervals [.095, .346] (Figure 88a-b), respectively).

Higher levels of paternal depressive symptoms were also associated with lower levels of paternal engagement in caregiving activities ( $\beta = -.229$ , posterior SD = .018, 95% credible

intervals [-.263, -.195] (Figure 89a-b). Children's sex, marital status, and full-time cohabiting status were related to paternal engagement in caregiving activities ( $\beta = -.076$ , posterior SD = .035, 95% credible intervals [-.145, -.008] (Figure 90a-b),  $\beta = .229$ , posterior SD = .071, 95% credible intervals [.090, .367] (Figure 91a-b), and  $\beta = .246$ , posterior SD = .064, 95% credible intervals [.119, .372] (Figure 92a-b), respectively).

Likewise, paternal depressive symptoms were negatively associated with paternal engagement in physical play ( $\beta = -.194$ , posterior SD = .018, 95% credible intervals [-.229, -.159] (Figure 93a-b)). Paternal age and full-time cohabiting status were associated with paternal engagement in physical play ( $\beta = -.007$ , posterior SD = .018, 95% credible intervals [-.229, -.159] (Figure 94a-b) and  $\beta = .190$ , posterior SD = .065, 95% credible intervals [.062, .317] (Figure 95a-b), respectively).

Paternal depressive symptoms were positively associated with, whereas paternal engagement in caregiving activities was negatively associated with children's internalizing behavior ( $\beta = .157$ , posterior SD = .019, 95% credible intervals [.121, .193] (Figure 96a-b) and  $\beta = -.105$ , posterior SD = .024, 95% credible intervals [-.151, -.058] (Figure 97a-b), respectively). Higher paternal educational attainment was linked to lower levels of internalizing behavior ( $\beta = -.086$ , posterior SD = .038, 95% credible intervals [-.161, -.010] (Figure 98a-b)).

Higher levels of paternal depressive symptoms were associated with higher levels of children's externalizing behavior ( $\beta = .133$ , posterior SD = .019, 95% credible intervals [.096, .169] (Figure 99a-b)). Paternal engagement in caregiving activities was negatively associated with children's externalizing behavior ( $\beta = -.088$ , posterior SD = .024, 95% credible intervals [-.134, -.040] (Figure 100a-b)). Children's sex and the number of children at home were also linked to children's externalizing behavior ( $\beta = -.114$ , posterior SD = .036, 95% credible intervals

[-.184, -.044] (Figure 101a-b) and  $\beta = -.037$ , posterior SD = .015, 95% credible intervals [-.067, -.007] (Figure 102a-b), respectively).

*Indirect Effects.* Economic hardship was negatively associated with paternal engagement in caregiving activities, social and cognitive activities, and physical play indirectly through paternal depressive symptoms ( $\beta_{indirect} = -.108$ , posterior SD = .020, 95% credible intervals [-.149, -.071] (Figure 103a-b),  $\beta_{indirect} = -.142$ , posterior SD = .026, 95% credible intervals [-.196, -.094] (Figure 104a-b), and  $\beta_{indirect} = -.139$ , posterior SD = .027, 95% credible intervals [-.195, -.091] (Figure 105a-b), respectively). Considering that the 95% credible intervals for the direct effects of economic hardship on paternal engagement in caregiving activities, social and cognitive activities, and physical play encompassed zero, paternal depressive symptoms mediated the associations between economic hardship and paternal engagement in caregiving activities, social and cognitive activities, and physical play.

Paternal depressive symptoms were positively associated with children's internalizing and externalizing behaviors indirectly through paternal engagement in caregiving activities ( $\beta_{indirect} = .012$ , posterior SD = .003, 95% credible intervals [.006, .018] (Figure 106a-b) and  $\beta_{indirect} = .015$ , posterior SD = .004, 95% credible intervals [.007, .024] (Figure 107a-b)). The 95% credible intervals for the direct effects of paternal depressive symptoms on children's internalizing and externalizing behaviors did not encompass zero, thus paternal engagement in caregiving activities partially mediated the links between paternal depressive symptoms and children's internalizing and externalizing behaviors. In other words, paternal engagement in caregiving activities partially reduced the negative associations between paternal depressive symptoms and children's internalizing and externalizing behaviors at 36-months.

Higher levels of economic hardship were also indirectly associated with higher levels of children’s internalizing and externalizing behaviors via paternal depressive symptoms ( $\beta_{indirect}=.070$ , posterior SD= .015, 95% credible intervals [.044, .101] (Figure 108a-b) and  $\beta_{indirect}=.093$ , posterior SD= .021, 95% credible intervals [.057, .138] (Figure 109a-b)). The 95% credible intervals for the direct effect of economic hardship on children’s internalizing behavior encompassed zero, suggesting that paternal depressive symptoms mediated the associations between economic hardship and children’s internalizing behavior. Given that the 95% credible intervals for the direct effect of economic hardship on children’s externalizing behavior did not encompass zero, paternal depressive symptoms partially mediated the association between economic hardship and children’s externalizing behavior.

Figure 110. Direct associations between study variables for all groups

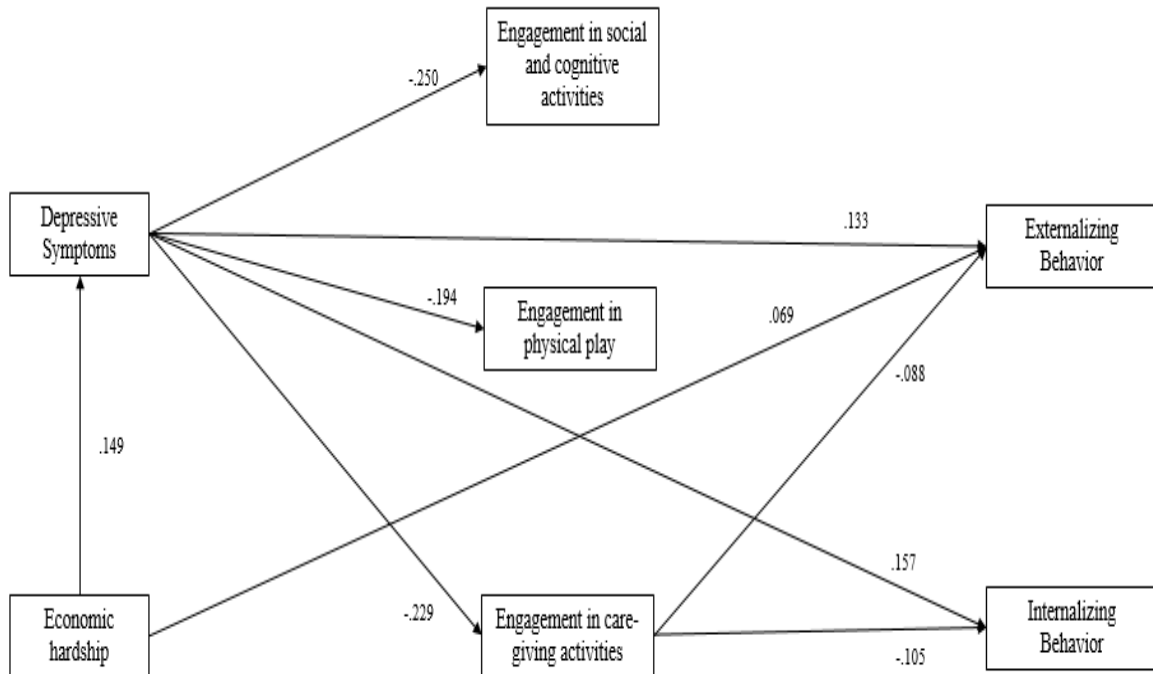
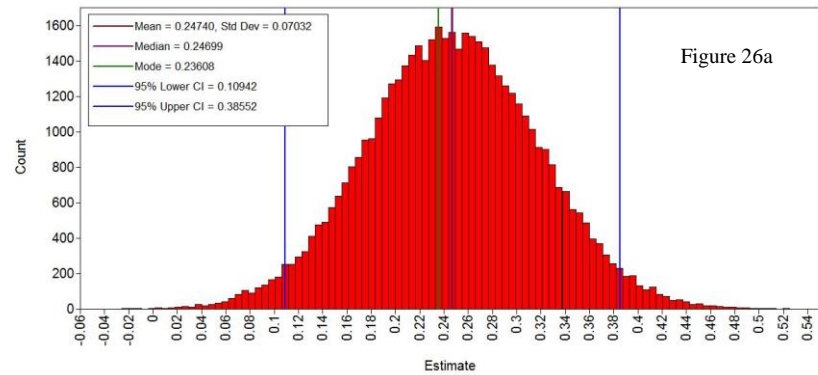
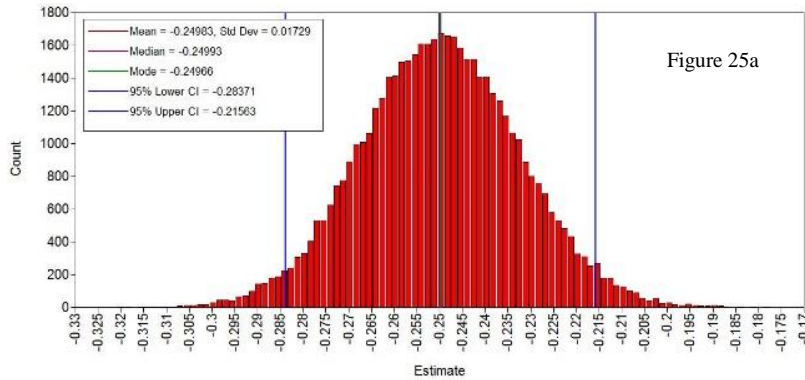
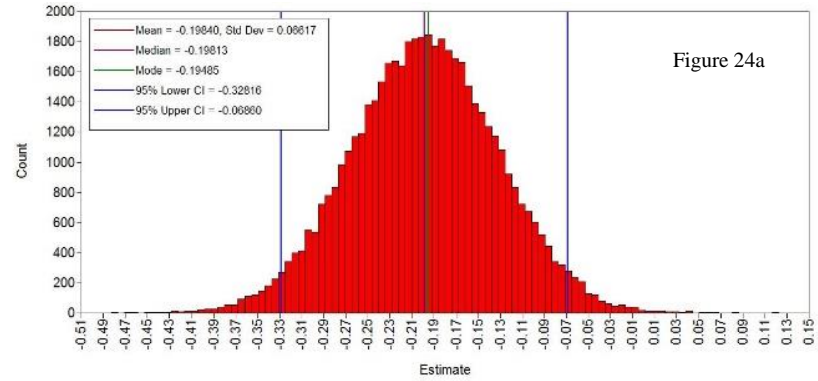
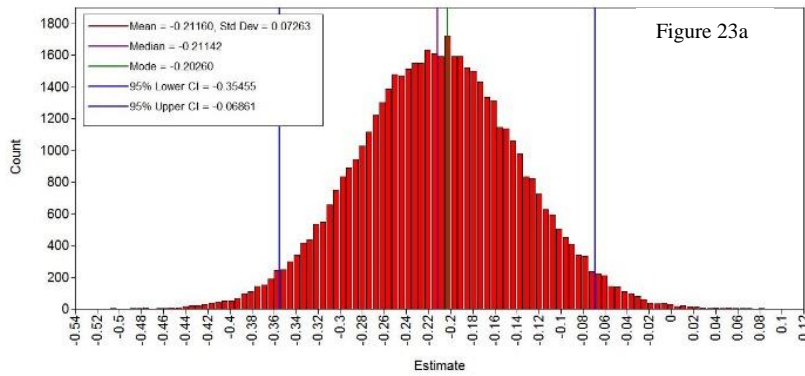
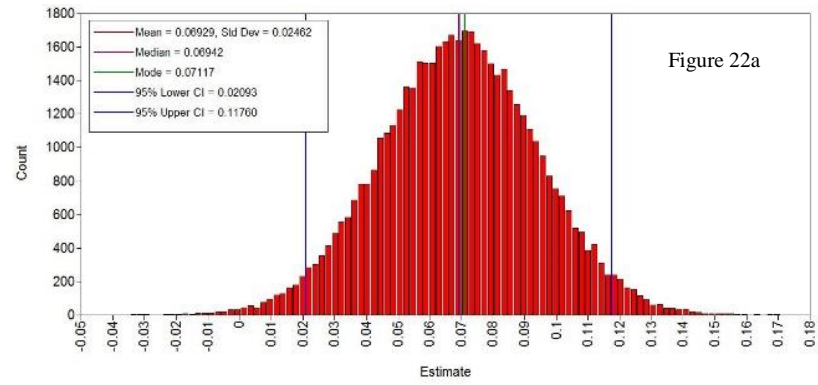
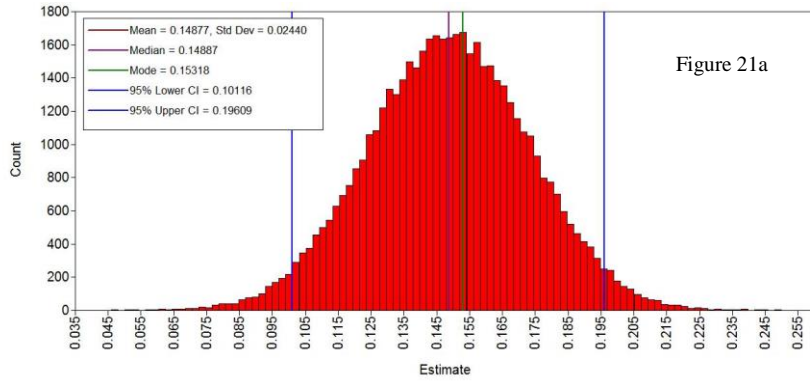
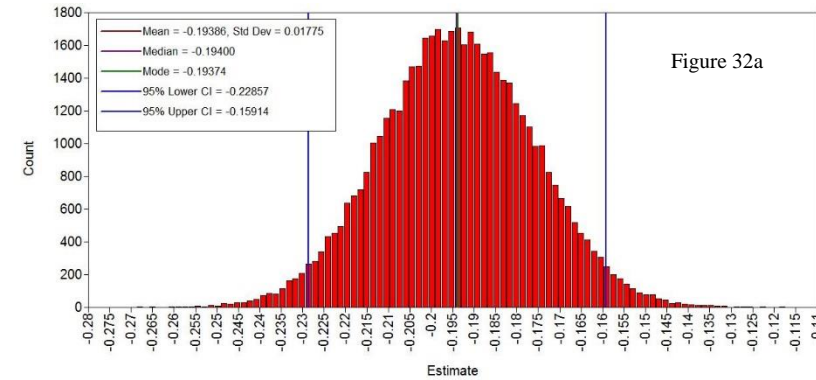
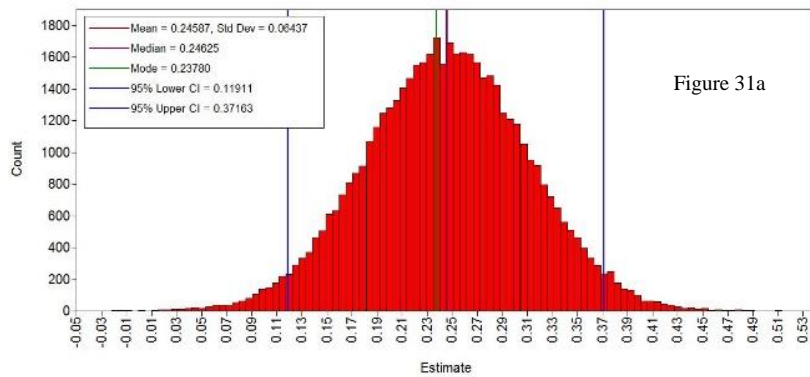
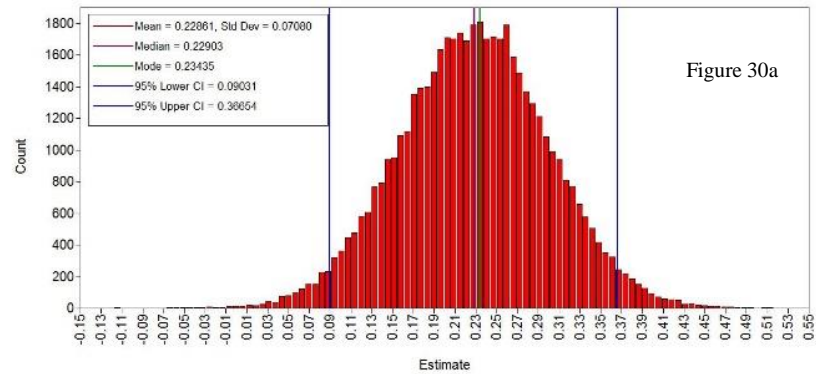
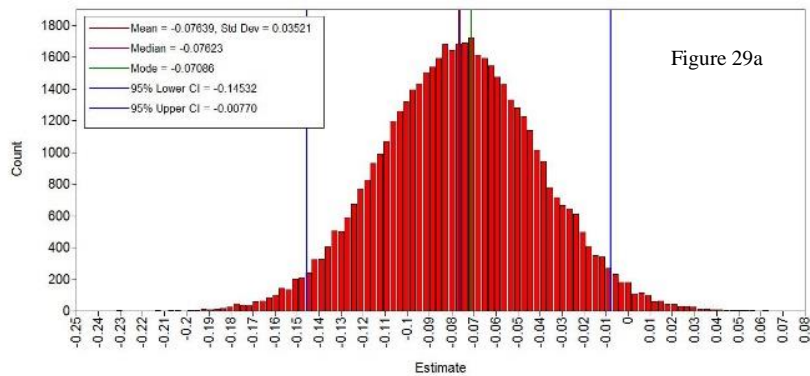
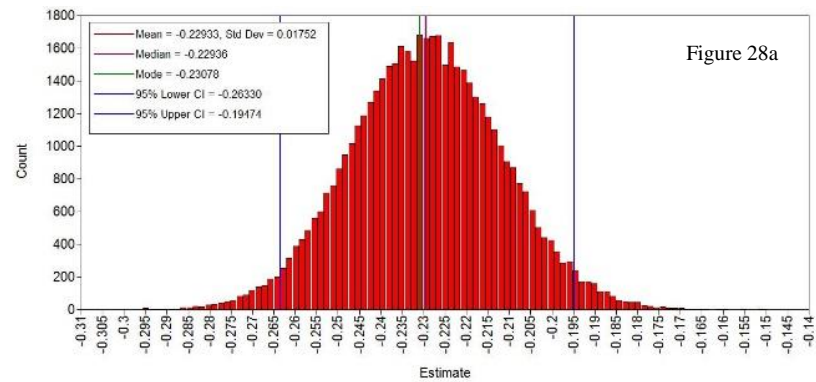
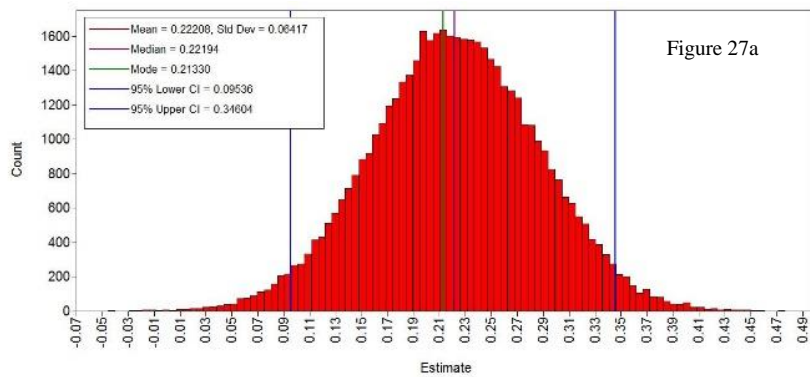
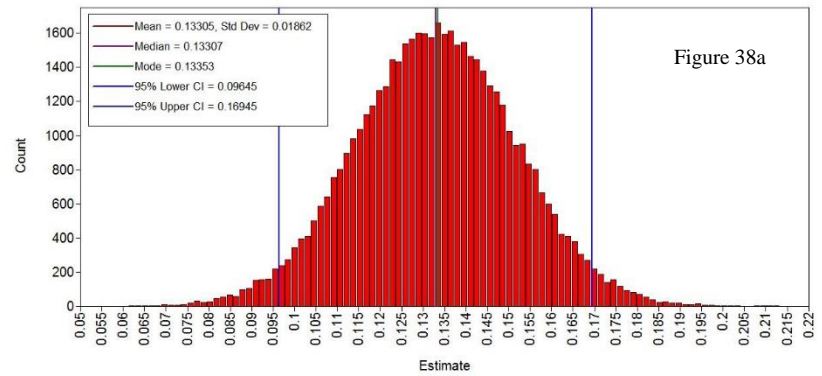
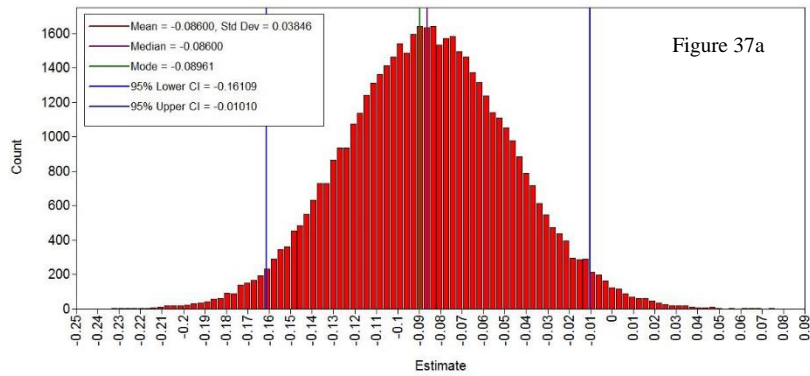
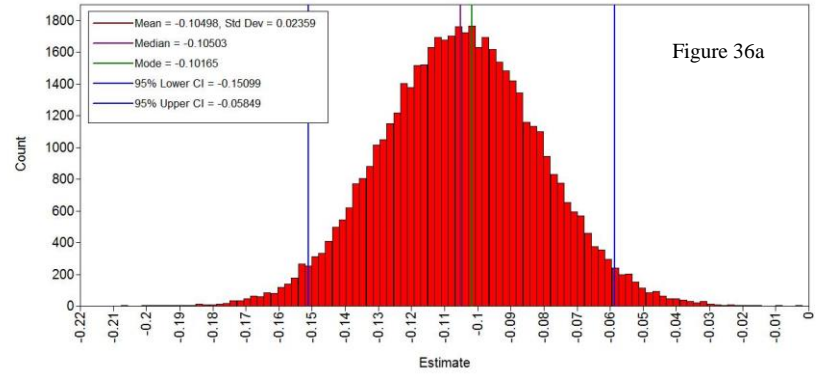
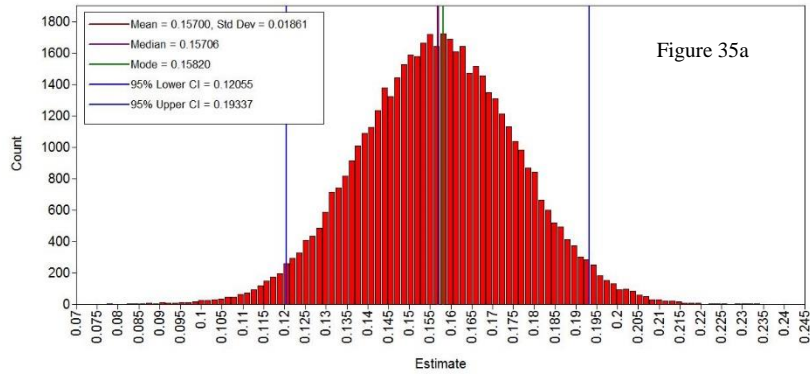
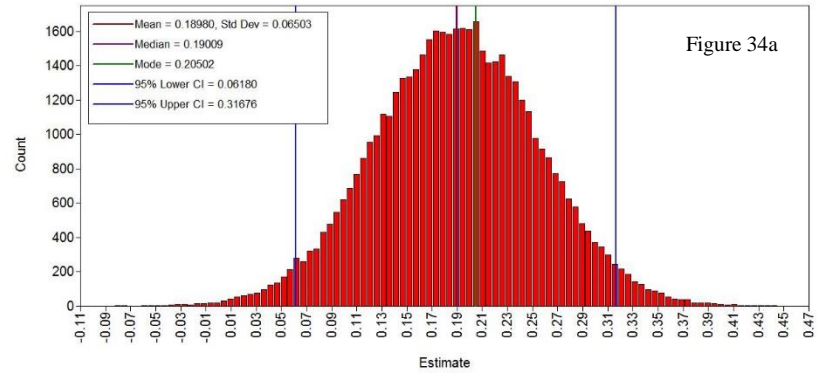
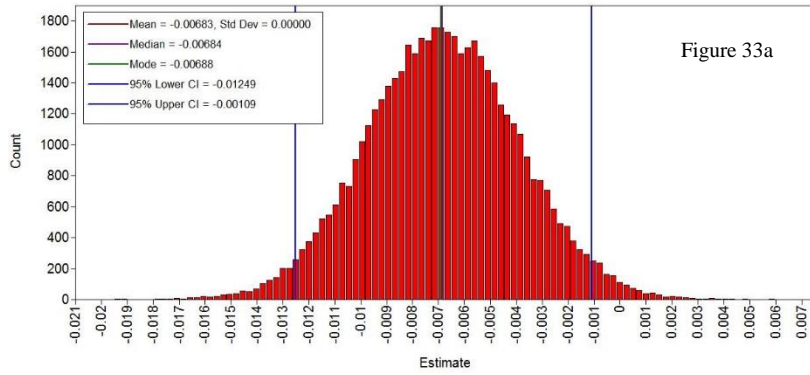


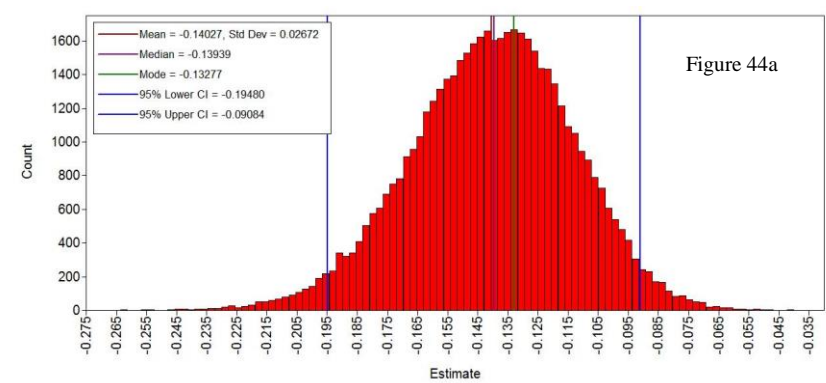
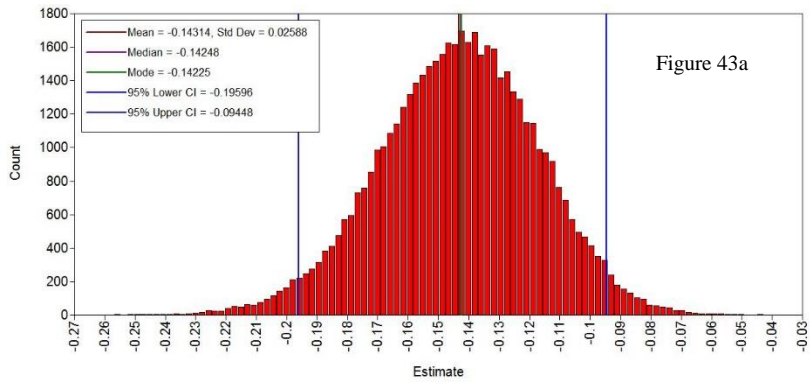
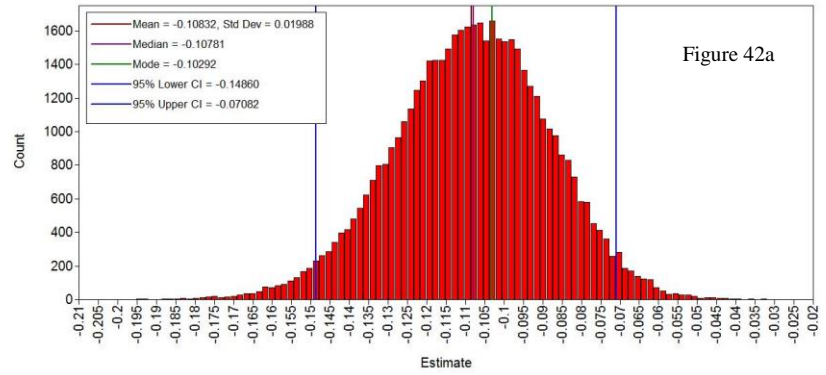
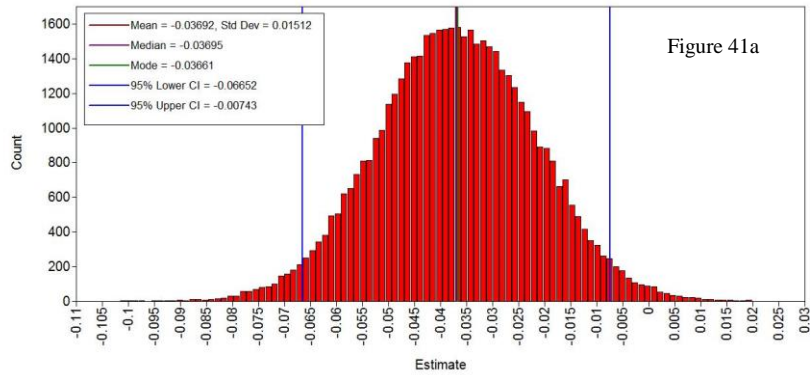
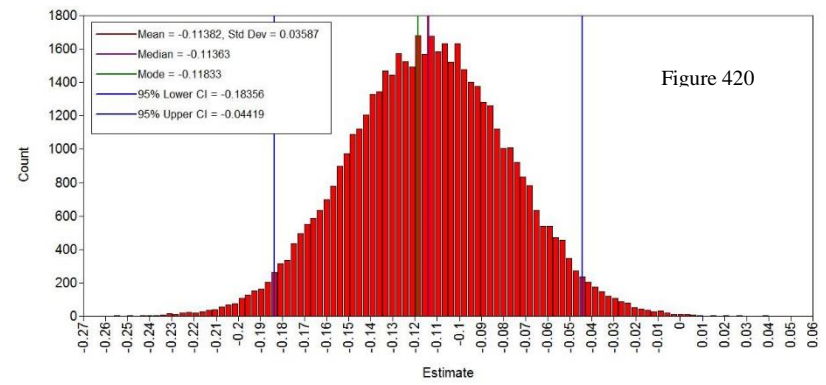
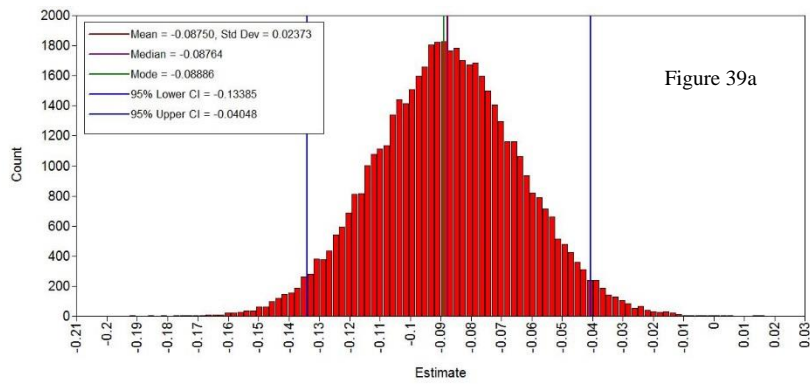
Figure 82a-109a. Posterior distributions for direct and indirect estimates for Model ##

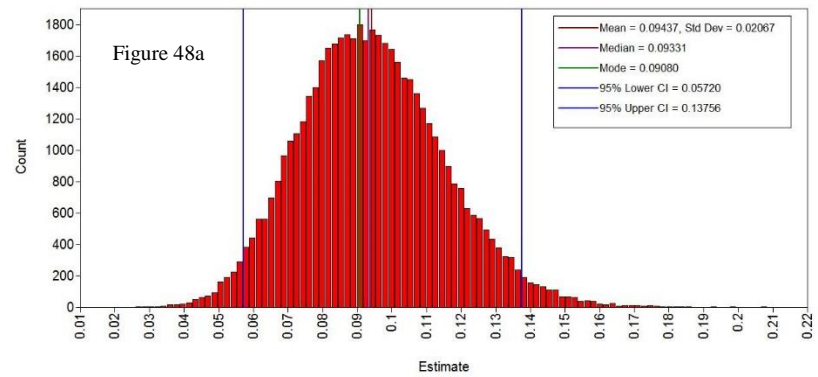
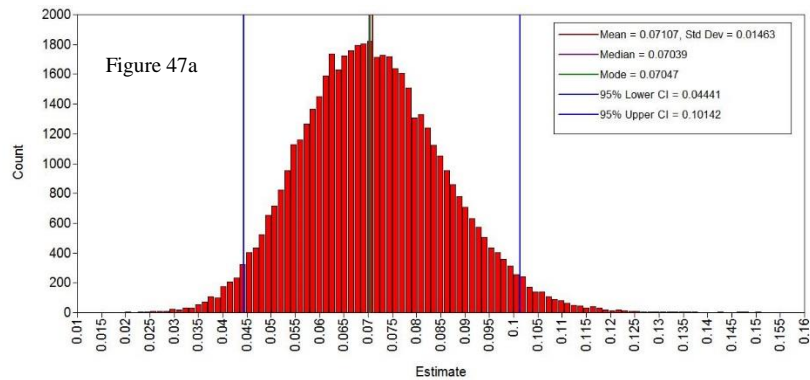
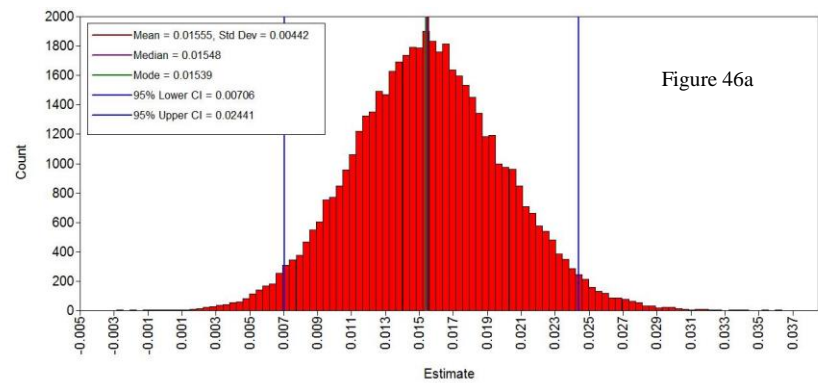
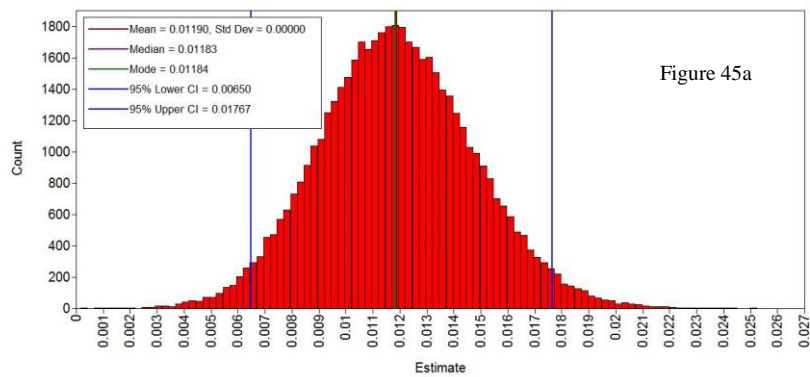












**Research Questions 2.** Does race/ethnicity moderate the associations between economic hardship and children's internalizing and externalizing behaviors via paternal depressive symptoms and fathers' engagement in physical play, social and cognitive activities, and caregiving activities across the BSF complier, non-complier, and control groups?

A Bayesian multi-group path analysis was conducted using non-informative priors to assess the associations between economic hardship and children's externalizing behaviors via paternal depressive symptoms and paternal engagement in caregiving activities, social and cognitive activities, and physical play across African American, European American, and Hispanic American BSF complier, non-complier, and control groups (Model 6). Nine groups were created namely; African American complier, African American non-complier, African American control, European American complier, European American non-complier, European American control, Hispanic American complier, Hispanic American non-complier, and Hispanic American control groups. The 95% CIs for the difference between the observed and replicated chi-square values did not cover zero [27.772, 206.268] and the posterior predictive p-value was 0.005, both indicating a poor predictive model fit (Figure 105-106). Model convergence was reached after 1500 iterations ( $PSR < 1.01$ ) and the matching scatterplot demonstrated an unsatisfactory model fit. Compared to the previous model (Model 5), the model fit did not improve, thus indicating the pathways of associations between the variables did not differ by racial-ethnic groups.

Figure 105. Model 6: Bayesian posterior predictive checking scatterplot

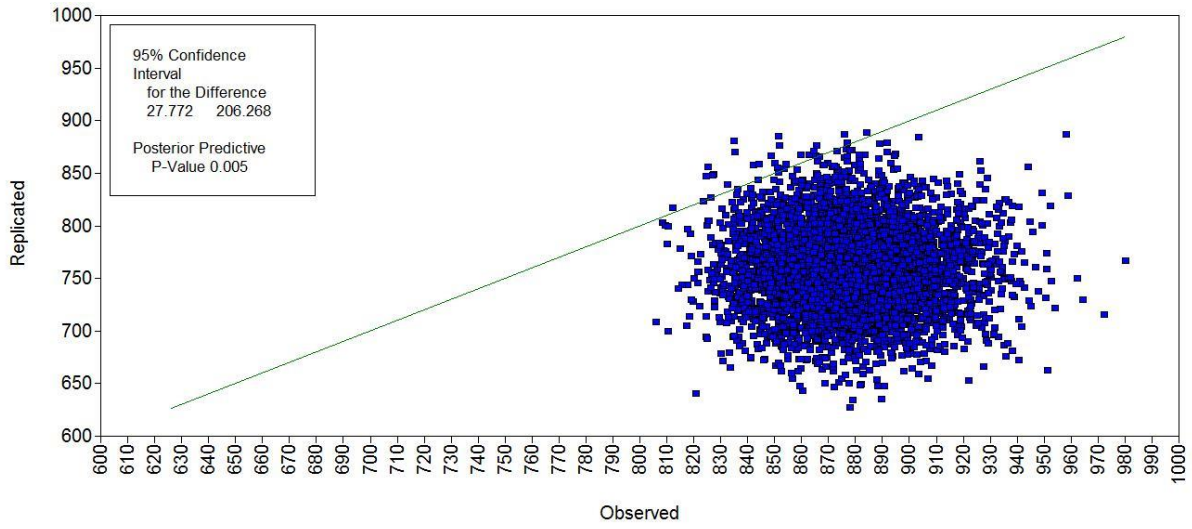
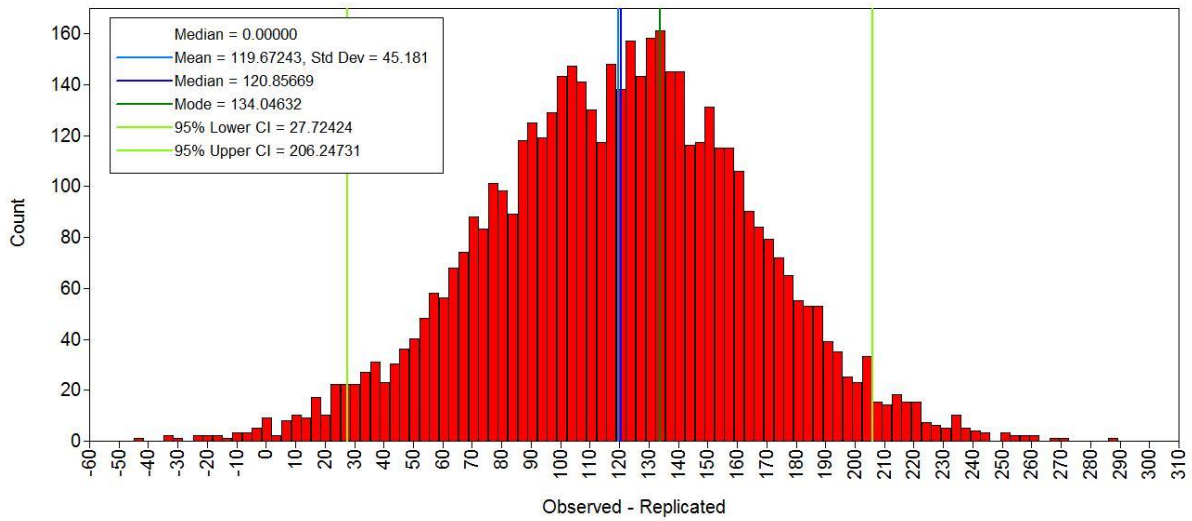


Figure 106. Model 6: Bayesian posterior predictive checking distribution plot



## Chapter 6: Discussion

Because of the significance of engaged fathering for children's social and cognitive development, increasingly researchers from diverse disciplines such as family sociology, child development/developmental psychology, pediatrics, clinical psychology, and anthropology have used multiple conceptual frameworks and models (e.g., bio-ecological, family stress, cultural ecological, risk and resilience) to examine factors that promote and undermine father-child relationships across cultural and ethnic groups (see volumes by Cabrera & Tamis-LeMonda, 2013; Gray & Anderson, 2011; Lamb, 2010; Roopnarine, 2015; Shwalb et al., 2013). More recently, studies have also attempted to determine what intervention strategies might assist in arresting risks associated with fathering preschool-aged children in poor neighborhood and family environments (e.g., Fragile Families and Child Well-being study; Carlson & Maclanahan, 2010). Together, these studies have provided a good deal of insights on proximal and distal factors that influence early father-child relationships. However, an area of inquiry that has received comparatively less attention is the impact of economic hardship and fathers' mental health on childhood development and the factors that might attenuate the negative consequences of economic hardship and fathers' mental health on children's social and cognitive skills. This study constitutes an attempt to add to our understanding of how two paternal risk factors work to influence children's early development in fathers who did and did not receive relationship skills education. In this chapter, I will first discuss the findings of this study in accordance with the research questions and hypotheses and then discuss variations in patterns of associations among the complier, non-complier, and control groups.

Rooted in propositions within family stress theory, the bioecological model, attachment theory, risk and resilience models, and paternal involvement models and the preventative science

approach to working with “at risk” families, the present study had three basic goals. It first established measurement invariance in economic hardship, paternal depressive symptoms, paternal engagement in social and cognitive activities, caregiving activities, and physical play, and children’s internalizing and externalizing behaviors across African American, European American, and Hispanic American fathers. It then assessed the associations between paternal economic hardship and children’s internalizing and externalizing behaviors via paternal depressive symptoms and paternal engagement in caregiving activities, social and cognitive activities, and physical play across the complier, non-complier, and control groups. Lastly, it examined the role of race/ethnicity on the associations between economic hardship and children’s internalizing and externalizing behaviors, via paternal depressive symptoms and paternal engagement in caregiving activities, social and cognitive activities, and physical play.

In order to improve and build upon much of the work on fathering interventions that had small, unrepresentative samples, and simply compared mean differences between the treatment and control groups (see Panter-Brick et al., 2014 for a consideration of studies in this area), the present study utilized data from a randomized controlled trial that included father-child dyads from diverse ethnic backgrounds across eight rural and urban locations in the United States. It also utilized Bayesian multi-group path analysis which provides for greater flexibility to estimate unbiased direct and indirect estimates, standard errors, and confidence intervals with non-normal distributions (van de Schoot et al., 2014). In keeping with efforts to address paternal risk factors through early intervention, this study also evaluated the potential impact of relationship skills education on the associations between two critical risk factors, economic hardship and fathers’ mental health and children’s behavioral difficulties in low-income men who are in structurally

unstable relationships and unions. Put differently, this study tried to address limitations in fatherhood intervention studies discussed at the end of chapter 3.

### **Equivalence across Racial/Ethnic Groups**

The psychometric properties of common behavioral indicators have been inadequate when used with different cultural and ethnic groups (van der Vijver & Leung, 1997). Prior to conducting path analysis, it was important to establish that the paternal and child measures had similar psychometric properties across different racial/ethnic groups. Bayesian multiple group confirmatory factor analysis confirmed measurement invariance in paternal depressive symptoms, economic hardship, paternal engagement in caregiving activities, social and cognitive activities, and physical play, and children's internalizing and externalizing behaviors across African American, European American, and Hispanic American families. That is, the paternal and child instruments utilized in the BSF study had approximately the same psychometric properties and were generalizable across racial-ethnic groups. Identical analysis conducted on measures of depressive symptoms, economic hardship, paternal engagement in physical play, social and cognitive activities, and caregiving activities, and internalizing and externalizing behaviors indicated that there were no differences in the structural properties of these measures across compliers, non-compliers and controls. It is important to mention that the 36-month impact assessments in the BSF study reported small yet significant mean differences in father involvement, relationship quality, parental depressive symptoms, and childhood outcomes. These differences could be attributed to the large sample size in the BSF study (Wood, Moore, Clarkwest, Killewald, & Monahan, 2012).



## **Associations among Economic Hardship, Paternal Depressive Symptoms, Paternal Engagement and Children's Behavioral Difficulties**

Links between economic hardship and family relationships and childhood outcomes have been shown in several studies (Conger et al., 2002; Leinonen et al., 2002; Reeb et al., 2013). Research has also determined associations between fathers' mental health and childhood development jointly with maternal mental health (e.g., Shen et al., 2016) and independent of maternal mental health (Sethna et al., 2015). As already indicated, both economic hardship and paternal depressive symptoms have not been adequately addressed in the fathering and family intervention literatures (see Fagan & Palm, 2015). In this study, it was hypothesized that paternal economic hardship would be positively associated with paternal depressive symptoms, which in turn, would be negatively associated with paternal engagement in caregiving activities, social and cognitive activities, and physical play across groups. Consistent with those of other investigations (e.g., Stykes, 2015; Fagan & Palkovitz, 2007), results from this study revealed that sociodemographic variables such as marital status, living arrangements with partner, paternal age and children's sex were related to paternal depressive symptoms, paternal engagement in caregiving activities, social and cognitive activities, and physical play, and children's internalizing and externalizing behaviors. In several investigations conducted in diverse cultural and ethnic groups (e.g., Samms-Vaughan, 2005; Planalp & Braungart-Rieker, 2016), family structural arrangements and stability exerted undue influence on adult adaptability, family cohesion, and parenting.

For the complier and control groups, higher levels of economic hardship were linked to higher levels of paternal depressive symptoms—suggesting the vulnerability of fathers' personal functioning to economic hardship irrespective of whether they received relationship skills

education classes. Equally informative is that paternal depressive symptoms were negatively associated with paternal engagement in caregiving activities, social and cognitive activities, and physical play across the non-complier, complier, and control groups. These findings are in accord with family stress theory which suggests that economic difficulties have unfavorable effects on parents' mental health and different dimensions of parenting, such as emotional availability, acceptance, sensitivity and warmth, and engagement (Reeb et al. 2010). Families' insufficient economic resources and circumstances deteriorate parents' ability of fulfilling children's needs and demands, which leads to parental stress and ineffective childrearing strategies (McConnell et al., 2011). Specifically, exposure to financial difficulties disrupts favorable parenting behaviors that compound children's behavioral problems (McConnell et al., 2011). Further, low levels of paternal warmth, high levels of father-child conflict and paternal depressive symptoms have been found to emerge out of adverse financial circumstances (Neppi et al., 2015; Wadsworth et al., 2013). The persistency and intensity of families' financial difficulties also exacerbate their perception of parental efficacy, which elevates their aggression and hostility toward their children (Elgar, Mills, McGrath, Waschbush, & Brownridge, 2007).

Previous research has also found that fathers' adjustment difficulties interfere with their relationships with their children and jeopardize their responsive parenting behaviors (Burkhart et al., 2013; Connell & Goodman, 2002; Garai et al., 2009; García et al., 2014; Grant et al., 2012; Kohl et al., 2011; O'Hara & Fisher, 2010; Wilson & Durbin, 2010), and affect children's and adolescent's adjustment and academic achievement (Betts et al., 2014; Shen et al., 2016; Coyne & Thompson, 2011; van der Bruggen et al., 2010). These data confirm the negative associations between father's depressive symptoms and caregiving activities and investment in social and cognitive interactions with children found in several other studies. Their meaning for children's

development during the formative preschool years when the acquisition of social and cognitive skills lay the foundation for early learning should not be underestimated (Shonkoff & Phillips, 2000).

The preventative science approach (see Cowan et al., 2009) stresses the need to identify protective factors within the proximal and distal ecologies of families that may help to ward off potential negative effects of poor home, early childhood care and education, and neighborhood environments on childhood development (see Panter-Brick et al., 2014). For example, the role of ethnic socialization, neighborhood collective efficacy, and paternal warmth seem to mediate the associations between harsh parenting and childhood outcomes (Roopnarine, 2015). In view of the importance of positive parent-child relationships for optimal child development outcomes (Cabrera & Tamis-LeMonda, 2013), it was also hypothesized that paternal engagement in caregiving activities, social and cognitive activities, and physical play would mediate the associations between paternal depressive symptoms and children's internalizing and externalizing behaviors. This hypothesis received partial support. For the complier group, paternal engagement in caregiving activities mediated the associations between paternal depressive symptoms and children's internalizing behavior and it mediated the associations between paternal depressive symptoms and children's internalizing and externalizing behaviors for the control group. However, paternal depressive symptoms were directly associated with children's internalizing and externalizing behaviors for the non-complier group.

As mentioned above, experiencing common mental health difficulties such as anxiety and depression can undermine fathers' caregiving ability, which in turn, can worsen children's behavioral difficulties. Conversely, fathers' optimal engagement in caregiving activities, such as feeding a child or helping a child to get dressed, may promote healthy father-child attachment

that lessens the negative effects of paternal mental health difficulties on children's socio-emotional and behavioral difficulties (Palm, 2014). In accordance with the tenets of interpersonal acceptance rejection theory (Rohner, Khaleque, & Cournoyer, 2012), fathers who engage in caregiving activities attend to the basic needs of children. This may signal their acceptance and the value they place on positive feelings toward their young children. The demonstration of care seems to lessen the impact of depressive symptoms on children's behavioral difficulties. It is not clear why paternal caregiving did not mediate the associations between paternal depressive symptoms and children's behavioral difficulties in the non-complier group. Remember the non-complier group was assigned to the treatment group and declined to attend any of the relationship skills or parenting classes. It may be that for this sub-group of fathers, personal circumstances and parent-child relationships worsened post-intervention when compared to the complier and control group. The 36-month assessments occurred almost 2 years after the intervention.

It was somewhat surprising that paternal engagement in social and cognitive activities and physical play were not associated with children's internalizing and externalizing behaviors across the three groups. These father-child behaviors are seen as central to engaged fathering in newer conceptual frameworks on father-child involvement (e.g., Pleck, 2010) and are related to various aspects of children's social and cognitive functioning (Smith, 2012). In particular, physical play has been proposed to have an enabling effect on the development of father-child attachment (Paquette, 2004) and fathers' engagement in cognitive activities during early childhood are associated with children's language development (Shannon et al., 2002; Tamis-LeMonda et al., 2004), math and reading abilities (McFadden, Tamis-LeMonda, & Cabrera, 2012), and school readiness (McWayne et al., 2013). The findings on the lack of associations

between father-child cognitive and social activities and play are contrary to those of Jia, Kotila, and Schoppe-Sullivan (2012) who found that fathers' engagement in play was negatively associated with preschoolers' internalizing and externalizing behaviors when the play was accompanied by supportive co-parenting. It should be pointed out that in the Jia et al. (2012) longitudinal study, the associations between paternal engagement in play and children's adjustment problems were negligible when supportive co-parenting was not included in their model. Possibly, other family mechanisms such as parental cooperation, warmth, and interactiveness provide a platform for bouts of meaningful parent-child play. This study only examined how economic risk and paternal mental health influence paternal engagement in caregiving and play. From ecological systems perspective, it may be that maternal mental health and inter-parental relations, such as conflict resolution strategies (e.g., that avoids blaming and high levels of anger) and communication between parents, may define the quality of paternal engagement in play. For instance, Planalp and Braungart-Rieker (2016) found that marital conflict moderated the associations between maternal depressive symptoms and paternal engagement in caregiving activities and in play over time—further suggesting the importance of examining other variables in the couple dynamics on father involvement with children.

### **Possible Influence of Relationship Skills Education**

One of the goals of this study was to determine whether or not receiving parenting and relationship skills education classes influenced the negative effect of economic hardship and poor paternal mental health on paternal parenting. To reiterate: the complier group was defined as fathers who received at least one parenting or relationship skills education session, either with their romantic partner or alone. The strength of the associations slightly differed by group status, specifically in regards to the links between economic hardship and paternal depressive

symptoms, paternal depressive symptoms and paternal involvement, and in the indirect pathways between economic hardship and paternal engagement via paternal depressive symptoms. In general, the effects of economic hardship on depressive symptoms were stronger for fathers who were in the control group compared to fathers who were in the complier group.

Although there were small differences on the strength of the associations between paternal depressive symptoms, paternal involvement and children's internalizing and externalizing behaviors, among complier, non-complier, and control groups, there was some evidence that participating in parenting skills or relationship education classes in this study may reduce the detrimental effect of paternal depressive symptoms on paternal involvement with children. In particular, the strength of associations between paternal depressive symptoms and paternal engagement in social and cognitive activities, caregiving activities, and physical play were weaker for fathers who attended parenting or relationship skills education classes compared to fathers who were offered classes but did not attend the parenting or relationship skills education classes and fathers who were in the control group. These results are in line with propositions within the bioecological systems framework, which emphasizes the interplay between family dynamics and paternal engagement. They are also in agreement with those of several prior investigations that demonstrated the beneficial impact of intervention programs on paternal sensitivity, positive parenting strategies, and fathers' involvement in children's lives (Benzies et al., 2008; Doherty et al., 2006; Raikes & Belotti, 2006). The findings were also consistent with other investigations (e.g., Rienks et al., 2011) that explored factors of father involvement, paternal depressed mood, anxiety, stress and coping efficacy, and co-parental relationship across samples of attenders, non-attenders, and control group couples using pretest-posttest design. There was significant mean difference in father involvement between the pretest

and posttest for fathers who attended fatherhood, relationship, and marriage education workshops compared to fathers who did not do so.

In as much as these findings are encouraging, the lack of pre-intervention assessment in the BSF study makes it difficult to argue that intervention status had a direct effect on the strength of the relationship between paternal depressive symptoms and paternal involvement. For one, it is entirely plausible that changes in fathers' sociodemographic characteristics over time could have accounted for the association between fathers' depressive symptoms and their engagement in activities with children. Employment status, job conditions, family stability, residential status, marital status, and educational attainment are all connected to paternal depressive symptoms (McConnell et al., 2011; McLoyd, 1998).

It is also noteworthy that receiving parenting or relationship skills education classes may have potential positive influences on the links between paternal depressive symptoms and children's internalizing and externalizing behaviors via paternal engagement in caregiving activities. Again, the strength of the pathways of associations between paternal depressive symptoms and internalizing behavior via paternal engagement in caregiving activities was stronger for the complier group than for the control group. This is consistent with findings in the existing literature that suggest the positive influence of participating in parenting or couple relationship education classes on fatherhood and family relationship quality (Fitzgerald et al., 2012). Adding to the caveats made earlier, once the intervention was over fathers in the complier group may have decided to expend more energy in improving their relationship quality with their partner and their parenting skills which led to better family functioning and more favorable childhood outcomes compared to the other groups. However, this is mere speculation at this juncture.

A final focus of this research was whether race/ethnicity moderates the associations between economic hardship, paternal depressive symptoms, fathers' involvement with children, and children's internalizing and externalizing behaviors. As was hypothesized, the strength of the associations between these variables were invariant across African American, European American, and Hispanic American father-child dyads. These findings lend support to previous claims that the pathways of associations between economic strain and children's behaviors via parental stress are similar across racial-ethnic groups (Conger et al., 2002). For example, Mistry et al. (2002) investigated the intervening effects of parental psychological distress, parental responsiveness, and parental disciplinary efficacy on the associations between economic hardship and positive and problematic child social behaviors among African American and Hispanic American parents and their school aged children. Parents' psychological distress mediated the impact of economic wellbeing and perceived economic pressure on parental responsiveness, which in turn, was negatively associated with children's externalizing behavior, hyperactivity, and disciplinary actions, and were positively associated with children's autonomy, compliance, and social competence. The strength of associations between economic hardship, parental distress, parenting behavior, and children's social behavior did not differ by sex or by race/ethnicity.

### **Summary**

This study contributes to the body of prior work on fathering that focused on the associations between economic hardship, paternal depressive symptoms, and central aspects of paternal engagement and children's behavioral difficulties after controlling for paternal and family characteristics. As in several other research projects (Neppl et al., 2015; O'Hara & Fisher, 2010; Wadsworth et al., 2013), economic risk and poor paternal mental health appear to



be strong predictors of paternal engagement in caregiving activities and play with preschoolers across racial-ethnic groups. At the same time, paternal engagement in caregiving activities emerged as a potential “protective factor” in that it mediated the influence of paternal depressive symptoms on preschooler’s internalizing behavior. This notwithstanding, paternal engagement in social and cognitive activities and physical play were unrelated to children’s internalizing and externalizing behaviors.

These findings also contribute to the intervention literature in that the possible influence of relationship skills education on paternal parenting and preschooler’s behavioral difficulties was explored. The strength of the pathways of associations between economic hardship and paternal engagement in caregiving activities, social and cognitive activities, and physical play via paternal depressive symptoms were weaker for the complier group compared to the control group. By comparison, the strength of the pathways of association between paternal depressive symptoms and children’s internalizing behavior via paternal engagement in caregiving activities was stronger for the complier than the control group.

The influence of economic hardship and paternal mental health on children’s behavioral functioning was similar across the complier, non-complier, and control groups. Receiving parenting and relationship skills education classes could have affected the associations between paternal risk factors, paternal engagement with children, and children’s behavioral difficulties. Among the major constructs examined in this study, patterns of associations appear to be similar across African American, European American, and Hispanic American father-child dyads, suggesting the strong role of paternal risk factors in charting a course for father-child relationships and children’s functioning during the preschool years.

## **Limitations**

Despite the possible utility of these findings for informing prevention science research, there are a number of limitations in the design features of the intervention and in the sample characteristics that limit generalizations across fatherhood programs and cultural groups. First, this study utilized measurements at one point that cannot infer temporal order in pathways of associations among depressive symptoms, paternal involvement with children, and children's internalizing and externalizing behaviors. Besides economic hardship, which was assessed when children were 15 months old, all of the other variables were assessed when children were 36 months of age. Thus it is not possible to address causality in the hypothesized paths or directionality between constructs. Nevertheless, all of the paths in this study were drawn from theoretical models and previous studies that utilized rigorous study designs, such as experimental design or longitudinal analysis, that may assist in shedding light on the direction of associations between constructs in the current study (Cabrera et al., 2007a; Conger et al. 1993; Fagan et al., 2009; Lamb et al., 1985; Khaleque & Rohner, 2012; Palm, 2014).

A second limitation concerns the single source of information. Different sources of information were attempted from different family members. Mothers and fathers provided assessments of children's internalizing and externalizing behaviors. Economic hardship, paternal depressive symptoms, paternal engagement in social-cognitive activities and play were based on fathers' self-reports. The latter might have increased method variance shared among constructs in the conceptual model. To increase model efficiency, future research in this area might benefit from multi-informant methods, particularly from mothers. Low-income, unmarried men move in and out of romantic relationships and prior partners may be a useful source of data as well. As

the present study utilized a secondary data set, the assessment measures included in the model tested were limited by the BSF study's design.

Another potential limitation of this study concerns the generalizability of findings. The BSF study did collect data on families from diverse backgrounds, but African American families were oversampled while European American and Hispanic American families were under-represented. It is also the case that only fathers who lived with the focal child, at least some of the time, were examined in these analyses. As a result, these findings are not generalizable to non-resident fathers who constitute a significant portion of low-income fathers and who remain an elusive target of intervention programs. Furthermore, fathers assigned to the treatment group participated in relationship skills education or parenting classes prior to the 15-month assessments. The lack of pre-intervention assessments makes it difficult to ascertain the effect of receiving parenting or relationship skills education classes on fathers' and children's social functioning over time. It may be that other factors not measured here contributed to the differences between the BSF complier, non-complier, and control groups over time.

### **Policy Implications**

A chief aim of this study was to add to our understanding of the complex interplay between economic hardship and fathers' mental health and parenting and their links to children's behavioral well-being. Along with recommendations made by researchers (e.g., Cowan et al., 2009; Fagan & Palm, 2015), early childhood educators (e.g., ECP, Child Trends), government and state entities (e.g., the US Department of Health and Human Services, Administration of Children and Families), national fatherhood groups (e.g., National Fatherhood Initiative; Fatherhood Research and Practice Network), and international organizations (e.g., Sonke Justice Centre in South Africa, Promundo in Washington, DC.), the findings of this study have

implications for attending to the needs of fathers and children living in difficult circumstances. The examination of risk factors associated with paternal functioning are particularly important for developing and tailoring prevention and intervention programs and for informing policies in situ that target low-income families at risk.

In the main, economic risk and paternal responsibilities to young children have received quite a bit of attention in terms of educational and job training. Unfortunately, this approach has often ignored the mental health of fathers and consistent access to services that focus on men's personal and interpersonal functioning. The findings of the present study discerned the strength of associations between paternal mental health and the different domains of father involvement and children's internalizing and externalizing behaviors across racial-ethnic groups that could potentially inform several healthy marriage and fatherhood programs. Intervention programs can help to promote optimal intrapersonal and interpersonal functioning by taking into consideration economic challenges. Programs that focus on the bidirectional links between fathers' mental health, economic challenges, intimate relationship with their partner, their transition to parenting and co-parenting in families from diverse socio-demographic, cultural and racial/ethnic backgrounds may reduce potential barriers to attending programs. Marrying approaches that in combination deal with economic and paternal functioning can help to stave off the negative consequences of economic hardship and paternal mental health on childhood development.

Table 1. Baseline Characteristics

	Maryland		Louisiana		Florida		Georgia		Texas (Houston)		Indiana		Oklahoma		Texas (San Angelo)	
	C	P	C	P	C	P	C	P	C	P	C	P	C	P	C	P
Age (years)	25.56 (6.43)	25.71 (6.90)	25.56 (5.93)	24.84 (5.95)	24.72 (5.66)	25.22 (6.69)	25.07 (6.18)	24.91 (5.70)	27.11 (6.29)	26.99 (6.99)	24.87 (5.73)	26.73 (6.27)	25.52 (6.47)	25.32 (5.85)	24.32 (5.82)	24.26 (5.61)
Relationship status																
Part-time cohabiting	56.5%	48.4%	50.4%	44.1%	42.5%	44.1%	49.0%	42.7%	24.7%	19.9%	26.2%	29.8%	25.3%	27.6%	21.8%	19.5%
Full time cohabiting	39.3%	48.2%	45.7%	52.1%	51.5%	51.0%	45.0%	49.4%	62.1%	68.5%	65.5%	63.9%	68.3%	65.1%	72.5%	72.5%
Married	4.2%	3.4%	3.9%	3.8%	6.0%	4.8%	6.0%	7.9%	13.2%	11.6%	8.3%	6.3%	6.3%	7.4%	5.6%	8.1%
Race/ethnicity																
Hispanic American	.4%	-	.4%	.3%	13.4%	9.3%	9.3%	10.4%	86.2%	90.6%	7.3%	9.6%	18.8%	19.5%	62.7%	59.7%
European American	1.5%	2.3%	11.3%	12.9%	7.0%	4.1%	-	.2%	1.1%	-	27.7%	22.6%	29.6%	30.1%	14.8%	16.1%
African American	93.5%	92.0%	76.6%	77.3%	58.2%	61.7%	83.5%	81.2%	6.3%	3.9%	37.4%	46.6%	22.2%	24.8%	2.1%	2.0%
Other	4.6%	5.7%	11.7%	9.4%	21.4%	24.8%	7.2%	8.1%	6.3%	5.5%	27.7%	21.2%	29.4%	25.5%	20.4%	22.1%
Education																
Less than high school	37.7%	42.4%	30.9%	35.7%	25.5%	29.4%	34.4%	36.3%	44.1%	47.8%	22.4%	30.0%	31.8%	30.2%	35.9%	31.4%
High School diploma	52.3%	42.4%	41.3%	36.0%	59.9%	58.5%	49.5%	47.3%	46.0%	41.9%	32.8%	32.2%	53.8%	54.7%	44.9%	51.4%
GED or equivalency	9.3%	14.2%	13.1%	11.1%	12.9%	10.1%	15.3%	15.3%	7.4%	8.9%	10.8%	10.3%	14.0%	14.3%	12.0%	14.9%
Other	.3%	1.0%	14.7%	16.9%	1.4%	2.0%	.9%	.6%	2.5%	1.5%	24.6%	18.0%	.2%	.8%	6.6%	2.3%
Employment																
Working at a job for pay	61.3%	54.0%	76.8%	78.2%	77.1%	83.0%	63.0%	66.7%	88.6%	90.1%	73.7%	72.5%	78.1%	77.7%	75.4%	81.7%
Not working	38.3%	45.4%	23.2%	21.8%	20.6%	16.4%	36.8%	33.3%	10.4%	9.9%	25.4%	27.0%	21.3%	22.3%	22.8%	17.7%
Primary Language																

English	100%	99.3%	99.1%	99.4%	90.5%	89.6%	88.0%	87.3%	22.8%	19.2%	90.9%	90.6%	85.0%	82.1%	90.4%	92.0%
Spanish	-	.7%	.6%	.6%	5.2%	5.2%	11.4%	12.7%	75.7%	79.8%	8.6%	9.4%	14.8%	17.5%	7.8%	8.0%
Live with mother																
All of the time	48.7%	57.6%	57.8%	63.4%	68.2%	63.7%	63.0%	67.3%	81.7%	83.7%	77.6%	73.4%	79.7%	77.5%	80.8%	85.1%
Most of the time	17.3%	13.6%	9.5%	9.2%	10.3%	11.8%	10.8%	12.5%	9.9%	8.4%	8.2%	8.2%	6.7%	9.5%	9.0%	5.1%
Some of the time	15.7%	11.6%	15.9%	12.3%	12.0%	14.1%	15.9%	12.3%	6.9%	5.4%	6.9%	11.2%	7.5%	7.0%	4.8%	4.6%
Never	18.3%	16.9%	16.8%	14.8%	9.5%	10.4%	10.1%	7.7%	1.5%	2.0%	7.3%	6.9%	5.9%	6.0%	4.8%	4.6%



Figure 37b

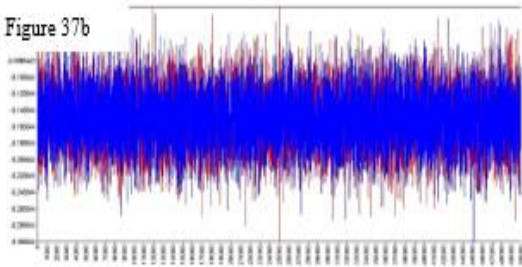


Figure 38b

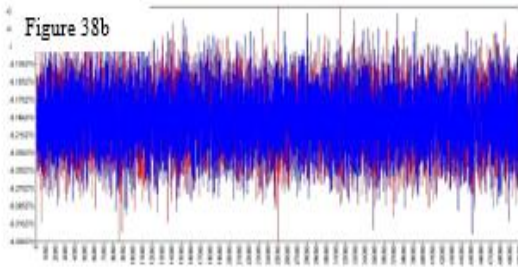


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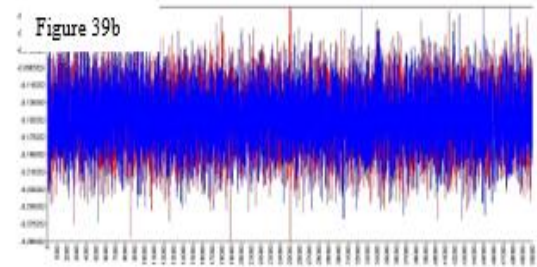


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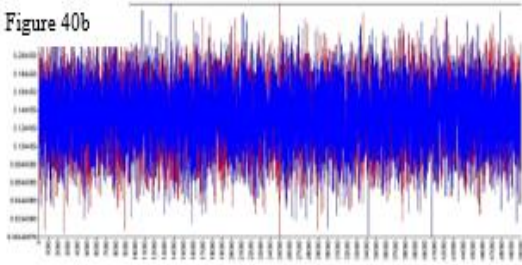


Figure 41b

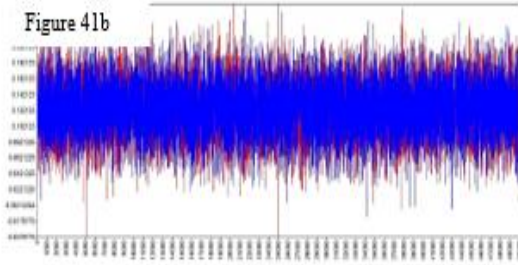


Figure 42b

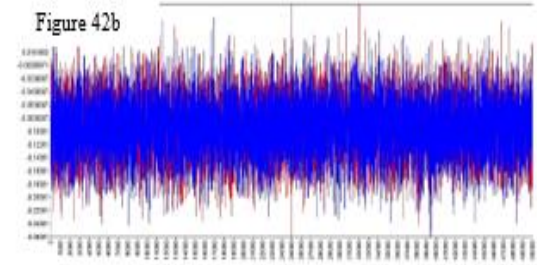


Figure 43b

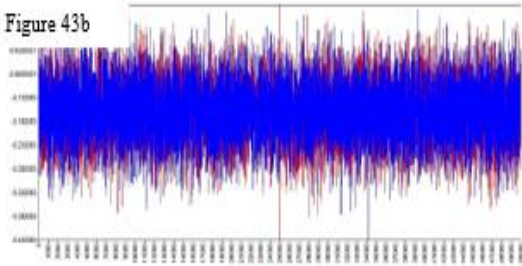


Figure 44b

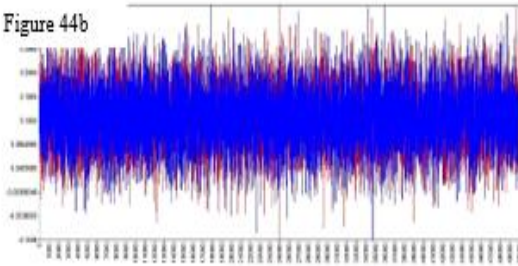


Figure 45b

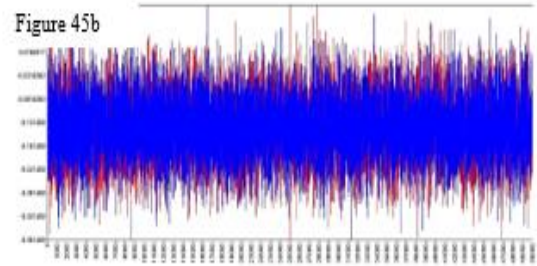


Figure 46b

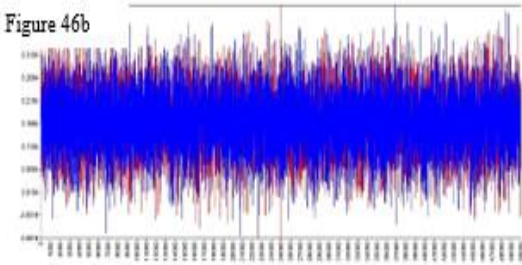


Figure 47b

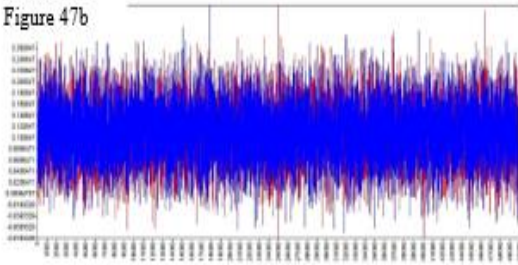


Figure 48b

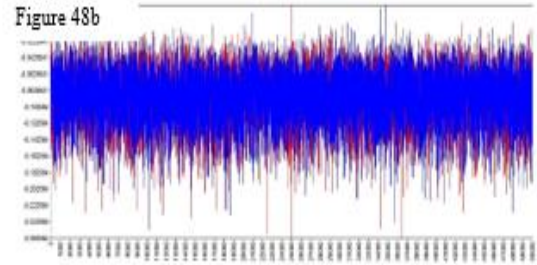




Figure 49b

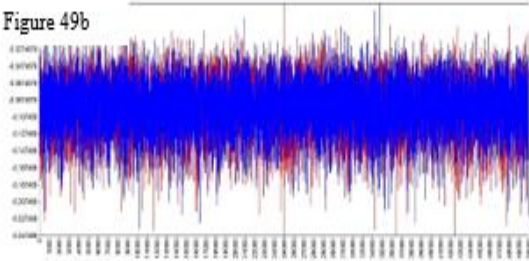


Figure 50b

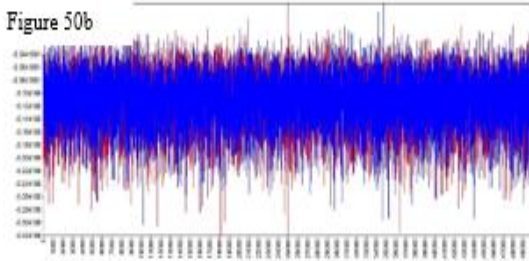


Figure 51b

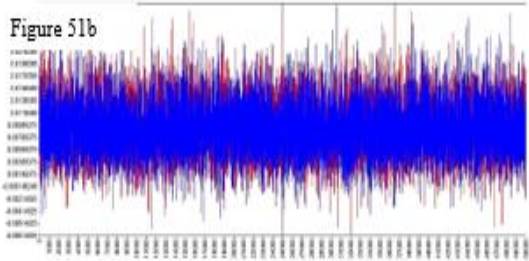


Figure 52b

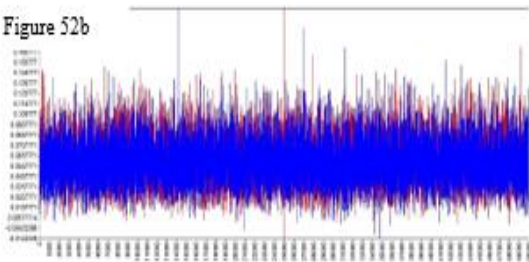


Figure 53b

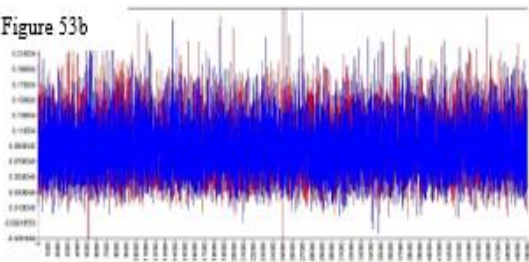


Figure 55b

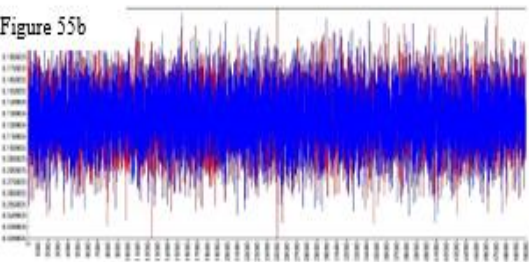


Figure 56b

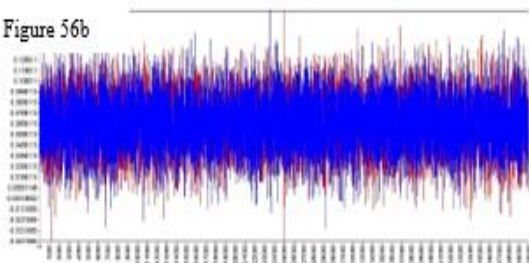


Figure 57b

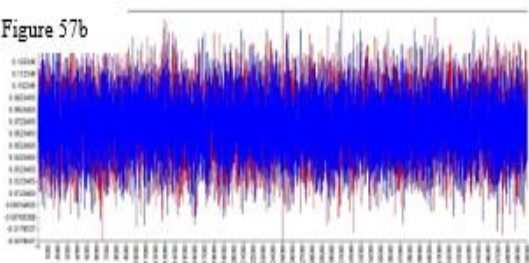


Figure 58b

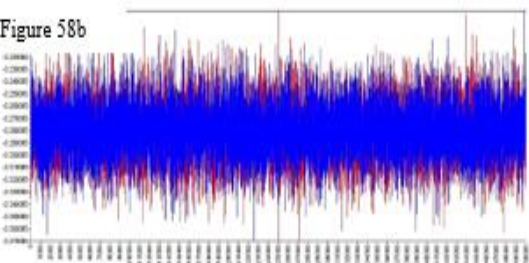


Figure 59b

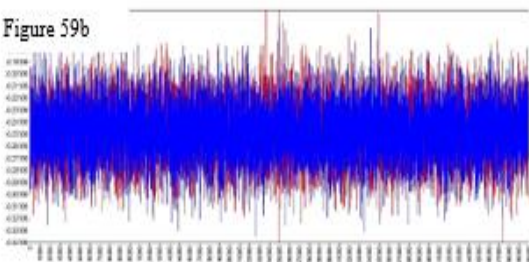


Figure 60b

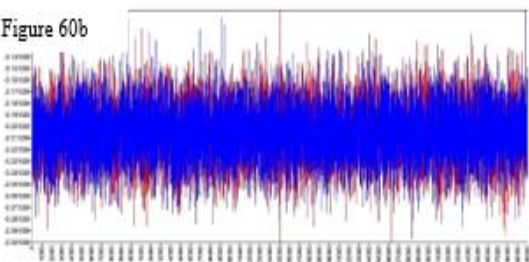


Figure 61b

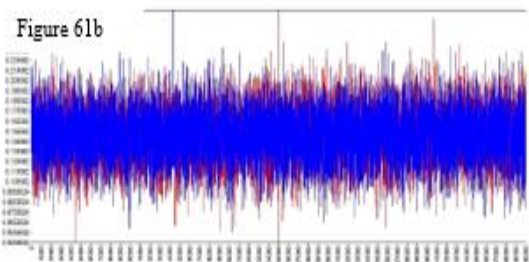


Figure 62b

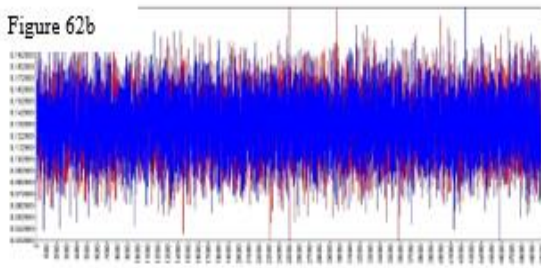


Figure 63b

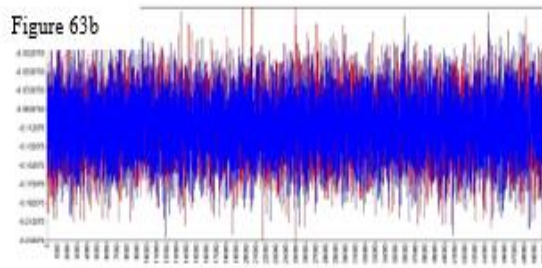


Figure 64b

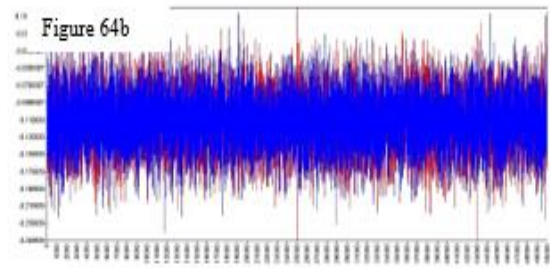


Figure 65b

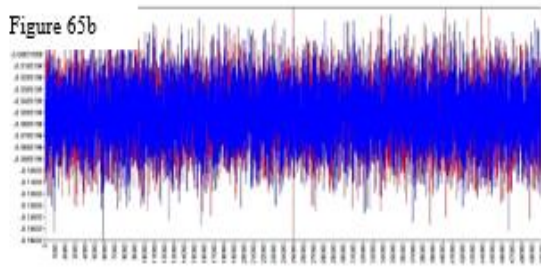


Figure 66b

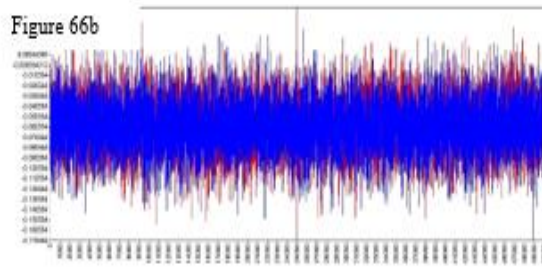


Figure 67b

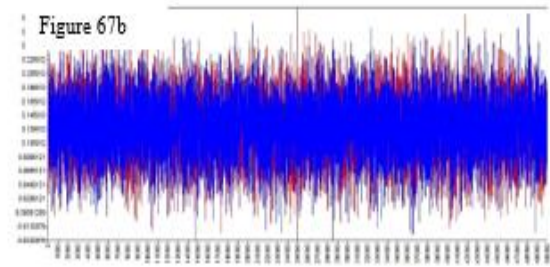


Figure 68b

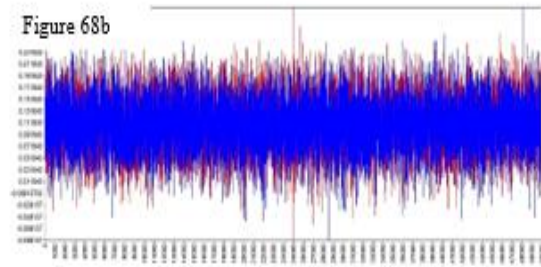


Figure 69b

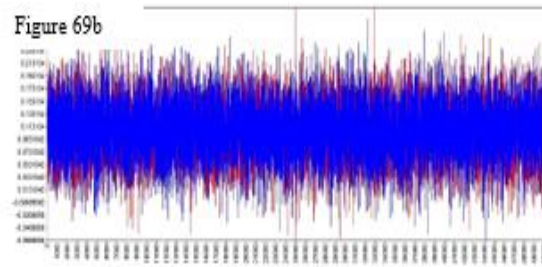


Figure 70b

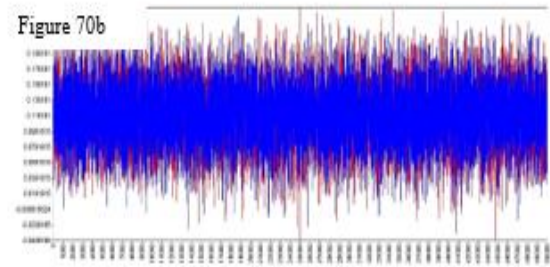


Figure 71b

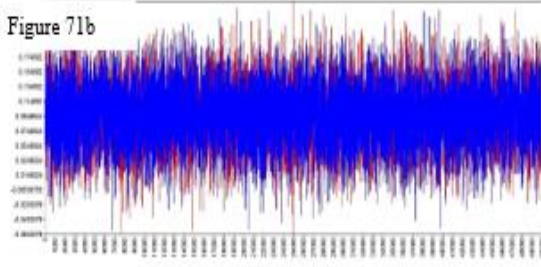


Figure 72b

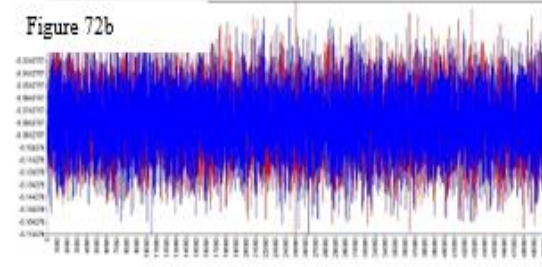


Figure 73b

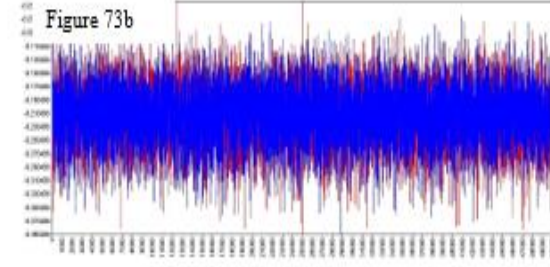


Figure 74b

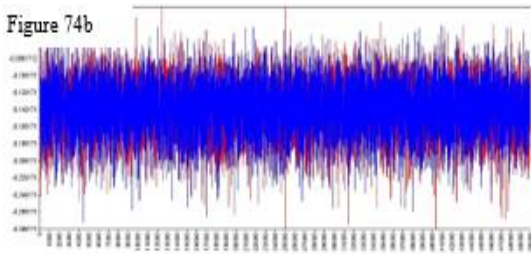


Figure 75b

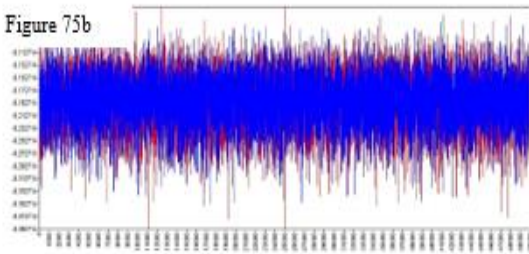


Figure 76b

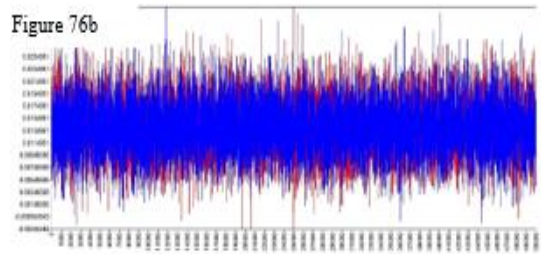


Figure 77b

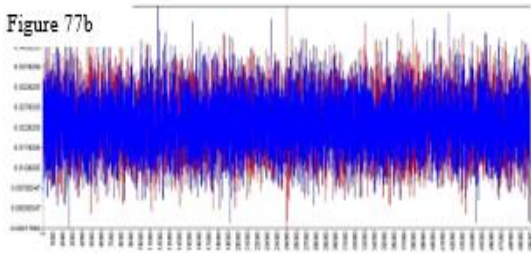


Figure 78b

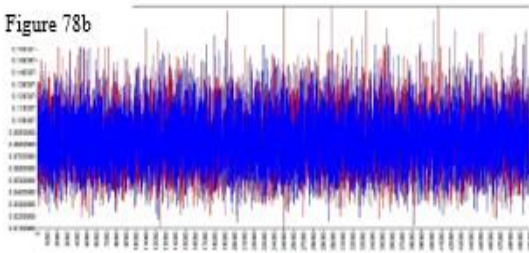


Figure 79b

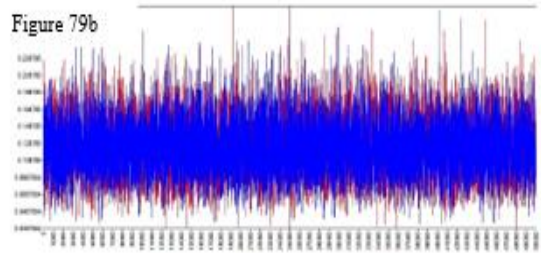


Figure 82b

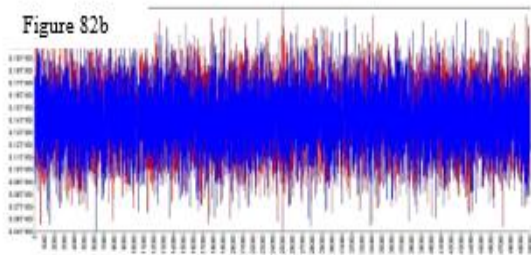


Figure 83b

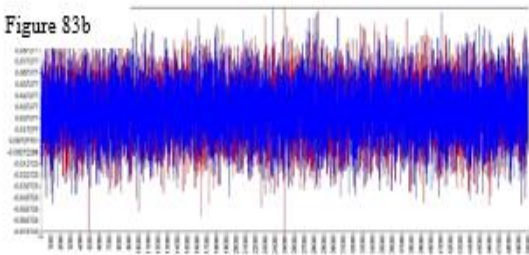


Figure 84b

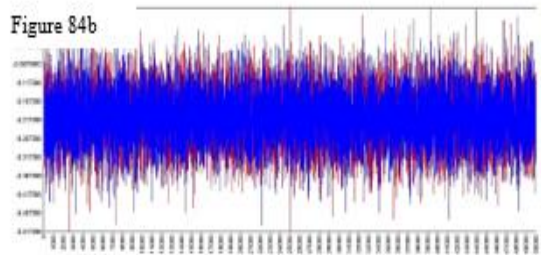


Figure 85b

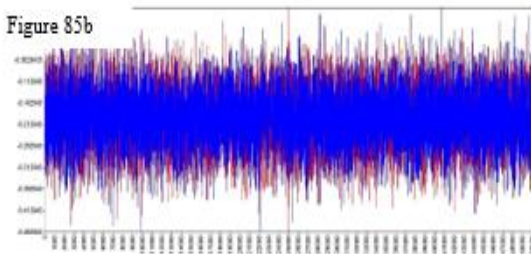


Figure 86b

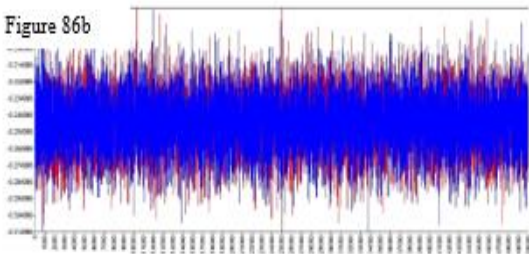


Figure 87b

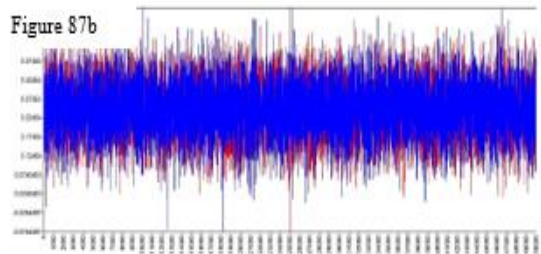




Figure 100b

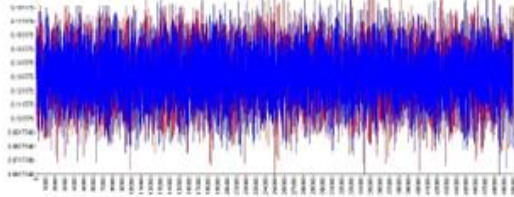


Figure 101b

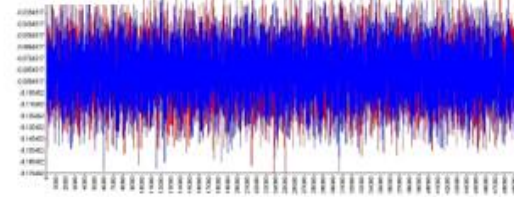


Figure 102b

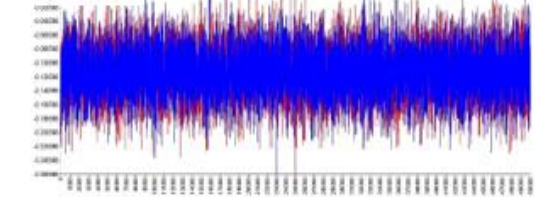


Figure 103b

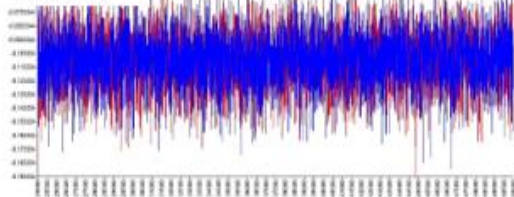


Figure 104b

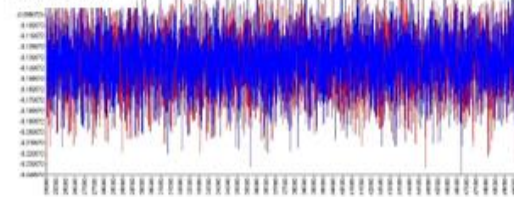


Figure 105b

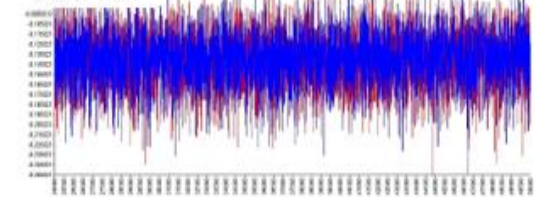


Figure 106b

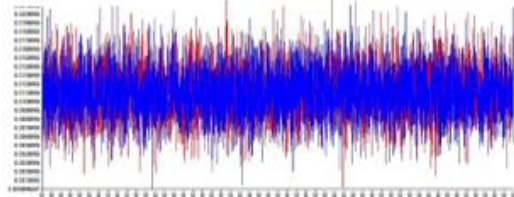


Figure 107b

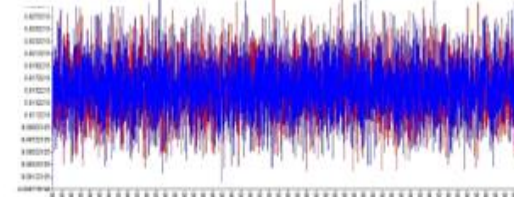


Figure 108b

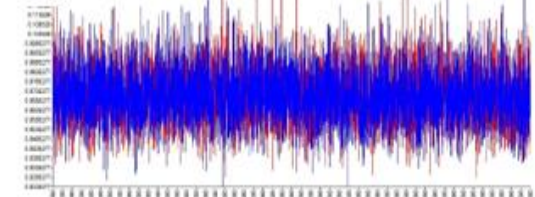
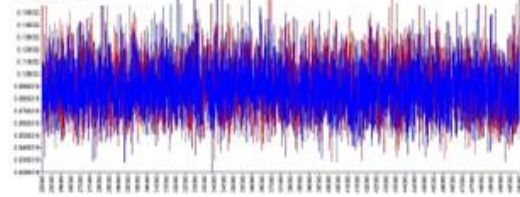


Figure 109b



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**MS in Applied Statistics** **2014**

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**MS in Child and Family Studies** **2013**

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Advisor: Jaipaul L. Roopnarine, PhD.

Thesis title: Relationships between Parenting Styles, Severity of Punishment, Importance of Religion in Child Development and Childhood Social Behaviors in Caribbean Immigrant Families.

**BA in Sociology** **2004**

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***Grants***

Administration for Children and Families 2014 -2016

U. S. Department of Health and Human Services

Paternal Factors and Childhood Outcomes: The Mediating Role of Relationship Quality and Support Networks. PI: Jaipaul L. Roopnarine. (\$100,000).

***Scholarships and Awards***

Turkish Ministry of National Education Scholarship 2008-2016

Child and Family Studies Master's Award for Research Excellence 2013

Syracuse University

John and Beatrice Whiting Memorial Award for Outstanding Student in Cross-Cultural Studies  
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***Research Experience***

**Research Assistant**

Department of Child and Family Studies  
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Fall 2014-Spring 2016

Supervisor: Jaipaul L. Roopnarine

Project Involved: Paternal Factors and Childhood Outcomes: The Mediating Role of Relationship Quality and Support Networks.

Department of Nutrition

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Supervisor: Tanya M. Horacek, PhD RD

Project Involved:

- a. Healthy Campus Environmental Audit: Development, Validation and Automation
- b. Green Eating Behavior among College Students

**Graduate Assistant**

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Supervisor: Matthew Mulvaney, Ph.D.

Project Involved:

- a. Predictors and Outcomes of Physical Punishment (Cross-cultural comparison)
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***Teaching Experience***

**Instructor**

Department of Child and Family Studies  
CFS 331: Play, Childhood Development and Early Education

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HSH 101: Freshmen Gateway  
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Summer 2015

Department of Public Health  
Syracuse University

Spring 2015

Department of Nutrition Science and Dietetics  
Syracuse University

Fall 2014 - Spring 2015

Department of Nutrition Science and Dietetics  
Syracuse University

Fall 2013

### ***Publications***

**Dede Yildirim, E.** & Roopnarine, J. L. (2014). The Mediating Role of Maternal Warmth in the Associations Between Harsh Parental Practices and Externalizing and Internalizing Behaviors in Hispanic American, African American, and European American Families. *Cultural Diversity And Ethnic Minority Psychology*, doi:10.1037/a0038210

Roopnarine, J.P., **Dede Yildirim, E.** (2015). Family Structure and Socialization Patterns in Caribbean and Caribbean Immigrant Families: Developmental Outcomes. In U. Gielen & J. L. Roopnarine (Eds.), *Childhood and adolescence in cross-cultural perspective*. New York, NY: Praeger.

Roopnarine, J.P., **Dede Yildirim, E.** (2016). Fathering in Diverse Cultural Contexts: A Glimpse at the Current State of Knowledge. <http://www.child-encyclopedia.com/>

Mullin, M., **Dede Yildirim, E.**, Kelly, E., Brown, O., Byrd-Brenner, C., Franzen-Castle, L., Greene, G., Kattelman, K., Kidd, T., Morrell, J., Olfert, M., Riggsbee, K., Shelnut, K., White, A., Horacek, T. (2015). A Simple Convenience Store SHELF (Supportive Healthy Environment for Life-promoting Food) Audit. *Journal of Nutrition Education and Behavior*, 47.

Horacek T, **Dede Yildirim, E.**, Kattelman K, Byrd-Brenner C, Brown O, Coby S, Greene G, Hoerr S, Kidd T, Koenig M, Phillips B, Morrell J, Olfert M, Shelnut K, White A. (in press). Mediating relationship of gender, campus walkability/bike-ability, and college students' exercise attitudes and behaviors on their body mass index.

### ***Manuscripts submitted for publication***

Roopnarine, J.L. & **Dede Yildirim, E.** Associations between Father's Depressive Symptoms and Interpersonal Violence and Childhood Behaviors Following Relationship Skills Education (*submitted for publication*)

**Dede Yildirim, E.** & Roopnarine, J.P. Maternal Psychological Aggression, Physical Assault, and Warmth and Childhood Academic Outcomes in Diverse Ethnic Groups (*submitted for publication*)

Roopnarine, J.P., & **Dede Yildirim, E.** Association between Relationship Education and Depressive Symptoms in Fathers with Young Children: A Complier Average Causal Effect Estimate. (*submitted for publication*)

### ***Manuscripts in Preparation***

**Dede Yildirim, E.** & Roopnarine, J. L. Stability and Change in Harsh Parenting over the Middle Childhood Period: Implications for Children's Intellectual Functioning.

**Dede Yildirim, E.** & Roopnarine, J.P. Paternal Risk and Protective Factors and Childhood Outcomes in Hispanic American, European American, and African American Families

### ***Books in Preparation***

Roopnarine, J. L., & **Dede Yildirim, E.** (in preparation). *Fathers in Cultural Contexts: Developmental and Clinical Issues*. Routledge Press.

### ***Presentations***

Roopnarine, J.P., & **Dede Yildirim, E.** (May 2016). Association between Relationship Education and Depressive Symptoms in Fathers with Young Children: A Complier Average Causal Effect Estimate. Modern Modeling Methods. Storrs, CT

**Dede Yildirim, E.**, Roopnarine, J.P. (February, 2016). Paternal Risk and Protective Factors and Childhood Outcomes in Hispanic American, European American, and African American Families. Society for Cross Cultural Research Conference, Portland, Oregon.

Roopnarine, J.P., **Dede Yildirim, E.** (November, 2014). Paternal Factors and Childhood Outcomes: The Mediating Role of Relationship Quality and Support Networks. Secondary Data Analysis Grantee Meeting. Washington D.C.

**Dede Yildirim, E.**, Roopnarine, J.P. (February, 2015). Parental Harshness and Warmth and Cognitive Outcomes in Hispanic American, African American and European American Families. The 44<sup>th</sup> annual meeting of the Society for Cross-Cultural Research. Albuquerque, NM.

**Dede Yildirim, E.**, Roopnarine, J.P. (May, 2015). Stability and Change in Harsh Parenting over the Middle Childhood Period: Implications for Children's Intellectual Functioning. Modern Modeling Methods. Storrs, CT.

Mullin M, **Dede Yildirim E**, Kelly E, Brown O, Byrd-Bredbenner C, Frazen-Castle L, Greene G, Kattelman K, Koenings M, Kidd T, Morrell J, Olfert M, Riggsbee K, Shelnut K, White A, Horacek T. (July, 2015). A Simple Convenience Store SHELF (Supportive Healthy Environment for Life-promoting Food) Audit. Society for Nutrition Education and Behavior Annual Meeting. Pittsburgh, PA.

Horacek T, **Dede Yildirim E**, Mullin M, Matthews M, Franzen Castle L, Koenings MM, Shelnut K White A. (June, 2015). Full Restaurant Evaluation Supporting a Healthy (FRESH) Dining Environment Audit. International Society for Behavioral Nutrition and Physical Activity Annual Meeting. Edinburgh, Scotland.

Horacek T, **Dede Yildirim E**, Kattelman K, Byrd-Bredbrenner C, Kidd T, Phillips B, Morrell J, Olfert M. (June, 2015). Mediating relationship of gender, campus food store environment, and college students' dietary attitudes and behaviors on their body mass index. International Society for Behavioral Nutrition and Physical Activity Annual Meeting. Edinburgh, Scotland.

Horacek T, **Dede Yildirim E**, Kattelman K, Koenings MM, Brown O, Colby S, Greene G, Hoerr S. (June, 2015). Mediating relationship of gender, campus walkability/bike-ability, college students' physical activity attitudes and behaviors on their body mass index. International Society for Behavioral Nutrition and Physical Activity Annual Meeting. Edinburgh, Scotland.

### ***Professional Development***

Immigration, Immigrants and Health Conditions, Health Status and Policies: August 2015  
Examining Multi-level and Multi-dimensional Models and Approaches  
ICPSR Summer Program, Ann Arbor, MI

Bayesian Data Analysis June 2015  
Instructor: John Kruschke, Ph.D.  
Stats Camp. Grapevine, TX.

New Features in LISREL 9 May 2015  
Instructor: Karl Jöreskog, Ph.D.  
Data Analysis Training Institute of Connecticut, Storrs, CT.

Multilevel Structural Equation Modeling using xxM. May 2015  
Instructor: Paras Mehta, Ph.D.  
Data Analysis Training Institute of Connecticut, Storrs, CT.

Meta-Analysis: Statistical Methods and Applications with R. June 2014  
Instructor: Tania B. Huedo-Medina, Ph.D.  
Data Analysis Training Institute of Connecticut, Storrs, CT.

Advances in Latent Variable Modeling Using the New Mplus Version 7.2. May 2014  
Instructor: Bengt Muthén, Ph.D.  
Data Analysis Training Institute of Connecticut, Storrs, CT.

Bayesian Methods for the Social and Behavioral Sciences. May 2014  
Instructor: David Kaplan, PhD.  
Data Analysis Training Institute of Connecticut, Storrs, CT.

### **Teaching-Related Professional Development**

Future Professorate Program Annual Conference May 2014  
Hamilton, NY

### **Professional Memberships**

Member of Student Council on Family Relations  
Member of American Statistical Association  
Member of National Council of Family Relations  
Society of Cross Cultural Research