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Maternal Incarceration and Young Adult Arrest: Examining the Effect of Sibling Relationships

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MATERNAL INCARCERATION AND YOUNG ADULT ARREST:
EXAMINING THE EFFECT OF SIBLING RELATIONSHIPS

By

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This work is dedicated to my daughters, Kelsey Lynn and Emily Nicole, who have taught me how to love unselfishly and unconditionally. I hope that you follow your dreams no matter how difficult the journey may seem. If it is your passion, it will be well worth the effort.
I love you more than you will ever know.

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ABSTRACT

The general purpose of this study is to contribute to the efforts in understanding the effect of maternal incarceration on young adult wellbeing outcomes, and the factors that may buffer or exacerbate any negative effect. There is a need to identify and understand the important differences between children who overcome the adversity of maternal incarceration compared to those who do not. In particular, this study builds on the recent literature on heterogeneity in maternal incarceration effects by examining how social support, specifically sibling relationships, moderate the effect of maternal incarceration on young adult arrest.

It is expected that children who have a sibling residing with them during adolescence will experience less of an adverse effect when subjected to maternal incarceration. Additionally, it is expected that children who have siblings residing with them during adolescence will have differential outcomes that are associated with the quality of sibling relationships. Specifically, those children reporting positive sibling relationships will experience better outcomes while those with negative sibling relationships will experience more harmful outcomes.

Evidence exists that the consequences of parental incarceration vary by both parent and offspring sex. Considering possible gender differences, it is predicted that the effect of maternal incarceration on young adult arrest will be conditioned by the gender composition of the sibling relationship. Because there has been found to be greater similarity in behavior in same-gender sibling pairs, it is expected that mixed-sibling pairs will experience higher odds of arrest while same-gender sibling pairs will experience lower odds. Furthermore, attention is given to whether any differential effects exist for sons compared to daughters who experience maternal incarceration. Using data from National Longitudinal Study of Adolescent to Adult Health (Add Health) to examine these research questions, this study not only draws attention to sibling

relationships as an important consideration for youth experiencing maternal incarceration, but also further highlights how sons and daughters may cope differently with this particular form of adversity. A fundamental finding from this study is that sibling relationships are highly relevant for understanding the impact of parental incarceration on adult offending and arrest. Given the fact that a substantial number of incarcerated parents have children younger than 18, appropriate services need to be made available to children and their families immediately after a parent is incarcerated. Interventions aimed at improving wellbeing outcomes of children of incarcerated parents should involve other members of the family, including the other parent, siblings, grandparents, and others living in the home.

CHAPTER 1

INTRODUCTION

“Sibling relationships - and 80 percent of Americans have at least one - outlast marriages, survive the death of parents, resurface after quarrels that would sink any friendship. They flourish in a thousand incarnations of closeness and distance, warmth, loyalty and distrust.”

- Erica E. Goode

It is well known that the United States has the highest incarceration rate in the world (Brewer and Heitzeg, 2008) with more than 1.9 million adults incarcerated as of 2000 (Glaze and Kaeble, 2014). At the end of 2013, this number increased to more than 2.2 million and, most notably, the rate of incarcerated females housed in state or federal prisons increased by 21% between 2000 and 2010 (Glaze and Kaeble, 2014) outpacing the rate of male incarceration by twice the annual growth rate.

Consequently, as the number of adults confined to jails and prisons grows, so too, does the number of children who experience parental incarceration. By mid-2007 the number of children with incarcerated parents increased by 80%, impacting more than 1.7 million children (Glaze and Maruschak, 2010; Johnson and Waldfogel, 2002). Since 1991, the number of children with a father in prison has grown by 77% while the number of children with a mother in prison has more than doubled, up by 131% (Glaze and Maruschak, 2010). Further, an estimated 63% of incarcerated women have one or more minor children, with most of these mothers having reported living with their children prior to incarceration (Mumola, 2000). Compared to paternal incarceration, having a mother imprisoned may be more harmful to families and communities because more mothers than fathers live with their children prior to incarceration (Mumola, 2000). Indeed, more than half of mothers held in state prison reported living with at least one of their

children in the month prior to their arrest, compared to only 36% of fathers (Glaze and Maruschak, 2010). Additionally, mothers were almost three times more likely than fathers to be the child's primary caregiver prior to incarceration and were five times more likely than fathers to report that their children were in the care of a non-family member, such as a foster home, agency, or institution while incarcerated (Glaze and Maruschak, 2010).

The increasing rate of maternal incarceration, combined with the likelihood that maternal incarceration has a more disruptive effect on children has led to a growing body of research on the consequences of maternal incarceration on children (for example, Cho, 2011; Cho, 2009; Dallaire, Ciccone, and Wilson, 2010; Foster and Hagan, 2013; Huebner and Gustafson, 2007; Turney and Wildeman, 2015). However, there is still much to be learned in understanding the mechanisms linking maternal incarceration to youth outcomes, including factors that alter or condition the impact of incarceration on child wellbeing (Murray and Farrington, 2008). Specifically, researchers have suggested the need to examine protective factors and resilience processes in children with incarcerated parents, emphasizing a need to focus in the areas of interpersonal relationships (Poehlmann and Eddy, 2013). Furthermore, exploration of factors such as different types and levels of social support that alter the impact of parental imprisonment on children is also warranted (Murray and Farrington, 2008). While it is known that parental incarceration leads to hardship and difficulties, little attention has been given to what may help these children adapt and overcome such adversity. And given the growing number of studies examining the effects of maternal incarceration, there is still no consensus on whether detrimental outcomes are due to the mother's incarceration or other factors related to characteristics of disadvantaged families. Building upon previous studies, further examination is necessary to disentangle the factors that

alter the effect of maternal incarceration and explain the positive, negative, and null effects of maternal incarceration on offspring wellbeing documented in the literature.

One potential source of heterogeneity in the context of the effect of maternal incarceration is children's resiliency. The acquired ability to cope with stressful situations may be particularly important for children of incarcerated parents. The concept of resilience in the face of adversity may offer some explanation as to why many children of incarcerated parents, despite the risks, are capable of achieving healthy outcomes. Many experts identify family connections and relations as the most critical source for facilitating resilience mechanisms that allay broader environmental risks and help children cope with stressful life situations (Dulmus and Hilarski, 2003; Kirby and Fraser, 1997; Werner and Smith, 1992).

The family unit is primarily responsible for the nurturance and protection of a child from birth until late adolescence. Generally, parents provide support and comfort when a child experiences distress, anxiety, or fear (Bowlby, 1982) while siblings help fulfill their social needs through fun and playful interactions (Cicirelli, 1995). However, in the absence of the parent, it is possible for siblings to act as a source of comfort and support and thereby provide a buffer to experienced stresses, specifically those due to parental incarceration. Studies within other disciplines have examined to what extent siblings may buffer the effects of different types of stressful life events (Gass, Jenkins, Dunn, 2006; Keeton, Teetsel, Dull, Ginsburg, 2015; Mota and Matos, 2015; Sandler, 1980). Precisely, research has demonstrated that siblings can offer supportive and protective relationships during stressful and conflicting times such as when there is a divorce or death of a parent (Dulmus and Hilarski, 2003; Kirby and Fraser, 1997; Werner and Smith, 1992). Keeton and colleagues (2015) found that sibling relationships are a protective shield for youth's psychological outcomes. Mota and Matos (2015) found that sibling relationships can

be an important source of security through similarity and the sharing of experiences and feeling accepted when living among adolescents in residential care due to parent abandonment or lacking adequate family socio-economic resources. As such, siblings who are supportive of each other and offer encouragement may help each other overcome adversity and recover from the misfortune of maternal incarceration without resulting to dysfunctional or harmful behaviors. Conversely, negative sibling relationships can foster aggressive or anti-social behaviors (Slomkowski, Rende, Conger, Simons, and Conger, 2001).

While previous studies have found caring adults, such as aunts, uncles, teachers, and friend's parents, to function in a protective manner for children of incarcerated parents (Luther, 2015), little attention has been given to the protective role of siblings. Specifically, with respect to maternal incarceration, whether siblings buffer the harm associated with experiencing a mother's confinement has not yet been tested. The aim of this study is to fill this gap in existing literature by examining whether youth who have experienced maternal incarceration, and who have a co-residing sibling, experience lower odds of arrest as a young adult compared to those without co-residing siblings. Additionally, among those youth with siblings, the sibling gender composition and the quality of the sibling relationship will be studied to determine if negative or positive relationships condition the detrimental outcomes of maternal incarceration. By conducting an empirical evaluation of the impact of sibling relationships in the context of maternal incarceration, we can better understand which factors may, in fact, be protective or coercive influences on detrimental youth outcomes.

Theoretical Framework

Many studies examining maternal incarceration effects build off the framework of one of several prominent criminological theories as an explanation for documented empirical outcomes.

It will be useful to briefly discuss the more relevant theories and research used in the maternal incarceration effects literature, including social learning, strain, and stigmatization or labeling, and selection theories. Each of these theories provides a relevant framework in explaining the heterogeneous findings. For instance, social learning studies have found that siblings can learn not only positive and protective social behaviors from one another, but can also learn delinquent behaviors from one another as well. Strain theorists suggest that the negative emotions experienced by the loss of a mother due to incarceration is further exacerbated by a conflicting and destructive relationship with a sibling, and thus, potentially leading to engaging in delinquent or criminal behaviors as an outlet. Alternatively, having a mother behind bars can result in the negative labeling and stigmatization of her children. In turn, this may lead to less social support and a higher likelihood in detrimental outcomes for her offspring. Furthermore, the effects of maternal incarceration may, in turn, be explained by the genetic and social differences that exist between imprisoned parents and their children compared to those parents and children not imprisoned. These theoretical perspectives will be discussed further in Chapter 2.

Summary

While prior scholars have suggested a need to examine possible factors that may contribute to differential outcomes of children who have experienced maternal incarceration, prior research has yet to identify what these specific mechanisms may be. The current study seeks to contribute to the efforts in understanding the effect of maternal incarceration on young adult wellbeing outcomes, and the factors that may buffer or exacerbate any negative effect. There is a need to identify and understand the important differences between those children who overcome the adversity of maternal incarceration compared to those who do not. In particular, this study builds on the recent literature on heterogeneity in maternal incarceration effects by examining how social

support, specifically sibling relationships, moderate the effect of maternal incarceration on young adult arrest.

It is hypothesized that children who have a sibling residing with them during adolescence will experience less of an adverse effect when subjected to maternal incarceration. Additionally, it is expected that children who have siblings residing with them during adolescence will have differential outcomes that are associated with the quality of sibling relationships. Specifically, those children reporting positive sibling relationships will experience better outcomes while those with negative sibling relationships will experience more harmful outcomes. Siblings who get along and are supportive can learn positive and protective social behaviors from one another, enabling them to be more resilient in the face of anxiety and distress. The strain a youth experiences due to the loss of his or her mother will be exacerbated by the strain of a conflicting and negative sibling relationship. With limited conventional outlets for a youth to address this additional strain, there will be an increased likelihood for engaging in criminal behavior.

Evidence exists that the consequences of parental incarceration vary by both parent and offspring sex. Scholars have found that, compared to having an incarcerated father, having a mother incarcerated produces unique consequences (Dallaire, 2007; Siegel, 2011) and assert that parental incarceration differentially affects daughters and sons (Hagan and Foster, 2014; Wildeman, 2010). Burgess-Proctor and colleagues (2016) suggested that for daughters, the loss of a mother to incarceration is a particularly traumatic event, leading to a higher likelihood of experiencing adult arrest and conviction than sons of incarcerated fathers. While this dissertation cannot examine all of the relevant and interesting aspects of gender differences, the study will focus on two particular aspects. First, attention will be given to whether siblings who are of the same-gender provide a protective mechanism, compared to mixed-gender siblings when a mom

has been incarcerated. Considering possible gender differences, it is predicted that the effect of maternal incarceration on young adult arrest will be conditioned by the gender composition of the sibling relationship. Scholars have found sibling dyads that include a male are more conflictual, while, for instance, sibling pairs made up of sisters, tend to be the closest and have the warmest types of relationships (Feinberg, Solmeyer, and McHale, 2012; McHale et al., 2009; Rowe and Gully, 1992; Trim et al., 2006). Because there has been found to be greater similarity in behavior in same-gender sibling pairs, it is expected that mixed-sibling pairs will experience higher odds of arrest while same-gender sibling pairs will experience lower odds. Secondly, attention will be given to whether any differential effects exist for sons versus daughters who experience maternal incarceration. It is predicted that the effect of maternal incarceration will be more deleterious for daughters rather than sons and that the effect of a sibling, especially one of the same-gender will provide more of a protective factor for females.

To test these hypotheses, data from National Longitudinal Study of Adolescent to Adult Health¹ (Add Health) 1994-2008 (Harris, Halpern, Whitsel, Hussey, Tabor, Entzel, and Udry, 2009) is used in order to first examine how sibling co-residence moderates arrest of young adults whose mothers have been incarcerated. Secondly, an analysis of whether the quality of sibling relationships, measured as positive or negative, condition the effect of maternal incarceration on arrest in young adulthood will be conducted. Next, analysis will include testing whether same-gender versus mixed-gender sibling pairs condition the effect of maternal incarceration on arrest in young adulthood. Finally, whether there exists any differential effects for sons compared to daughters who experience maternal incarceration, and whether sibling indicators mitigate these effects, will be assessed.

¹ See Appendix A for more information on Add Health

Description of Chapters

The dissertation proceeds in the following way. Chapter two elaborates upon the prior research in this area, as well as summarize the existing evidence to date. Specifically, the literature review addresses a number of studies examining the effect of maternal incarceration, details heterogeneous findings, as well as identifies the gap in the literature this study fills. Additionally, social learning, strain, stigmatization, and selection perspectives that theoretically guide this assessment of sibling relationships as moderating the effect of maternal incarceration on young adult outcomes are discussed. The current study methodology is described in Chapter three and includes the research questions, a description of the datasets, variables, and statistical techniques that were used in the analysis. Study findings for research questions are detailed in Chapters four and five. More precisely, Chapter four will discuss the findings for the direct effects of maternal incarceration, co-residing siblings, sibling relationship quality, and sibling gender composition on adult arrests. The analysis and findings for how co-residing siblings, sibling relationship quality, and the sibling gender composition moderates the outcome of interest will be discussed in Chapter five. Chapter six will include a discussion of the findings, study contributions and limitations, as well as recommendations for future research.

CHAPTER 2

LITERATURE REVIEW

Heterogeneous Effects of Maternal Incarceration

As the rate of females entering the prison system has outpaced that of males (Frost, Greene, and Pranis, 2006), more attention is being given to the effect of maternal incarceration on the almost 2 million American children who have an imprisoned mother. Individuals whose mothers are incarcerated during their childhood tend to experience greater hardships in both childhood and young adulthood compared to those whose mothers were not incarcerated (Zhang and Emory, 2015). However, some scholars have found that maternal incarceration is inconsequential (Wildeman and Turney, 2014) or dependent on the outcome (Foster and Hagan, 2013; Lee, Fang, and Luo, 2013; Murray, Farrington, and Sekol, 2012). Other researchers have found maternal incarceration to be correlated with the increased likelihood of children experiencing home disruptions and displacements, attachment disorder, separation anxiety, depression, poor academic performance and test scores, higher school dropout rates, drug use, delinquency, and intergenerational incarceration (Cho, 2011; Cho, 2009; Dallaire, 2007; Dalliare, Ciccone, and Wilson, 2010; Foster and Hagan, 2013; Parke and Clarke-Stewart, 2003; Phillips, Burns, Wagner, Kramer, and Robbins, 2002; Poehlmann, 2005; Zhang and Emory, 2015). Furthermore, maternal incarceration has been found to be significantly correlated with involvement in the criminal justice system by adult children of incarcerated mothers (Burgess-Proctor, Huebner, and Durso, 2016; Huebner and Gustafson, 2007; Muftic, Bouffard, and Armstrong, 2015). And while the numbers of studies examining the effect of maternal incarceration has grown, there is no consensus on

whether detrimental outcomes are due to the mother's incarceration or other factors related to characteristics of disadvantaged families.

One perspective suggests that negative outcomes for youth experiencing maternal incarceration may be explained by the stigma of criminalization on children experiencing maternal incarceration. Huebner and Gustafson (2007) found that adult offspring of incarcerated parents may appear more threatening to the actors within the criminal justice system and are, therefore, more likely to be sanctioned formally when compared with offspring of parents with no prior contact with the criminal justice system. On the other hand, the stigma of a mother's incarceration can have the opposite effect as suggested by Cho (2009) in finding that sympathetic teachers may be more likely to promote children whose mothers entered prison, resulting in decreased grade school retention rates following maternal imprisonment.

Another perspective holds that the disadvantages in the lives of children whose mothers are incarcerated explain the association between maternal incarceration and children's behavioral problems (Giordano, 2010; Siegel, 2011). The selection perspective assumes that imprisoned parents and their children are already different from those who have not experienced incarceration, and these differences may be due to a mixture of genetic and social factors that accumulate up to the point of parental imprisonment (Hagan and Dinovitzer, 1999). A mother's lifestyle taken as a whole – drug use, violent behavior, other forms of offending, and economic hardship – appear to have a larger effect size on child well-being outcomes relative to the consequences stemming from the experience of maternal incarceration itself (Giordano, 2010). Turanovic, Rodriguez, and Pratt (2012) also found that a daunting set of disadvantages characterize these families, noting in particular that many of the incarcerated mothers have mental health issues, problems with addiction, and histories of abuse. Giordano and Copp (2015) argue that the factors that directly

influence a child's well-being are often part of a reciprocal process. An example of such a process is when a mother has drug addiction issues within disadvantaged contexts, which can be associated with housing instability and frequent school moves. However, these events may occur in a sequence that includes moves occasioned by arrests and periods of incarceration further noting that those who gain incarceration experience often have a fairly significant history of offending. Furthermore, Turanovic and colleagues (2012) concluded that findings where maternal incarceration is harmful may be a result of the "research literature's inability to disentangle preexisting hardships from the focal incarceration" (p. 945).

In seeking to understand the conditions in which negative consequences of maternal incarceration are most likely, some research has resulted in null effects. Turney and Wildeman (2015) found that maternal incarceration was inconsequential for children of mothers more likely to experience incarceration when compared to children whose mothers were least likely to experience incarceration. Moreover, no direct effects were found across behavior problems among nine-year-old children whose mothers had been imprisoned (Wildeman and Turney, 2014). There was also no significant effect of maternal incarceration on child homelessness at age five (Wakefield and Wildeman, 2014), nor on standardized math and reading scores for children in kindergarten to eighth grade (Cho, 2009).

Yet another perspective suggests that the imprisonment of a parent may be seen as a potential source of relief for the families (Hagan and Dinovitzer, 1999). Living with a criminally involved, and often chemically dependent, member of the household can be enormously stressful and disruptive to healthy family functioning, and particularly if that person is a parent (Ammerman, Kolko, Kirisci, Blackson, and Dawes, 1999; Carlson and Corcoran, 2001; Forehand, Wierson, Thomas, Armistead, Kempton, and Neighbors, 1991). Studies have shown that a parental

offender may be a drain on family resources and actually impede the kind of effective parenting that is critical for raising prosocial children (Giordano, 2010; Hagan and Dinovitzer, 1999; Jaffee et al., 2003). Other studies focusing on the effects of parental incarceration on family processes and child development have revealed positive outcomes, including reduced exposure to violence, as well as finding that parental incarceration often is unrelated to negative youth outcomes such as increased emotional and behavioral problems (Murray, Loeber, and Pardini, 2012; Shlafer, Poehlmann, and Donelan-McCall, 2012; Van de Rakt, Murray, and Nieuwbeerta, 2012). Furthermore, qualitative research finds that some children experience improved outcomes, especially those whose incarcerated addicted mothers have previously placed their children in harmful situations (e.g. Siegel, 2011:76-93; Turanovic et al., 2012).

Detrimental Effects of Maternal Incarceration

While results of maternal incarceration studies, as previously discussed, are varied, many recent studies have reported damaging consequences and outcomes for children. In particular, scholars find that maternal incarceration, compared to paternal incarceration, may be more detrimental to families since children of incarcerated mothers are more likely to live with non-parental relatives, such as grandparents, or be placed in foster care than are children with incarcerated fathers, thus experiencing a higher likelihood of displacement from the home (Brazzell, 2008; Ehrensaft, Khashu, Ross, and Walmsley, 2003). This can be particularly traumatic for young children who lose a mother to incarceration and where there is an increase in the child's risk of attachment disruptions, separation anxiety, depression, preoccupation with loss of their mother, and sadness (Dallaire et al., 2010; Murray and Farrington 2008; Poehlmann 2005). Some youth, particularly older children, may be more angry and grief-stricken as they reflect on

how their lives have been affected by the maternal absence which is further compounded by taking on adult roles in the mother's care-giving absence (Hissel, Bijleveld, and Kruttschnitt, 2011).

These differing perspectives correspond to mixed findings with respect to maternal incarceration effects in the research literature. An understanding of why and how youth who do overcome the adversity of maternal incarceration with positive outcomes is needed. Building upon previous studies, further examination is necessary to disentangle the factors that alter the effect of maternal incarceration, allowing for a potential explanation for the inconsistent effects of maternal incarceration on offspring well-being documented in the literature. Circumstances that children experience differentially, such as the type and quality of social relationships, and specifically relationships with family members, may help explain why the effect of maternal incarceration leads to heterogeneous findings.

Coping with the Detrimental Effects of Maternal Incarceration

When facing maternal incarceration, it is important for children to find effective ways to cope with the loss of the mother and the resulting additional financial, emotional, and psychological strains. The concept of resilience in the face of adversity may offer some explanation as to why many children of incarcerated parents, despite the risks, are capable of achieving healthy outcomes. Notwithstanding an increasing interest in factors that promote positive outcomes among children with incarcerated parents, very little empirical research exists on how young people cope with the stressors they experience during and after a parent's incarceration. However, a growing body of qualitative work in this area has revealed unique insights about the social and emotional difficulties that children encounter during parental incarceration (Miller, 2007; Nesmith and Ruhland, 2008; Siegel, 2011). In the face of the

adversities surrounding maternal incarceration, it is yet unknown what factors contribute to the positive well-being outcomes of offspring.

Exposure to life events - such as maternal incarceration - can be considered a ‘risk factor,’ making children vulnerable to developing later emotional and behavioral difficulties; however those factors that lessen or weaken the relationship between life events and child maladjustment are considered ‘protective factors’ (Luthar, 1991; Rutter, 2000). In the face of harmful situations, resilience refers to the development of adaptive coping, and a personal reorganization process (Luthar and Cicchetti, 2000; Luthar, Cicchetti, and Becker, 2000; Miligan and Stevens, 2006). Resilience is “a dynamic process encompassing positive adaptation within the context of significant adversity” (Luthar et al., 2000, p. 543). To explain how this positive adaptation occurs, scholars emphasize the impact that families and communities have on factors external to the individual, including social support from parents and positive role models from school, athletics, religion, and the general community, respectively (Luthar et al., 2000; Zolkoski and Bullock, 2012).

Several seminal longitudinal studies on risk and resiliency have followed children through much of their childhood, and while not looking explicitly at parental incarceration, these studies have examined overlapping risk factors such as divorce or separation from parents, poverty, and living in a high-crime neighborhood (Garmezy, 1998; Masten, Miliotis, Graham-Bermann, Ramirez, and Neemann, 1993; Rutter, 1987; Werner and Smith, 1992). The undesirable outcomes associated with these risk factors include those sometimes seen in children of incarcerated parents such as delinquency, early alcohol use, poor school performance, and aggressiveness. Some of the key protective factors for these children include social support, positive parent-child relationships, religiosity, a positive sense of self, and other support systems that may reinforce a

child's coping efforts (Grossman et al., 1992; Jenson, 1997; Rutter, 1987; Werner and Smith, 1992). According to Rutter (2006), resilience promotes the psychological strengths and the potential for overcoming adversity, such as the ability of the individual to build new pathways, to resume his or her development from the harm, and to remake him or herself. Thus, to be resilient explains why, and how, some individuals manage to maintain positive pathways in spite of facing the same adversities that lead others to negative outcomes.

The Protective Role of Sibling Relationships

A critical source for facilitating resilience mechanisms that allay broader environmental risks and help children cope with stressful life situations may be familial relationships, bonds, and processes (Dulmus and Hilarski, Kirby and Fraser, 2003; Werner and Smith, 1992). The manner in which a family confronts and deals with disruptive experiences, defends against stress, successfully reorganizes itself, and moves forward in daily life may impact the adaptive capabilities for every family member in the future. Some children may cope with maternal incarceration better than others as a result of supportive relationships, including those with siblings. When interviewing children who experienced paternal incarceration, Nesmith and Ruhland (2008) found that the children who did well at school and had a positive outlook on life reported having strong supportive people and resources to help them, an asset that is well documented as important in later-life resiliency (Scales and Leffert, 1999; Werner and Smith, 1992). In another study, Luckey (1996) found that with African Americans, the family unit, rather than its individual parts, is emphasized because the family remains stronger when there is solidarity. This is particularly important for children with incarcerated parents, because they are able to maintain a sense of support, identity, and belonging even with an absent parental figure.

Cicchetti (2013) noted that maltreated children who are able to build relationships, could develop a positive self-concept and manifest greater ease in developing a resilient process. Thus, the development of affective bonds with siblings, and in particular the perception of emotional support, allows adolescents to build relationships of greater security with themselves and with the social world, which improves their ability to cope with adversity (Herrick and Piccus, 2005). The affective bond between siblings may provide the stability and support that helps one to overcome difficulties during hard times, thus making positive sibling relationships an important source of support for offspring experiencing stressful life events.

When two or more siblings are separated from their principal attachment figure and are cared for in the same setting, the distress of each may be somewhat diminished by interaction with the other (Heinicke and Westheimer, 1965). For instance, when a child's parent dies, the child's feelings of grief and abandonment may be alleviated by the care he or she receives from an older sibling who plays a protective and caregiving role. Indeed, this role may actually help the older sibling to also feel more secure himself or herself, whether because caregiving makes the older sibling feel less helpless or because it diverts the sibling from his or her own feelings of distress or grief (Stewart and Marvin, 1984).

The Additional Importance of Sibling Relationship Dynamics

In addition to the protective effect of simply residing with a sibling, certain characteristics of the sibling relationship may further condition the potential adverse effects of maternal incarceration. Sibling relationships and interactions can be characterized by and are associated with children's well-being, by both strong positive features such as warmth and intimacy, as well as negative qualities such as intense conflict (Feinberg et al., 2012). While the family unit is primarily responsible for the nurturance and protection of a child from birth until late adolescence,

less attention has been given to the protective role of siblings. Positive parent-child relationships, consistent parental discipline and high levels of general familial support have all been found to protect children and adolescents from the maladjustments that can be caused by life events (Gass et al., 2006). However, and especially in the case of parental incarceration, parent-child relationships are not the only possible source of support available within a family. Generally, parents provide support and comfort when a child experiences distress, anxiety, or fear (Bowlby, 1982) while siblings fulfill the social needs through fun and playful interactions (Cicirelli, 1995). However, in the absence of the parent, it is possible for siblings to act as a source of comfort and support and buffer stresses, especially in the context of parental incarceration. Research has demonstrated that siblings can offer supportive and protective relationships during stressful and conflicting times such as when there is a divorce or death of a parent (Dulmus and Hilarski, 2003; Kirby and Fraser, 1997; Werner and Smith, 1992).

An estimated 90% of children in the United States grow up with at least one sibling and spend more time with their siblings than anyone else, including parents (Buist, Dekovic, and Prinzie, 2013; Kreider and Ellis, 2011). Indeed, children in the United States today are more likely to grow up in a household with a sibling than with a father (McHale, Kim, and Whiteman, 2006). Characterized by both love and warmth as well as by conflict and rivalry, the sibling relationship is unique and different from those relationships with parents or friends. The sibling relationship is one of the most enduring relationships throughout an individual's life span, starting at birth and continuing until death (Noller, 2005). Unlike friendships, sibling relationships are involuntary and lifelong (Hartup, 1979). Sibling relationships are also different from peer relations to the extent that they are characterized by greater involvement and reciprocity, while at the same time, allowing the differentiation of the self (Fernandes, 2002). Sibling relationships provide a unique and

important context in which children develop social and emotional skills due to the frequency and duration of interactions, the durability of the relationship, existence of ascribed roles, accessibility, and degree of common experiences (Cicirelli, 1982). At younger ages, siblings are part of the same family and share living space, making it hard to physically and emotionally withdraw from one another. Even as their primary social group shifts away from the family, siblings typically maintain frequent contact throughout their lives because of their familial bonds, can be an important source of social support during adulthood, and may represent important sources of emotional stability (Bowlby, 1982; Carstensen, 1992; Herrick and Piccus, 2005).

Sibling relationships are a unique and powerful context for children's development, characterized by strong positive features (e.g. warmth and intimacy) as well as negative qualities (e.g. destructive and conflict.). Furthermore, the importance of this social support is validated by recent findings indicating that sibling relationship quality helps differentiate patterns of adjustment to environments marked by stressful experiences, such as alcoholic parents, stressful divorce, and inter-parental conflicts (Piotrowski, 2011). Sibling warmth reflects positive aspects of the relationship, such as intimacy, affection, support, companionship, and closeness while sibling conflict is constructed by negative aspects such as arguing, bickering, fighting, aggression, hostility, negativity, and coercion (Sanders, 2004). The sibling interaction dimensions of warmth and closeness versus conflict have been shown to be only weakly correlated with each other, supporting the hypothesis that positive and negative qualities are not polar opposites (Shaver et al., 1984). Thus, siblings may differ or match on levels of closeness and conflict (Furman and Buhrmester, 1985). In other words, siblings may have high levels of warmth and closeness, but at the same time have high levels of conflict or have high level of conflict and low level of closeness, etc. Furthermore, while sibling conflict has been found to have a stronger impact than sibling

warmth, and while they co-occur in most sibling relationships, not much is known about their differential effects. Some research has shown that children and adolescents with warmer and less conflictive sibling relationships show significantly less problem behavior, and this dynamic is related to less internalizing as well as externalizing problem behavior (Buist et al., 2013).

Another component to a sibling relationship is the gender and how different compositions may affect whether interactions are positive or negative. Studies examining differences in the quality of sibling relationships as a function of sibling gender composition generally find higher quality relationships for same-gender sibling pairs, especially those made up of sisters, have higher levels of warmth and lower levels of conflict. This is in contrast to mixed-gender sibling pairs with the lowest relationship quality often found for older brother and young sister pairs (Aguilar et al., 2001; Tucker, McHale and Crouter, 2001; Rowe and Gulley, 1992).

Not only is the likelihood of a relationship characterized as warm versus conflictual typically associated with sibling gender composition, but gender is also correlated with the level of social influence one sibling may have over another. In sibling dyads where the gender composition is the same, the social influence one sibling has over another is assumed to be stronger (Andsager, Bemker, Choi and Torwell, 2006; Whiteman, McHale and Crouter, 2007). Based upon this research, it would be expected siblings exert more influence in a brother dyad or a sister dyad compared to that of a brother-sister pair.

Greater sibling warmth between brothers is associated with increased antisocial behavior, higher levels of affiliation with antisocial peers, and greater risky behavior among boys (Criss and Shaw, 2005; Solmeyer, McHale, and Crouter, 2014). Furthermore, Slomkowski and colleagues (2001) found that when the sibling relationship is high in both hostility and warmth, the older brother's delinquent behavior predicted the younger brother's behavior while in contrast the

younger sister's delinquent behavior was predicted by the older sister's delinquency when the relationship was high conflict-low warmth. Researchers have found that same-gender siblings and those with warm relationships are more likely to model one another with sister-sister pairs tending to be the most intimate while dyads that include a brother may be more conflictual (Feinberg, Solmeyer, and McHale, 2012; McHale et al., 2009; Rowe and Gulley, 1992; Trim et al, 2006).

Harmful versus Positive Effects of Sibling Relationships

The literature on sibling relationships points out that siblings can have a positive and a negative influence on one another, and these influences need not be mutually exclusive. Intense aggression between siblings is fairly common, even among adolescents (Tucker, Finkelhor, Turner and Shattuck, 2013). Sibling exchanges, particularly in the preschool years may be infused with a level of conflict and hostility that is not often observed in children's interactions with parents or friends, however such behavior is understood as characteristic of sibling relationships. This dynamic, where high levels of sibling conflict is considered "normal", is illustrated in the DSM-5 criteria for oppositional defiant disorder which specifies that children who display anger or vindictiveness only with siblings should not receive the diagnosis (American Psychiatric Association, 2013).

Children with negative sibling attachment experiences may be more prone to view themselves as unworthy of love, resulting in internalizing behaviors and viewing the social world as negative and untrustworthy. Furthermore, children experiencing sibling conflict are less prone to empathy which increases a child's odds of developing externalizing problems increasing the risk factor for engaging in delinquent behaviors, substance abuse, and aggression (Buist et al., 2013.)

Conversely, secure attachment relationship experiences in childhood are theorized to result in an internal working model of attachment that includes a positive image of oneself and the social world (Bowlby, 1982). The supportive, close, and warm sibling relationships can result in enhancing a child's sense of security and may buffer the impact of negative influences on child well-being. Ainsworth (1989) stressed the importance of attachment among siblings who may function in some situations as a secure base, and may provide feelings of unconditional support and encouragement in difficult situations. These influences may be extremely significant because siblings generally share a life story and establish strong ties of affection, intimacy, friendship and trust, contributing to the development of the self. Thus, siblings often take roles as caregivers, friends, and supporting figures for one another throughout the lifecourse (e.g., Conger, Stocker, and McGuire, 2009; Kramer and Kowal, 2005; Zukow-Goldring, 2002).

Empirical Studies on Sibling Effects

Studies examining sibling effects have focused on how sibling presence, and the characteristics of sibling relationships, such as warmth or conflict-centered relationship qualities, affect adolescent outcomes (Piotrowski, Taylor, and Cormier, 2014; Rowe and Gulley, 1992; Scholte et al., 2007; Slomkowski et al., 2001). Sibling relationships may play a role in compensating for other problematic relationships by providing an alternative context for experiencing satisfying social relationships and protecting children from adjustment difficulties (Parke, 2004). For instance, in a study examining the effect of stressful life events of children in kindergarten, Sandler (1980) found that those children who had older siblings showed fewer adjustment problems.

Studies involving children of incarcerated parents have shown that these children are exposed to factors that place them at greater risk for engaging in delinquent activities (Mears and

Siennick, 2015; Miller and Barnes, 2015; Porter and King, 2015). Aaron and Dallaire (2010) examined the effect of siblings in the context of having an incarcerated parent and the resulting outcomes for the child. The authors found that a history of parental incarceration predicted delinquent behaviors of children's older siblings and delinquent behaviors of the child participants over and above children's demographic characteristics and other risk experiences. Overall, the authors found that older delinquent siblings negatively influenced the effect of parental incarceration on adolescents. Although Aaron and Dallaire's (2010) examination is a valuable addition to the literature, there are a few notable limitations. For example, the authors included older siblings within their study, but did not specify the residence of the sibling(s), the quality of the sibling relationship, nor did the authors specifically examine the effects of maternal incarceration.

Studies within other disciplines have more thoroughly examined to what extent siblings may buffer the effects of different types of stressful life events (Gass et al., 2007; Sandler, 1980). Researchers have found sibling relationships to be a protective shield for children and adolescent psychological outcomes when experiencing parental psychological distress, low level of parental support, marital hostility, living in low-income and high-risk neighborhoods, and other adversities (Criss and Shaw, 2005; East and Rook, 1992; Iturralde, Margolin, and Shapiro, 2013; Jenkins and Smith, 1990; Keeton et al., 2015; Milevsky and Levitt, 2005; Tucker et al., 2013; Widmer and Weiss, 2000).

By providing an alternative context for experiencing satisfying social relationships and protecting children from adjustment difficulties, sibling relationships may play a role in compensating for other problematic relationships such as being bullied by peers or losing a loved one due to death (Bowes et al., 2010; East and Rook, 1992; Gass et al., 2007; Milevsky and Levitt,

2005). Stocker (1994) also reported support for the compensatory role of at least one positive relationship, such as that of a sibling, as protection from behavioral conduct difficulties.

Additionally, for children separated from their parents, the continued presence of siblings may be vital for maintaining a sense of safety and emotional continuity in an unknown and potentially frightening situation (Shlonsky, Bellamy, Elkins, and Ashare, 2005; Stewart, 1983). Mota and Matos (2015) found sibling relationships to be an important source of security through similarity and sharing of experiences, as well as feeling accepted among adolescents living in residential care, due to parent abandonment or lack of adequate family socioeconomic resources. In examining whether a child's feelings of grief and abandonment may be alleviated by the care he or she receives from an older sibling who plays a protective and caregiving role, Stewart (1983) found that approximately half of his sample of three- and four-year-old children acted to provide reassurance, comfort, and care to their younger siblings when their mothers left them alone together in a waiting room setting. He later confirmed this finding in an experimental study (Stewart and Marvin, 1984) in which the separation from the mother took place in a modified "strange situation" where the behavior of a sibling pair was observed in a series of eight episodes lasting approximately three minutes each².

Siblings who are supportive of each other and offer encouragement may help each other overcome adversity and recover from the misfortune of maternal incarceration without acting in dysfunctional or harmful ways. Conversely, negative sibling relationships can foster aggressive or anti-social behaviors (Slomkowski et al., 2001). However, with respect to maternal

² Psychologist Mary Ainsworth devised an assessment technique called the Strange Situation Classification (SSC) in order to investigate how attachments might vary between children. (1) Mother, baby and experimenter (lasts less than one minute), (2) Mother and baby alone., (3) Stranger joins mother and infant, (4) Mother leaves baby and stranger alone., (5) Mother returns and stranger leaves., (6) Mother leaves; infant left completely alone., (7) Stranger returns., (8) Mother returns and stranger leaves (Ainsworth and Wittig, 1969).

incarceration, the role of siblings and how they may buffer the harm associated with experiencing a mother's confinement is in the infancy stages of examination. In the only known study to date, Woodard and Copp (2016) used data from the Fragile Families and Child Wellbeing study, a birth cohort study of 4,898 children born between 1998 and 2000 in 20 US cities (Reichman, Teitler, Garfinkel, and McLanahan, 2001) and found that the effect of maternal incarceration on juvenile delinquency is a function of sibling relationship quality. While the findings did indicate that maternal incarceration is associated with variation in children's delinquent involvement, and sibling relationship quality did condition the outcome, the study was limited by the focus on self-reported delinquent behaviors of nine-year old children. Additionally, there was no familial information regarding sibling age, gender, or type of sibling, such as full, step, half, or foster.

Theoretical Considerations

Much of the literature linking maternal incarceration with the offspring outcomes are rooted primarily in social learning, strain, selection, and labeling theories. These theories, specifically social learning and strain, can also help explicate how sibling relationships may buffer or further amplify the negative effect of maternal incarceration. The following discussion will help provide a framework for better understanding the heterogeneous outcomes for youth experiencing maternal incarceration by exploring different explanations for family relationship characteristics, dynamics, processes, and effects.

Social Learning

Socialization processes and mechanisms of social learning, such as imitation, are popular theoretical constructs guiding research on the effect of maternal incarceration. This perspective suggests individuals learn new behaviors and develop attitudes and beliefs through reinforcement, observation, and subsequent imitation of those who are influential, close, and similar to themselves

(Akers, 1985). The theoretical notions associated with the socialization approach date back to the late 1940's and Edwin Sutherland's nine propositions that comprise differential association theory. Sutherland (1947) theorized that criminal behavior was learned through interactions with those individuals one has close attachments with, is in greater contact with for longer periods of time, and with whom are influences earlier in life.

In the context of this study, siblings who reside together can certainly be influential on one another due to the physical and emotional closeness, as well as continued contact for long durations. Through interaction with these associations one can learn definitions either favorable or unfavorable towards the commission of crime, as well as learning the techniques and motivations for engaging in criminal activities (Sutherland, 1947). Burgess and Akers (1966) reformulated the theory by applying concepts prominent in behavioral psychology, including operant conditioning, reinforcement, and imitation, in order to specify how the learning process takes place when individuals interact with others he or she is close with. Akers further developed this idea into what is known as social learning theory by positing that past interactions and experiences result in future expectations of punishments or rewards. The expectation of rewards or punishment, based upon previous experiences and influences, in turn, affects the individual's decisions of whether or not to engage in delinquent or criminal behaviors. Social learning theory also proposes a vicarious component where individuals may imitate behaviors in order to achieve similar outcomes, or to avoid replicating missteps, after observing the punishment or reinforcement of others' behaviors (Akers, 1985).

Both positive and negative outcomes of these socialization and social learning concepts have been used to explain maternal incarceration effects (see Hagan and Dinovitzer, 1999; McLanahan and Bumpass, 1988; Sack, 1977). Antisocial mothers may teach children ideas,

behaviors, and techniques favorable to committing crime through her own actions. Therefore, subsequent incarceration may have detrimental or beneficial outcomes for the child depending on their level of awareness, and whether this awareness prompts imitation or modeling of the mother's behavior (van de Rakt et al., 2011). In addition to imitating the behaviors and attitudes of an offending mother, the sibling relationship may also serve as another training ground for either prosocial or hostile and destructive interactions. Dirks and colleagues (2015) suggest sibling interactions can change children's behavior and that coercive cycles between siblings serve as a training ground for aggression, since children model and reinforce each other's aversive behavior.

Studies have shown that individuals can learn positive and protective social behaviors from siblings in the face of anxiety and distress, not only from older siblings, but reciprocally with younger siblings as well (Stewart, 1983). Furthermore, Slomkowski and colleagues (2001) found that older sibling's delinquent behavior can predict the behavior of younger siblings when the relationship is high in conflict, suggesting an imitation of behavior possibly borne out of competition. Because siblings share a life story and establish strong ties of affection, intimacy, trust, and shared experiences, the sibling bond can be more influential in the context of simulating attitudes and behaviors. In particular brothers may compare themselves to one another and be more competitive (Buist et al., 2013) resulting in one brother trying to outdo the other in prosocial behaviors such as performing well in school or in sports. Alternatively, the competitive nature to outdo one another may also occur in the context of engaging in delinquent or criminal activities.

Strain

Robert Agnew's (1985) general strain theory (GST) provides another useful framework for explaining maternal incarceration effects in arguing that crime is caused not so much by the inability to achieve positively valued goals, but by the inability to escape from painful or aversive

conditions. In many cases, the loss of financial contributions from the incarcerated parent creates economic hardships for families, caretakers, and children on the outside (Hagan and Dinovitzer, 1999; Siegel, 2011). Research on maternal incarceration often considers not only the family's financial strain, but also the loss of social capital resulting in relational and emotional strain (Hagan and Dinovitzer, 1999; McLanahan and Sandefur, 1994). Further explicating the concept of lost social and human capital after the removal of a parent, McLanahan and Sandefur (1994) note that, assuming the incarcerated parent was providing some form of social capital, whether financial or emotional, current caretakers will now have less support, time, and money to invest in the upbringing of those children that are left behind.

By adding different types and sources of strain to the classic 'failure to achieve monetary or success goals,' Agnew (1992) outlined how removal of positively valued stimuli, for example the loss of a parent, or the inability to avoid negative stimuli, such as being in a hostile environment or experiencing verbal or physical assault, could also cause individual strain. When a mother is incarcerated, the child is more likely to be placed with someone other than the father such as with another family member or in foster care, possibly creating contrary conditions. The negative emotions experienced by the loss of the mother, in conjunction with continued material hardship and disadvantage, is then amplified by a negative and conflicting relationship with a sibling. Rather than finding a source of comfort, the child experiences yet more conflict with a negative sibling relationship leading to a situation where the child has limited outlets to address the additional strain. Moreover, with less quality supervision due to parental absence, and increased risk for poverty due to loss of income, children are at increased risk for criminal involvement (Arditti, Lambert-Shute, and Joest, 2003).

Maternal incarceration may, in fact, be more detrimental than paternal incarceration due to the economic strain alone. In her qualitative study of children with incarcerated parents, Siegel (2011) underscores the typical income disparities between male and female prisoners, noting that, before imprisonment, a woman's economic standing is most likely worse than a man's, and is most often below poverty level, suggesting maternal incarceration may cause more strain, thereby increasing the likelihood of a youth's involvement in externalizing behaviors as well as in delinquent or criminal behaviors. A youth living in a home within a disadvantaged neighborhood who does not have a positive or nurturing parent present, but instead is confronted with the compounded stress of having a harmful sibling relationship, may seek to pursue delinquent activities as an outlet.

Stigma and Labeling

Other research on the effects of maternal incarceration focus on the stigma associated with having a mother imprisoned and the ensuing behaviors of not only the effected youth, but also those who interact with these youth. Labeling theorists suggest labels applied by the criminal justice system act as a form of social control and unintentionally produce subsequent deviant behavior through the labelees' commitment to future deviant self-identities (Paternoster and Iovanni, 1989). Mainstream society attaches a stigma and negative stereotype to deviant labels, such as "prisoner" or "convict" or "son or daughter of a criminal" (Bernburg, 2009; Link and Phelan, 2001). These societal stereotypes about criminals, imprisonment, or other norm violations influence and inform the reactions and attitudes of society toward the labeled individuals (Paternoster and Iovanni, 1989). These applied labels, and associated negative stereotypes, may then impact the quality of interactions between labeled individuals and members or institutions within society, subsequently reinforcing deviant self-concepts for those labeled (Bernburg, 2009).

Research has found that having a parent or family member behind bars can result in children and families being labeled and stigmatized (Hagan and Palloni, 1990). As a society, it is even less acceptable for a mother to be incarcerated, thus potentially having a more stigmatizing effect than paternal incarceration.

Quantitative researchers have explored how offspring's subsequent behavior may be impacted by the stigma associated with parental incarceration. By focusing on a parents' criminal label, others may treat or view these children negatively and, thereby, potentially affecting the children's self-perception (e.g., Giordano, 2010; Nesmith and Ruhland, 2008; Siegel, 2011). Foster and Hagan (2007, p. 403) report, "actual and anticipated rejections [by others] can have lasting harmful consequences" for offspring stigmatized by their parents' incarceration. Siegel (2011) found that maternal incarceration betrays stereotypical gender expectations and "runs counter to the idealized image of what a mother should be" (Siegel, 2011, p. 159) suggesting maternal incarceration is more stigmatizing than having a father in prison. For youth labeled as children of a criminal mother, outside emotional support may be limited or non-existent. Existing and accessible emotional support may be found in siblings who have only each other to rely on and have warm and positive relationships, thus assisting in building the resilience to overcome the adversity of maternal incarceration.

Selection Perspective

The selection perspective argues that the effects of maternal incarceration are explained by the genetic and social differences that exist between imprisoned parents and their children compared to those parents and children not imprisoned (Hagan and Dinovitzer, 1999). Foster and Hagan (2007) propose that earlier processes such as genetic predispositions, exposure to violence, neglect, or poor parenting techniques that predate a mother's imprisonment help set inevitable

baseline differences contrasted to other families from the start. These differences are reflected in the differential risk and resiliency levels of families experiencing maternal incarceration compared to parents and children who do not experience incarceration (Hagan and Dinovitzer, 1999; Murray et al., 2012b).

Conversely, this perspective highlights that an increased number of risk factors does not necessarily predict negative future outcomes, such as adolescent and adult adulthood involvement in the criminal justice system. Resiliency is an important component to this perspective suggesting that various protective factors may engender positive adaptations to adverse life events such as having an incarcerated parent (Dallaire, 2007; Eddy and Reid, 2003; Parke and Clarke-Stewart, 2003). Studies have found that some children have successfully avoided the pathways to negative life outcomes associated with increased risk and, instead, have positively adapted to their experiences (Giordano, 2010; Parke and Clarke-Stewart, 2003). Giordano (2010, p. 168) explains, “Children possess the uniquely human capacity to reflect on their parents’ and their own experiences, [and] some youths, based on the totality of their experiences, and their own social psychological reactions to them, move forcefully to develop an identity in sharp contrast to the one the parents have modeled.” Scholars in this field have expressed a need for broader approaches to understanding the intricacies of such a complex issue and better identify how maternal incarceration may be one adverse event amongst many risk factors (Giordano, 2010; Murray et al., 2012b).

Social Bonding

The theoretical concept of attachment, or parental bond, is prominent in criminological literature (e.g., Dallaire, 2007; Murray et al., 2005; Parke and Clarke-Stewart, 2003; van de Rakt et al., 2011). Hirschi’s (1969) social bond theory has been noted in regard to the impact of

disrupted parent-child attachments on offspring outcomes (e.g. van de Rakt et al., 2011). As Hirschi (1969) theorized, the most important aspect of the social bond is the emotional attachment between individuals or between an individual and a community. Individuals who have strong attachment to one's parents, circumvent criminal behavior in order to avoid damaging the relationship. Thus, if the parent-child attachment is broken due to separation caused by maternal incarceration, youth are more likely to engage in delinquent or criminal behaviors. The disruption of mother-child relationships would intensify children's inability to establish or maintain secure attachments with alternative caregivers beyond that of father-child separations (Dallaire, 2007).

Specifically pertaining to maternal imprisonment research, attachment-based theoretical arguments are often subcategorized as trauma perspectives (Murray and Farrington, 2008; Murray and Murray, 2010; van de Rakt et al., 2011). The trauma theorist most often cited in parental incarceration literature is Bowlby (1982) who posited that the disruption of parent-child attachment can result in adverse emotional reactions among offspring and these adverse emotional responses likely hinder continuous healthy psychosocial development. Maternal incarceration effects explained from this perspective argue that trauma is experienced as a result of parent-child separation or disruption of the parent-child bond. Maternal incarceration not only includes disrupted attachment, loss, or separation from a parent, but trauma can also result from disrupted living arrangements or changes in caretakers (Murray and Murray, 2010). As previously stated, incarcerated mothers are more likely than incarcerated fathers to have been the living with and caring for their child prior to imprisonment, thereby making the loss of a mother even more disruptive and detrimental to children's lives (Eddy and Reid, 2003; Glaze and Marushack, 2008; Hagan and Dinovitzer, 1999; Mumola, 2000). If a sibling can provide a substitute for the

displacement of the mother-child attachment, healthy psychosocial development may still be possible with children more likely experiencing positive rather than detrimental outcomes.

Summary

As female incarceration rates rise, the number of minors impacted by maternal incarceration is also increasing. While much of the empirical research supports an association between negative child outcomes and maternal incarceration, not all findings have yielded the same conclusions. Certainly, the question remains about whether parental incarceration actually causes negative outcomes for offspring or if the intergenerational consequences are instead due to selection effects. Because of the heterogeneous findings, identifying the specific factors that may alter the outcomes of children who experience maternal incarceration is necessary and justified. In understanding those factors, we can better distinguish between what influences may be protective versus those that may be harmful for children of incarcerated mothers. The quality of existing interpersonal relationships and how a family functions during a mother's incarceration likely affects how children cope with parental absence. This understanding will permit researchers to examine which factors may lead to detrimental child outcomes or, as equally important, which factors are protective. As prevalent as siblings are in American families, this important and significant relationship has been omitted in the research as a potential moderator of maternal incarceration effects. In identifying factors that may serve as protectors or aggravators, more consideration can be given to the development of effective interventions and the allocation of resources for these children and their families. The goal of this study is to add to the literature on maternal incarceration by examining the moderating effects of sibling relationships on young adult arrest.

CHAPTER 3

METHODS

The Current Study

In order to extend the literature on parental incarceration, and to better understand the heterogeneous findings in the prior research, the current study examines how maternal incarceration affects levels of arrest for young adults. The primary goal of the study is to identify the role that sibling relationships play in conditioning the effect of maternal incarceration on young adult arrest. This involves an examination of the potential buffering or amplifying effects of sibling characteristics such as warmth and conflict of the relationship, or the gender composition of sibling pairs. Data from the National Longitudinal Study of Adolescent to Adult Health (Add Health) 1994-2008 (Harris et al., 2009) is used to examine the association between maternal incarceration and arrest controlling for a number of well-documented risk factors including characteristics of the parents and respondent. Beyond these basic associations, the role of siblings is examined with particular regard to whether siblings moderate the effect of maternal incarceration. Although more recent attention within the incarceration effects tradition has shifted to understanding variation in the outcomes of children exposed to parental incarceration, limited work has focused exclusively on maternal incarceration or the potential conditioning role of sibling relationships. Important insights from strain and social learning theories are utilized, in addition to a broad range of multidisciplinary research, to better understand how siblings may help explain observed variation in outcomes associated with maternal incarceration.

Existing research on incarceration effects draws heavily on strain perspectives to understand the mechanisms that drive problem outcomes for children. Although scholars have begun to consider the broader context within which parental incarceration occurs, parental

incarceration often remains the sole independent variable (Aaron and Dallaire, 2010; see also Dannerbeck, 2005). Missing from these analyses are other important sources of strain, including contextual factors and family processes. In these analyses, family processes are examined by directing empirical attention to the role of sibling relationships. According to a strain perspective, the negative emotions following maternal loss due to incarceration are further exacerbated by poor quality sibling relationships, potentially leading to engagement in illegal activity (Hagan and Dinovitzer, 1999; Siegel, 2011; Slomkowski et al., 2001). Conversely, strain theory also posits that coping skills, resources, and conventional social supports (e.g., positive sibling relationships) may help youth cope with the strains associated with maternal incarceration (Agnew, 1992). Although less commonly applied to research on incarceration effects, social learning theory can also shed light on the ways in which siblings condition the effect of maternal incarceration on their engagement in illegal behaviors. That is, research adopting a social learning framework has found that siblings can learn positive and potentially protective social behaviors from one another, in addition to illegal behaviors (Dirks, Persram, Recchia, and Howe, 2015; Stewart, 1983).

Using data from the Add Health study, the following research questions will be addressed:

1. Are there unconditioned effects on young adult arrest for the key predictors, including maternal incarceration, the presence of a co-residing sibling, the nature of a sibling relationship, and sibling gender composition?
2. Do co-residing siblings moderate the effect of maternal incarceration on arrest for young adults?
3. Does the quality of co-residing sibling relationships condition the effect of maternal incarceration on young adult arrest?

4. Are there differential effects of maternal incarceration on young adult arrest for same-gender siblings compared to not having a same-gender sibling?
5. Do sibling indicators differentially condition the effect of maternal incarceration for males compared to females?

Based on extant research and theory, it is expected that young adults exposed to maternal incarceration will report higher levels of arrest. However, it is expected that the association between maternal incarceration and arrest will be a function of sibling relationships. The first research question examines whether these key predictors – maternal incarceration and sibling characteristics – are associated with adult arrest before considering any potential moderating influences. The second question addresses whether the negative impact of maternal incarceration on arrest is lessened for those who resided with siblings during adolescence. The third question is motivated by an expectation that the effect of maternal incarceration will also be conditioned by the quality of the sibling relationship, such that the positive effect of maternal incarceration on young adult arrest will be exacerbated by negative sibling relationship quality, and buffered by positive sibling relationship quality. Moreover, because the level of social influence is assumed to be stronger in same-gender sibling relationships (Andsager, Bemker, Choi and Torwell, 2006; Whiteman, McHale and Crouter, 2007), the fourth research question tests the expectation that the adverse effects of experiencing maternal incarceration will be lower for respondents who have a sibling of the same gender. Lastly, the fifth research question addresses the expectation that the effect of maternal incarceration will be more deleterious for daughters rather than sons and that the effect of having a sibling, especially one of the same-gender will be more of a protective factor for females than males.

Data

This research draws on data from The National Longitudinal Study of Adolescent to Adult Health (Add Health), 1994-2008 which is a longitudinal study of a nationally representative sample of adolescents in grades 7-12 in the United States during the 1994-1995 school year. Using four in-home interviews, the Add Health cohort has been followed into young adulthood with the most recent interview occurring in 2008 when the sample was aged 24-32. The Add Health data was collected using systematic sampling methods and implicit stratification thereby resulting in a research design that ensures national representativeness with respect to region, urbanicity, ethnicity, school type, and size (Harris et al., 2009). Add Health combines longitudinal survey data on respondents' social, economic, psychological, and physical wellbeing with contextual data on the family, neighborhood, community, school, friendships, peer groups, and romantic relationships. Thus, it provides researchers the unique opportunity to study how social environments and behaviors in adolescence are linked to health and achievement outcomes in young adulthood.

The current study relies on data from two waves (Wave I and IV) of the in-home component of Add Health. Wave I contains information collected in 1994-95 from Add Health's nationally representative sample of adolescents with the total number of approximately 20,745 students. Additionally, an at-home interview with a parent, usually the resident mother, was part of Wave I and this data is also used as part of the analysis in this study. Over eighty-five percent of the parents of participating adolescents completed the parental questionnaire which gathered data on such topics as heritable health conditions, marriage and marriage-like relationships, involvement in volunteer, civic, or school activities, health-related behaviors, education, employment, household income and economic assistance, parent-adolescent communication and interaction, the

parent's familiarity with the adolescent's friends and friends' parents, and neighborhood characteristics. Wave IV was designed to study the developmental and health trajectories across the life course of adolescence into young adulthood. Interviews expanded the collection of biological data in Add Health to understand the social, behavioral, and biological linkages in health trajectories as the Add Health cohort ages into adulthood. In 2008, approximately seventy-six percent of the original Wave I respondents were interviewed resulting in the collection of data on 15,701 respondents, aged 24 to 32 for Wave IV (Harris et al. 2009).

Additionally, the Add Health design included a unique design component of embedded sibling pairs. This component includes an oversample of more than 3,000 pairs of individuals with varying genetic resemblance, ranging from identical and fraternal twins, full siblings, half siblings, and unrelated siblings who were raised in the same household. These pairs of adolescents took the same questionnaires, share the same home environment, and share, in most cases, the same school and neighborhood environment. In all follow-up interviews, high priority was placed on locating and re-interviewing sibling pairs to maintain the integrity of this subsample for longitudinal research purposes. Response rates for the sibling pairs subsample have been higher than for the overall sample with 2,883 sibling pairs of the original 3,139 pairs at Wave I responding at Wave IV (92.7%)³.

Description of the Measures

Outcome Variables

Previous scholars (Burgess-Proctor, et al., 2016; Huebner and Gustafson, 2007; Muftic et al., 2016) have studied the effect of maternal incarceration on criminal justice outcomes including arrest, conviction, and incarceration. For purposes of this study, the entry point into the criminal

³ Only one member of the pair needed to be interviewed for the pair to be included in a response category (Harris, et al., 2013)

justice system is analyzed. Specifically, young adult arrest is operationalized as whether respondents experienced an arrest after turning the age 18 and prior to Wave IV. Answer to the Wave IV self-report questions “Have you ever been arrested?” (1=yes, 0=no) and “How old were you the first time you were arrested?” are used. The age of 18 is used as the division between adolescence and young adulthood as it is the formally recognized age of adulthood and emancipation from one’s parents.⁴

Predictor Variables

The focus of this study is on the biological mother, so the main predictor variable is maternal incarceration and is operationalized using a dichotomous measure. At Wave IV respondents were asked “Has/did your biological mother ever (spent/spend) time in jail or prison?” (1=yes, 0=no). Additionally, based upon answers to the question, “How old were you when your biological mother went to jail or prison (the first time)?”, a dichotomous variable was created to determine whether the mother’s imprisonment occurred prior to the respondent turning 18 (1=yes, 0=no).

The other key variables of interest relate to siblings, and specifically whether there is at least one co-residing sibling, sibling gender, and the quality of the sibling relationship. At Wave I, respondents were asked to identify each member of the household by type of relationship. When a member of the household was identified as a sibling, the respondent was asked to indicate whether the sibling was a brother or sister. A dichotomous variable based on whether the respondent has at least one sibling living with them (1=yes, 0=no) will be used to examine the first research question.

⁴ At the time of Wave IV, the majority of states used the age of 18 as the cutoff for processing an individual in adult court, but it is worth noting that, at the time, 17 states had an age younger than 18 as the division between juvenile and adult status.

Those respondents who answered affirmative to having a sibling will then be used as a subsample to answer the second research question. In addition to the physical presence of a sibling, the quality of sibling relationships is also assessed. Based on prior research, warmth and conflict are two measures of sibling mutual interaction that are commonly used. Sibling interaction dimensions of warmth and conflict are only weakly correlated and thus, siblings may differ or match on levels of closeness and conflict (Furman and Buhrmester, 1985). As such, two questions from the Wave 1 interview are used to measure the nature of the sibling relationship. The first question is a measure of conflict indicating a negative relationship: “How often do you quarrel or fight with your sibling?” The second question measures warmth indicating a positive relationship: “How often do you feel love for your sibling?” Response categories for each question are 1= Never, 2 = Seldom, 3 = Sometimes, 4 = Often, 5 = Very Often. An ordinal measure for each relationship quality is used. For positive relationships, higher values indicate warmer and more positive relationships while for the negative relationship measure, higher values indicate stronger negative and conflicting relationships. The quality of sibling relationships are measured in both Wave I and Wave III in the Add Health study. To better establish temporal ordering of sibling relationship quality occurring prior to involvement with the young adult arrest outcome, the sibling relationship quality measured at Wave 1 is used.⁵ Wave I relationship questions are administered only to respondents who have siblings in the study.⁶

To appropriately address the third research question of whether sibling gender composition moderates the effect of maternal incarceration, a variable identifying the gender composition of

⁵ Measure of relationship quality questions of both conflict and warmth used in Wave 1 and Wave 3 are positively correlated ($p \leq .05$).

⁶ Due to some respondents having multiple siblings in the study, it was decided that the sibling the respondent reported the highest level of warmth and conflict with would be used, rather than an average, or randomly selecting a relationship.

individuals who have at least one sibling who is of the same gender as the respondent is used. This variable is coded as a dichotomous measure where 1=same-gender sibling pair (male/male or female/female) or 0= mixed-gender sibling pair (male/female) or no sibling.

Control Variables

A number of variables during Wave I and IV that may confound the link between maternal incarceration during childhood and the outcome are included as controls, comprising key individual demographic and parental characteristics. Four respondent demographic characteristics - age, gender, race, ethnicity, and education - are included in the models as controls. The respondent's age is measured in years at Wave IV. Gender is measured at Wave 1 and coded as a dichotomous measure (1 = male; 0 = female). Race and ethnicity are measured as a categorical variable and include: White (as the reference category), Black, Hispanic, and Other which includes American Indian, Asian, and other non-white race or ethnicity. Respondent education levels are measured at Wave IV with the question "What is the highest level of education that you have achieved to date?" Responses range from 8th grade or less to completion of post baccalaureate professional education and coded as follows: 1 = less than high school graduate (reference category), 2 = high school graduate, vocational/technical training, 3 = some college or bachelor's degree, 4 = doctoral degree.

Key parental variables correlated with higher numbers of arrest are included as controls. Respondents were asked at Wave 1 whether their mother has ever smoked a cigarette and coded 1 = yes and 0 = no. A dichotomous variable at Wave 4 measures prior biological father incarceration. Responses to the question "Has/did your biological father ever spent/spend time in jail or prison?" are coded 1 = yes and 0 = no.

Table 1 provides a summary of the variables and their coding while Table 2 provides the weighted descriptive statistics of all variables. Within this sample, twenty-two percent have been arrested at least once since turning 18. Two percent have a mother who had been in jail or prison sometime prior to the respondent becoming an adult (turning 18). The average age of the respondents is 29, almost half are male (49%), and the average education level is just below “some college or bachelor’s degree.” Ninety-eight percent had at least one co-residing sibling during adolescence and seventy-one percent have at least one sibling of the same gender. The majority of the sample is White (68%), while thirteen percent are Black, five percent are Hispanic, and fifteen percent are from other races. The average level of sibling conflict is 3.03 (“Sometimes”), with a higher average level of sibling warmth (3.8) which is closer to “Often.” Lastly, almost half (48%) of the sample reported their mother smoked and fifteen-percent reported having a father who had spent time in jail or prison.

Analytic Strategy

All analysis was performed using Stata version 14 (Stata Corp, College Station, TX) which allows for the control of survey design effects of individuals clustered within schools and stratification by geographic region, and also provides for multiple imputation. After the data was coded and multiple imputation was completed, descriptive statistics for all study variables, including the means, standard errors, and ranges of the variables were considered. Next, multivariate analysis using multiple logistic regression was performed examining the associations between maternal incarceration, having at least one co-residing sibling, sibling relationship quality, sibling gender composition, individual and parent characterizes, and adult arrest.

Design Effects

An Add Health sampling weight was included in order to ensure unbiased estimates of population parameters and standard errors. Failing to account for the sampling design may lead to underestimating standard errors and false-positive statistical test results. Because the outcome variable (adult arrest) is from Wave IV, but the predictor variables (maternal incarceration, co-residing siblings, and sibling relationship quality and gender composition) are from a previous wave, the appropriate weight to include is the cross-sectional weight for the wave of the outcome variable (Chen and Chantala, 2014).

Missing Data

Missing data are a common occurrence, and the conclusions that are derived from analysis can be quite different depending on how and whether missing data are addressed. Missing data can occur because of nonresponse or because a particular question does not apply to the respondent: where no information is provided for one or more items or for a whole unit. Attrition is a type of missingness that often occurs in longitudinal studies such as the Add Health study, where participants drop out before the study ends and one or more measurements are missing. These forms of missingness have different impacts on the validity of conclusions from research. Missing data reduce the representativeness of the sample and can therefore distort inferences about the population. In situations where missing data occur, methods of data analysis that are robust to missingness are recommended. In other words, the analysis is robust when there is confidence that mild to moderate violations of the technique's key assumptions will produce little or no bias, nor result in distorted conclusions drawn about the population.

Multiple imputation provides a useful strategy for dealing with data sets with missing values. Instead of filling in a single value for each missing value, Rubin's (1987) multiple

imputation procedure replaces each missing value with a set of possible values that take into account the uncertainty about the correct value to impute. These multiply imputed data sets are then analyzed by using standard procedures for complete data and combining the results from these analyses, resulting in valid statistical inferences. In the current study, no more than seven percent of data were missing for any of the independent variables used, and in most cases, there was much less missingness. However, to ensure unbiased estimates, multiple imputation was performed using five imputations, to provide values for missing entries.

Research Questions and Modeling Strategy

The goal for the current study is to examine whether the effect of maternal incarceration on young adult arrest is moderated by sibling co-residence, by the quality of sibling relationships, and by the sibling gender composition. Moderator variables are typically introduced when there is an inconsistent relationship between a predictor and an outcome variable such as the case with maternal incarceration where outcomes are found to be detrimental to some children but not to others. First, the main effect of maternal incarceration and each of the key sibling indicators on young adult arrest is examined by using multiple logistic regression analysis. This method is appropriate due to the dichotomous nature of the outcome variable. After estimating main effects of maternal incarceration and sibling presence, the next step is to introduce individual and parental control variables. Next, multiplicative interaction terms will be included in the models to examine whether the effect of maternal incarceration on the likelihood of young adult arrest varies according to the presence of siblings in residence, the quality of the sibling relationships, and same-gender versus not having a same-gender sibling. All models are re-estimated for males and females separately to test for differential effects by gender. Below are the specific models presented in Chapters 4 and 5.

Research Question 1

Are there unconditioned effects on young adult arrest for the key predictors, including maternal incarceration, the presence of a co-residing sibling, the nature of a sibling relationship, and sibling gender composition? This first research question is addressed through a large number of preliminary models estimated to establish baseline effects for the key predictors. This is partly a replication of prior research, but using a more appropriate data source and an expanded set of measures. However, it also introduces a more refined and extensive set of sibling indicators, and it controls for key individual and parental characteristics to avoid spurious effects of maternal incarceration. First, maternal incarceration is regressed on arrests occurring after the age of 18 and prior to Wave IV. This bivariate logit model will be generated to preliminarily assess the bivariate relationships between the key independent variable, maternal incarceration, and the outcome variable. Second, each sibling indicator will be added to separate models in order to estimate how maternal incarceration and having a co-residing sibling, the nature of sibling relationship, and sibling gender composition affect the likelihood of arrest for young adults. Third, individual-level and then parental characteristic control variables will be added to the model in order to rule out the possibility that the effect of maternal incarceration and presence of siblings on the likelihood of arrest is due to some other variable(s) associated with the predictor and outcome variables. After presenting the results of these models in Chapter 4, the following research questions will be addressed in Chapter 5.

Research Question 2

Do co-residing siblings moderate the effect of maternal incarceration on arrest for young adults? To address this question, an interaction term between maternal incarceration and sibling presence is included into the model to determine whether living with at least one sibling moderates the effect of maternal incarceration.

Research Question 3

Does the quality of co-residing sibling relationships condition the effect of maternal incarceration on young adult arrest? This question is addressed by adding an interaction term between maternal incarceration and warmth to determine if positive sibling relationships moderates the effect of maternal incarceration on young adult arrests. It is further addressed with an additional interaction term between maternal incarceration and conflict to determine if negative sibling relationships moderate the effect of maternal incarceration on young adult arrests.

Research Question 4

Are there differential effects of maternal incarceration on young adult arrest for same-gender siblings compared to not having a same-gender sibling? This is tested by adding an interaction term for maternal incarceration and sibling gender composition.

Research Question 5

Do sibling indicators differentially condition the effect of maternal incarceration for males compared to females? This research question is addressed alongside the analysis for each of the previous three questions regarding conditional effects. After adding each interaction term models are re-estimated separately for males and females.

Supplementary Analysis and Robustness Check

After addressing each of these research questions, several additional models are estimated to test for robustness of the findings, and to rule out an alternative explanation. Specifically, all models were re-estimated using self-reported criminal offending as the outcome rather than arrest. Finding a similar pattern of results for this outcome would bolster confidence in the reliability of the results, and since criminal offending is an obvious predictor of arrest, this would suggest a possible mechanism through which maternal incarceration affects adult arrest. Moreover, this

would rule out the possibility that at least some of the observed effects on adult arrest are actually due to a labeling effect of having an incarcerated mother. Given that this supplementary analysis constitutes a very large set of additional models, the results will be broadly summarized.

Table 1. Summary of Dependent and Independent Variables

Variable	Coding	Wave	Description	Value
Dependent Variable				
Adult Arrest	AdultA	4	Respondent was arrested as an adult. Constructed from whether respondent was ever arrested (h4cj1) and what age at only one arrest (h4cj3) or multiple arrests (h4cj4).	1=yes; 0=no
Independent Variables				
Maternal Incarceration	Matinc	4	Maternal incarceration prior to age of 18 Constructed from whether mom was incarcerated (h4wp3) and at what age Respondent was at the time (h4wp5)	1=17 or younger; 0=18+
Sibling	Sibling	1	How many respondents have at least one sibling Constructed from brother and sister variables	1=yes, 0=no
Conflict	Conflict	1	Conflict Scale based on question: How often do you fight or quarrel with this sibling? (h1ws3a-g) Using the sibling with the highest conflict for each respondent	1=never to 5= very often
Warmth	Warm	1	Warmth Scale based on question: How often do you feel love/affection with this sib? (h1ws4a-g). Using the sibling with the highest warmth for each respondent	1=never to 5= very often
Gender Composition	SameGen	1	At least one sibling of the respondent is same gender constructed from gender, brother and sister variables	1=same-gender, 0=mixed

Table 1. (Continued)

Variable	Coding	Wave	Description	Value
Controls				
Individual Characteristics	Age	4	Respondent Age constructed from w4age= int(w4date-date_of_birth)/365.25	24-35
	White	1	Respondent race constructed from h1gi6a-e and, h1gi4	1=yes, 0=no
	Hispanic		Respondent race constructed from h1gi6a-e and, h1gi4	1=yes, 0=no
	Black		Respondent race constructed from h1gi6a-e and, h1gi4	1=yes, 0=no
	Other		Respondent race constructed from h1gi6a-e and, h1gi4 (American Indian, Asian, other)	1=yes, 0=no
Parental Characteristics	Male	1	Gender of respondent constructed from bio_sex	1=male, 0=female
	Education	4	Child education level constructed from h4ed2	0-15
	Momsmoke	1	Mother smoked constructed from h1rm14	1=yes, 0=no
	Dadinc	4	Father incarceration constructed from h4wp9	1=yes, 0=no
Weighting Variable	gswgt4_2	4	Sampling weight for cross sectional - weights - representative of young adults in 2008 enrolled in grades 7-12 during 1994-1995	

Table 2. Weighted Means of Adult Arrest, Sibling Indicators, and Control Variables

Variable	Mean	Std. Err.	[95% Conf.	Interval]
Adult Arrest	0.22	0.01	0.20	0.25
Maternal Incarceration	0.02	0.00	0.01	0.03
Sibling	0.98	0.00	0.97	0.99
Same Gender Dyad	0.71	0.01	0.69	0.74
Conflict	3.03	0.03	2.96	3.10
Warm	3.80	0.04	3.72	3.88
Male	0.49	0.01	0.47	0.52
Age	28.83	0.15	28.54	29.12
White	0.68	0.05	0.58	0.77
Hispanic	0.05	0.01	0.03	0.07
Black	0.13	0.02	0.08	0.18
Other	0.15	0.03	0.09	0.20
Education Level	2.67	0.04	2.59	2.74
Maternal Smoking	0.48	0.02	0.45	0.51
Paternal Incarceration	0.15	0.01	0.13	0.18

n= 14,470

CHAPTER 4

RESULTS – MATERNAL INCARCERATION AND SIBLING EFFECTS

Summary

This study examines the effect of maternal incarceration on young adult arrest and how the role of siblings may either buffer or aggravate this effect. Specific research questions include whether residing with a sibling during adolescence, having a sibling relationship characterized by high levels of warmth or conflict, or having a sibling who is of the same gender, serve as protective factors for those who have experienced maternal incarceration. Alternatively, the study also examines whether these sibling indicators may exacerbate the effect of maternal incarceration. Before examining conditioning models in the next chapter, analyses are performed within the current chapter to assess for direct effects of maternal incarceration and each of the sibling indicators of interest on adult arrest. This establishes a baseline for the relationship between each of the key independent variables and the dependent variable. Additionally, demographic and parental controls correlated with both the key independent variables and the outcome will be added to the models. These analyses will assess whether the observed relationships between maternal incarceration, sibling relationships, and adult arrest are due to some confounding processes rather than directly by the independent variables. This chapter begins with a discussion of bivariate statistics in order to identify any initial associations that might inform the research questions, as well as identify any problematic levels of collinearity that may exist between the independent variables. Next, results of logistic regression models examining the effect of maternal incarceration and siblings on young adult arrests are presented.

Bivariate Statistics

Table 3 presents a bivariate correlation matrix to show the size and direction of the relationship between any two variables used in this study. Prior work has found a positive correlation between having an imprisoned mother and being arrested as an adult (Muftic et al., 2016), and this relationship is confirmed in the current analysis. Additionally, maternal incarceration is negatively associated with the presence of siblings and a warm sibling relationship. In other words, living with a sibling, and reporting a warm relationship with a sibling, are less likely for individuals who experience maternal incarceration. Also as anticipated, adult arrest appears to be positively associated with conflict and negatively associated with having siblings of the same gender, although neither relationship reaches conventional levels of statistical significance. In addition to examining initial bivariate effects of key predictors, this preliminary analysis can also uncover any severe collinearity between the independent variables. In examining the correlation matrix, no two items appear to be problematically correlated. The only variables with moderate correlations are those that are necessarily related, such as the dummy variables for race, and even these never exceed a correlation of 0.55. Further examination showed that the variance inflation factor (VIF) scores were within acceptable ranges, and the mean VIF was well below two (Allison, 1999).

Multivariate Statistics

This study examines the relationship between maternal incarceration and sibling relationships with arrest as a young adult. Subsequently, it is important to assess the relationship between each of the key independent variables with the dependent variable before examining conditioning models in the next chapter. Multivariate regression analysis is performed to assess the effects of maternal incarceration and each of the sibling indicators on adult arrest. These

models will be generated in order to estimate how maternal incarceration and having a co-residing sibling, the nature of sibling relationship, and sibling gender composition affect the likelihood of arrest for young adults. Additional analyses will include demographic characteristics and parental characteristics correlated with the key independent variables and the outcome to assess whether the observed relationships between maternal incarceration, sibling relationships and adult arrest are due to some confounding processes rather than directly by the independent variables. By replicating prior work testing for maternal incarceration and sibling effects, but by using a larger sample and better measures of these sibling indicators, we can obtain more precise estimates. Multiple sets of multivariate regression models will be presented in Tables 4-12, analyzing the effect of maternal incarceration, along with each key sibling indicator of interest, on adult arrest.

Tables 4-6 focus on the effects of maternal incarceration and having a co-residing sibling. Specifically, Table 4 presents models for the full sample, while Tables 5 and 6 replicate those models using male and female subsamples to identify any gender-specific effects. Tables 7-9 present similar sets of models, but examine sibling warmth and conflict rather than simply the presence of a sibling. Finally, Tables 10-12 examine the effect of gender composition of sibling pairs.

Four regression models are presented within Tables 4-6. Because maternal incarceration is a primary focus of this study, Model 1 presents the bivariate regression of maternal incarceration on young adult arrest. Again, given that each sibling indicator is also a key focus, Model 2 includes the co-residing sibling variable, thus establishing a baseline for the relationship of these two key independent variables with the dependent variable. Individual demographic characteristics are added in Model 3 and parental characteristics are added in Model 4. Adding these groups of variables will allow for an examination of whether maternal incarceration and having a co-residing

sibling have direct effects on adult arrest, or whether these relationships are due to some confounding process such as the selection effects described in Chapter 2.

Because the effect of maternal incarceration on adult arrest is already established in Model 1 within Tables 4-6, only three regression models are presented within Tables 7-12. Within these tables, Model 1 will regress adult arrest on maternal incarceration and the sibling measure of interest to establish a baseline for the relationship of these two key independent variables with the dependent variable. As with the models in the first three tables, individual demographic characteristics are added in Model 2 and parental characteristics are added in Model 3.

Co-Residing Siblings

Maternal incarceration is associated with a wide array of detrimental outcomes and it is expected that living with a sibling is associated with less harmful effects. Because sibling relationships are unique in the frequency and duration of interactions, accessibility, and degree of common experiences, they are an important source of social support during childhood and adolescence. It is expected that adolescents who are living with at least one sibling, will have lower odds of being arrested than those who do not live with a sibling. Table 4 presents the results from the first set of multivariate models which regressed adult arrest on maternal incarceration and having at least one co-residing sibling during adolescence. The first model reveals that maternal incarceration has no effect on young adult arrest. It was anticipated that due to the unique nature of a sibling relationship, living with one will decrease the odds of being arrested as an adult. This expectation is confirmed when the variable for a co-residing sibling is added in Model 2, revealing that living with at least one sibling decreases the odds of adult arrest by 14% while the effect of maternal incarceration lessens slightly.

It is possible that any observed relationship between maternal incarceration and arrest may be due to factors that drive both of these outcomes. By controlling for these correlates, we can better assess the true relationship between adult arrest and maternal incarceration, and whether it is, in fact, associated with these known risk factors. To this end, Model 3 presents results from a model that includes demographic variables of gender, race, age, and education. Results show that being male and having a lower level of education are significant predictors of adult arrest while both maternal incarceration and living with a sibling are nonsignificant. This indicates that gender and education have a direct effect on adult arrest, but maternal incarceration and co-residing siblings do not. As gender is a key predictor of offending, it is not surprising that the odds of being arrested as a young adult are nearly three times greater for males than for females.

As part of the analysis, it is also important to control for key parental characteristics associated with adult arrest including maternal smoking and paternal incarceration. Again, this is to ensure that any observed relationship between maternal incarceration and arrest is not explained by known characteristics associated with both outcomes. Prior work has shown that children who have a mother who smoked, or have a father who has been incarcerated, are at greater risk for detrimental outcomes (e.g. Ellis, Widmayer, and Shyamal, 2012 and Hagan and Dinovitzer 1999). Once more, to ensure the results reflect the true relationship between adult arrest and maternal incarceration and living with a sibling, these parental risk factors associated with adult arrest need to be controlled. These characteristics are added in Model 4 and show that, in addition to gender and education, adult arrest is associated with being black, experiencing maternal smoking, and paternal incarceration. According to these results, and contrary to what was expected, adult arrest is explained by individual and parental characteristics and not by the effect of maternal incarceration.

Individuals who have experienced maternal incarceration are not more likely to be arrested as a young adult compared to those who have not had a mother who has been imprisoned. As expected, having at least one sibling is associated with lower odds of adult arrest. However, in the full model, only gender, race, level of education, maternal smoking and paternal incarceration are significant predictors of young adult arrest. When controlling for individual and parental characteristics, living with a sibling has no significant association with arrest as a young adult. Being male, followed by having a father incarcerated, and exposure to maternal smoking, are the strongest risk factors associated with arrest. The null findings for any direct effect of maternal incarceration suggests a differential effect does exist between paternal and maternal incarceration, and that having a father imprisoned, rather than a mother, is more harmful.

In general, these findings argue against a direct effect of maternal incarceration on adult arrest, and instead, it appears adult arrest is a function of demographic, social, and environmental differences that exist between individuals experiencing maternal incarceration compared to those who have not.

Analyses by Gender

Another important consideration in this work is whether maternal incarceration is equally traumatic and detrimental for daughters and sons, or whether there are differential effects, and likewise whether males and females are differentially affected by living with a sibling. In fact, the null effects of maternal incarceration and co-residing siblings in the full models in Table 4 may be obscuring important gender-specific effects. In order to examine whether these relationships vary by gender, the same models are re-estimated on the female and male subsamples, the results of which are presented in Tables 5 and 6, respectively.

Model 1 in Table 5 indicates that the odds of females being arrested as a young adult are nearly twice as high when they have experienced maternal incarceration. As expected, having a

sibling is negatively associated with arrest as indicated in Model 2 where the odds of females being arrested are 26% lower if living with a sibling during adolescence. Again, individual risk factors associated with maternal incarceration and adult arrest are added in Model 3. Here, the effect of maternal incarceration becomes nonsignificant while having a co-residing sibling remains significant. As with the estimation on the full sample, females with less education are more likely to be arrested as adults, and interestingly, being black has a larger effect on adult arrest for females than what was found in the pooled sample. When parental characteristics correlated with both maternal incarceration and adult arrest are added in Model 4, the effect of having a co-residing sibling remains significant, while experiencing maternal smoking, paternal incarceration, being black, and having a lower level of education are positively associated with adult arrest for females. As with the full sample, maternal incarceration has no direct effect on adult arrest when individual and parental characteristics are included as controls, suggesting there is not a meaningful impact of maternal incarceration for daughters. However, unlike the pooled sample, living with a sibling is associated with lower likelihood of arrest for daughters who have experienced maternal incarceration.

The estimations are repeated for the male subsample and presented in Table 6. The first model indicates maternal incarceration has no effect on adult arrest for males. Thus, the traumatic effect of having a mother incarcerated appears to exist for daughters, but not for sons. When the variable for co-residing siblings is added to Model 2, there is no effect for either of the independent variables--maternal incarceration or co-residing sibling--on the outcome. Individual characteristics associated with maternal incarceration and the outcome are added in Model 3 and show education as the key predictor of adult male arrest. When parental characteristics known to be associated with adult arrest are added in Model 4, education, maternal smoking, and paternal

incarceration are significant predictors of young adult arrest for males. In contrast with females, only a lower level of education, being exposed to maternal smoking, and paternal incarceration is associated with adult arrest for males. One finding to note within this model is that the gender difference in the effect of paternal incarceration appears to be substantial, with a larger effect for females (OR=1.72, $p \leq .001$) than for males (OR=1.27, $p \leq .05$). Analysis of these gender-specific coefficients using seemingly unrelated regression reveals that this is, indeed, a statistically significant difference in how daughters are impacted differently than sons when a parent is incarcerated⁷.

To summarize, the analyses examining the effects of maternal incarceration on the male and female subsamples revealed key differences between daughters and sons. First, females who experienced maternal incarceration are at higher odds of being arrested while there is no significant effect for males. Additionally, living with a sibling decreases the odds of arrest for females, yet the same is not true for males. For sons, only education, exposure to maternal smoking, and paternal incarceration predict a greater likelihood of arrest. Conversely, for females, being black, being less educated, exposure to maternal smoking, and experiencing paternal incarceration are associated with higher odds of adult arrest. As predicted, when examining the effects of maternal incarceration, differential effects do exist for daughters compared to sons. In particular, paternal incarceration is more harmful to daughters compared to sons when a mother has been incarcerated.

Sibling Relationship Quality

Looking next at sibling relationship quality, it is anticipated that siblings who share a more loving and supportive relationship will be more resilient when confronted with the negative effects

⁷ There is disagreement over the appropriate method for testing the significance of coefficient differences across models for logistic regression, but a typical method, and the method employed in this study, is to use seemingly unrelated regression with an associated chi-square test (Allison, 1999; Williams, 2009).

of having an incarcerated mother. The sibling relationship quality helps differentiate patterns of adjustment to environments marked by stressful experiences. The emotional and financial strains resulting from the mother's absence, the stigma of having a mother incarcerated, as well as potentially being uprooted to a different living environment contribute to harmful outcomes for children. Siblings who have loving and supportive relationships are better able to overcome these hardships. Alternatively, if a sibling relationship is characterized by conflict and hostility, this relationship adds additional strain contributing to more harmful outcomes. Table 7 presents results from the set of multivariate models which regress adult arrest on maternal incarceration and sibling relationships characterized by higher levels of warmth and conflict. Model 1 shows that the odds of adult arrest for those who experience maternal incarceration are nearly three times higher than for those who have not experienced maternal incarceration. Additionally, having a sibling relationship characterized by higher levels of warmth decreases the odds of adult arrest by 14%. Having a sibling relationship high in conflict is associated with a higher likelihood of arrest, but the effect does not reach statistical significance.

As described above, it is important to control for individual characteristics associated with maternal incarceration, sibling relationship qualities, and adult arrest to ensure that results are not due to these other variables driving the key independent and dependent variables. These individual controls are included in Model 2 and show that the effects for both maternal incarceration and having a warm sibling relationship become nonsignificant after controlling for these confounding influences. As seen in prior models, being male and having a lower level of education are positively associated with adult arrest. Likewise, including the parental characteristics in Model 3 show that maternal smoking and paternal incarceration are also significantly associated with a

higher odds of adult arrest. As with the previous analyses, adult arrest is explained by individual and parental characteristics, rather than maternal incarceration.

When examining sibling relationship quality, contrary to expectations, maternal incarceration, warmth, and conflict have no direct effect on adult arrests. Instead, being male, having less education, exposure to maternal smoking, and paternal incarceration are significantly associated with a higher odds of arrest.

As anticipated, it initially appeared as if young adults who experienced maternal incarceration, and who report a warmer sibling relationship, are less likely to be arrested as a young adult, thus supporting the argument that warmer, supportive relationships are associated with a greater ability to overcoming adverse situations, such as maternal incarceration. Surprisingly, there was no support, even without including control variables, for the expectation that a sibling relationship high in conflict has any effect on the likelihood of arrest. While the sibling relationship may be adversarial, the effect of this conflict may be diminished by more stressful factors such as parental incarceration. However, when controlling for all variables in the full model, only gender, level of education, maternal smoking, and paternal incarceration are significant predictors of young adult arrest. Contrary to what was predicted, maternal incarceration does not have a direct effect on adult arrest when examining sibling relationship quality. Instead, as with the previous findings regarding co-residing siblings, adult arrest is explained by the demographic, social, and environmental differences that exist between individuals experiencing maternal incarceration compared to those who have not. This is particularly meaningful given that one of the parental characteristics that has been added to the model is paternal incarceration. It has a significant effect on adult arrest, increasing the odds by about 39%, yet maternal

incarceration has no effect. Thus, despite what some scholars have argued, having a father incarcerated may be more detrimental than having a mother who has been incarcerated.

Analyses by Gender

Again, it is important to consider whether the influence of adolescent sibling relationships on adult arrest might differ for males and females, since examining them in a single model may be obscuring meaningful effects. To this end, Table 8 presents results for models that have been re-estimated using only the female subsample. Unlike findings in the full sample, it appears that the nature of sibling relationships in terms of warmth or conflict between siblings is not related to adult incarceration for females. This suggests that the effect of sibling warmth that was observed in the pooled model above may be driven primarily by an effect for females but not for males. However, for those females who have experienced maternal incarceration, the odds of being arrested as a young adult are seven times greater than for those who have not had a mother imprisoned. When individual characteristics are added to Model 2, maternal incarceration remains significant as does the level of education. This suggests that, in contrast with the results for males and females pooled together, this sizable effect of maternal incarceration is not due only to the fact that those with incarcerated mothers tend to have other characteristics that are associated with arrest. Though the effect of maternal incarceration is diminished when controlling for these factors, it still remains significant and sizable, indicating a meaningful direct effect of maternal incarceration. The results of Model 3 reveal a similar impact when controlling for parental characteristics. The effect of maternal incarceration is reduced somewhat, but it remains statistically significant and substantial. Indeed, even after controlling for individual and parental characteristics, females experiencing maternal incarceration still have an odds of being arrested that is nearly five times as great as those whose mother was not incarcerated.

Based upon prior work, it is anticipated that the loss of a mother due to incarceration is not as traumatic and detrimental for sons as it is for daughters. It is further expected that relationships between brothers will function as predicted with warmer relationships associated with lower odds of arrest, while adversarial relationships are associated with higher odds of arrest for males. Hence, Table 9 presents results for models that have been re-estimated using only the male subsample. The first model reveals no effect for maternal incarceration, warmth, or conflict on adult arrest for males. When individual characteristics are added in Model 2, only lower levels of education are significantly associated with a higher likelihood of adult arrest for males. Of the parental characteristics added in Model 3, only maternal smoking is a significant predictor for male adult arrests. This analysis indicates that when examining sibling relationship qualities, there is no significant effect of maternal incarceration on sons as there is for daughters.

In these analyses allowing for differential effects between daughters and sons, maternal incarceration does appear to have a meaningful direct effect on young adult arrest, but only for daughters. This is important for two reasons. First, this indicates that the effect of maternal incarceration is not due only to the other characteristics associated with a higher likelihood of adult arrest. Second, when a mother has experienced incarceration, there is a significant and substantial effect on the likelihood of adult arrest for daughters, but not for sons. This suggests that gender of the child *and* the parent experiencing incarceration must be jointly considered when examining enhanced risks for detrimental outcomes. The null findings for the effect of relationship quality on arrest for either gender may be explained by the fact that the relationship quality with a parent, rather than a sibling, may be more important.

Sibling Gender Composition

Turning now to sibling gender composition, in sibling pairs where gender is the same, the social influence one sibling has over another is assumed to be stronger. In continuing the analyses of possible gender differences, the effect of having a same-gender sibling is assessed to identify any differences in adult arrest between brother or sister pairs versus a mixed pair or having no sibling at all. Because prior work has found that same-gender sibling pairs generally find higher quality relationships, it is anticipated that these dyads will experience lower odds of adult arrest compared to having a mixed-gender sibling pair or having no sibling. Table 10 presents results for models regressing adult arrest on maternal incarceration and sibling gender composition. Specifically, an indicator of whether siblings are same- or mixed-gender is included. The first model indicates no effect of either maternal incarceration or sibling gender composition on the likelihood of criminal arrest. When individual characteristics are added in Model 2, gender, race, and lower levels of education are significant. The effect of gender on the outcome increases when parental characteristics are added in Model 3. Here, race, education, exposure to maternal smoking, and paternal incarceration are all significant as well.

To summarize, when examining sibling gender composition, only gender, race, lower level of education, maternal smoking, and paternal incarceration are significant predictors of young adult arrest.

Analyses by Gender

In prior work examining sibling relationships, same-gender siblings and those with warm relationships are more likely to model one another with sister dyads tending to be the most intimate and brother dyads more adversarial (Feinberg, Solmeyer, and McHale, 2012; McHale et al., 2006; Rowe and Gulley, 1992; Trim et al, 2006). As such, it is anticipated that sister pairs will have

lower odds of adult arrest compared to having a brother or no sibling. To assess the effect of maternal incarceration and sibling gender composition for sister pairs on adult arrest, the models were re-estimated on only the female subsample. Results are presented in Table 11 and show females who have experienced maternal incarceration have odds of being arrested as a young adult that are twice as high as females who haven't had a mother imprisoned. As expected, having a sister decreases the odds of arrest for females, but is not statistically significant. In Model 2, maternal incarceration becomes nonsignificant when controlling for individual characteristics, while being black and having a lower level of education have a significantly positive affect on adult arrest for females. Of the added parental characteristics in Model 3, maternal smoking and paternal incarceration are significant predictors of adult arrest for females.

Unlike sister pairs, brother dyads have been found to be more adversarial, and therefore, it is anticipated that when experiencing maternal incarceration, this conflict increases the odds of being arrested as an adult. The models were re-estimated for the male subsample and are presented in Table 12. As in previous models, there is no effect of maternal incarceration on adult arrest for males. Contrary to predictions, brother pairs have no effect on the likelihood of adult arrest. Similar to the results when examining the female subsample, less education, maternal smoking, and paternal incarceration are significant predictors of adult arrest for males. In the analyses comparing the effect of maternal incarceration on males compared to females, there are no significant findings for sibling gender composition for either group.

Conclusion

Using data from Add Health, the first steps of this study included examination of the effect of maternal incarceration and the presence and nature of sibling relationships on young adult arrest. Results from multiple multivariate logistic regression models provide significant and meaningful results. First, maternal incarceration is associated with an increased likelihood of being arrested

as an adult, but this is explained through demographic and parental characteristics of individuals who have experienced maternal incarceration compared to those who have not. Specifically, it appears that respondents with lower levels of education, exposure to maternal smoking, and paternal incarceration are more likely to be arrested and more likely to have had an incarcerated mother. This manifests as a significant bivariate effect of maternal incarceration on adult offending, but it is no longer significant after accounting for these individual and parental characteristics.

Second, when examining the effects of having a co-residing sibling and sibling relationship quality for the pooled sample, differential effects do exist between paternal and maternal incarceration. Contrary to what some scholars have suggested, having a mother imprisoned is not necessarily more harmful than having a father incarcerated.

Third, support for the idea that males and females experience the effects of parental incarceration differently is noteworthy. In models that control for sibling warmth and conflict, as well as other individual and parental characteristics, the odds ratio for the effect of maternal incarceration on adult arrest is significant and about 4.7 times larger for females than for males when controlling for both relationship qualities and individual and parental characteristics. Conversely, when examining males only, there is no effect of maternal incarceration on adult arrest.

The next chapter will build upon these initial results and examine whether any observed effects of maternal incarceration on adult arrest are conditioned by the presence of siblings, and the nature of the relationship between them. Specifically, the next chapter will examine whether having an incarcerated mother is less detrimental for those who have at least one sibling, and whether it varies according to the nature or gender composition of the sibling relationship.

Table 3. Bivariate Correlation Matrix of Variables

	1	2	3	4	5	6	7	8	9	10	11	12	13	14	15
1	1														
2	0.040	1													
3	-0.039	-0.033	1												
4	-0.014	-0.001	0.550	1											
5	0.008	0.004	0.091	-0.045	1										
6	-0.040	-0.015	0.010	0.029	-0.078	1									
7	0.191	-0.027	0.000	0.027	-0.076	-0.167	1								
8	0.024	-0.028	-0.102	-0.050	-0.072	0.071	0.061	1							
9	-0.010	-0.056	-0.015	-0.046	0.104	-0.099	0.013	-0.061	1						
10	-0.016	-0.012	-0.003	0.014	-0.008	0.001	0.002	0.053	-0.295	1					
11	0.054	0.090	-0.026	-0.005	-0.066	0.139	-0.032	-0.024	-0.551	-0.145	1				
12	-0.034	-0.015	0.048	0.056	-0.060	-0.016	0.015	0.068	-0.507	-0.133	-0.249	1			
13	-0.157	-0.067	0.026	-0.010	0.005	0.043	-0.114	-0.018	0.058	-0.036	-0.038	-0.010	1		
14	0.061	0.053	0.000	-0.009	0.076	-0.015	-0.025	-0.044	0.127	-0.037	-0.027	-0.111	-0.126	1	
15	0.083	0.145	-0.043	-0.018	-0.004	0.000	-0.007	-0.033	-0.049	-0.017	0.076	-0.006	-0.141	0.114	1

bold and italic = $p \leq .05$

1=Adult Arrest, 2=Maternal Incarceration, 3=Sibling, 4=Same Gender Dyad, 5=Conflict, 6=Warmth, 7=Male, 8=Age, 9=White, 10=Hispanic, 11=Black, 12=Other, 13=Education, 14=Maternal Smoking, 15=Paternal Incarceration

Table 4. Regression of Adult Arrest on Maternal Incarceration, Co-residing Siblings, Individual and Parental Characteristics

Variable	Model 1		Model 2		Model 3		Model 4	
	OR	SE	OR	SE	OR	SE	OR	SE
Maternal Incarceration	1.42	0.267	1.40	0.266	1.21	0.237	1.08	0.221
Sibling			0.86 *	0.061	0.89	0.063	0.90	0.065
Age					1.02	0.018	1.02	0.019
Male					2.57 ***	0.14	2.63 ***	0.143
Black					1.21	0.106	1.22 *	0.102
Hispanic					0.84	0.114	0.89	0.123
Other					0.83	0.095	0.86	0.094
Education					0.68 ***	0.03	0.70 ***	0.031
Maternal Smoking							1.33 ***	0.074
Paternal Incarceration							1.43 ***	0.117

n= 14,470 SE = Standard Error, OR = Odds Ratio

* p≤.05, ** p≤.01, ***p≤.001

Table 5. Regression of Adult Arrest on Maternal Incarceration, Co-residing Siblings, Individual and Parental Characteristics – Female Subsample

Variable	Model 1		Model 2		Model 3		Model 4	
	OR	SE	OR	SE	OR	SE	OR	SE
Maternal Incarceration	1.96 **	0.465	1.92 **	0.463	1.43	0.353	1.21	0.321
Sibling			0.74 **	0.078	0.75 **	0.081	0.77 *	0.086
Age					0.99	0.025	0.99	0.026
Black					1.40 *	0.199	1.38 *	0.196
Hispanic					0.86	0.158	0.92	0.18
Other					0.91	0.146	0.95	0.152
Education					0.67 ***	0.598	0.71 ***	0.049
Maternal Smoking							1.41 ***	0.103
Paternal Incarceration							1.72 ***	0.214

n= 7,702 SE = Standard Error, OR = Odds Ratio

* p≤.05, ** p≤.01, ***p≤.001

Table 6. Regression of Adult Arrest on Maternal Incarceration , Co-residing Siblings, Individual and Parental Characteristics – Male Subsample

Variable	Model 1		Model 2		Model 3		Model 4	
	OR	SE	OR	SE	OR	SE	OR	SE
Maternal Incarceration	1.22	0.299	1.21	0.299	1.03	0.262	0.96	0.252
Sibling			0.94	0.077	0.97	0.077	0.99	0.08
Age					1.03	0.022	1.04	0.022
Black					1.11	0.124	1.13	0.120
Hispanic					0.83	0.138	0.89	0.143
Other					0.79	0.107	0.82	0.106
Education					0.68 ***	0.032	0.69 ***	0.033
Maternal Smoking							1.28 **	0.102
Paternal Incarceration							1.27 *	0.125

n= 6,768 SE = Standard Error, OR = Odds Ratio

* p≤.05, ** p≤.01, ***p≤.001

Table 7. Regression of Adult Arrest on Maternal Incarceration, Sibling Relationship Quality, Individual and Parental Characteristics

Variable	Model 1		Model 2		Model 3	
	OR	SE	OR	SE	OR	SE
Maternal Incarceration	2.63 *	1.18	2.19	1.051	2.01	0.977
Warmth	0.86 **	0.041	0.93	0.044	0.93	0.044
Conflict	1.02	0.051	1.06	0.053	1.06	0.056
Age			0.99	0.038	0.99	0.038
Male			2.79 ***	0.342	2.86 ***	0.358
Black			1.29	0.281	1.35	0.283
Hispanic			0.73	0.204	0.68	0.189
Other			0.96	0.209	1.04	0.21
Education			0.64 ***	0.066	0.68 ***	0.066
Maternal Smoking					1.61 ***	0.211
Paternal Incarceration					1.39 *	0.202

n= 3,794 SE = Standard Error, OR = Odds Ratio

* p≤.05, ** p≤.01, ***p≤.001

Table 8. Regression of Adult Arrest on Maternal Incarceration, Sibling Relationship Quality, Individual and Parental Characteristics – Female Subsample

Variable	Model 1		Model 2		Model 3	
	OR	SE	OR	SE	OR	SE
Maternal Incarceration	7.03 ***	3.459	5.65 **	2.75	4.75 **	2.38
Warmth	0.89	0.074	0.90	0.082	0.89	0.078
Conflict	1.06	0.081	1.06	0.079	1.04	0.083
Age			0.99	0.06	0.99	0.061
Black			1.02	0.266	0.95	0.253
Hispanic			0.75	0.353	0.61	0.316
Other			1.16	0.352	1.20	0.358
Education			0.67 **	0.076	0.73 **	0.088
Maternal Smoking					1.35 *	0.269
Paternal Incarceration					1.93	0.526

n= 1,980 SE = Standard Error, OR = Odds Ratio

* p≤.05, ** p≤.01, ***p≤.001

Table 9. Regression of Adult Arrest on Maternal Incarceration, Sibling Relationship Quality, Individual and Parental Characteristics – Male Subsample

Variable	Model 1		Model 2		Model 3	
	OR	SE	OR	SE	OR	SE
Maternal Incarceration	1.36	0.788	1.03	0.623	1.01	0.635
Warmth	0.94	0.066	0.93	0.062	0.94	0.062
Conflict	1.06	0.066	1.05	0.065	1.05	0.067
Age			1.00	0.047	1.00	0.047
Black			1.43	0.428	1.59	0.456
Hispanic			0.70	0.239	0.69	0.223
Other			0.85	0.214	0.95	0.218
Education			0.63	*** 0.078	0.66	*** 0.081
Maternal Smoking					1.78	*** 0.301
Paternal Incarceration					1.16	0.246

n= 1,814 SE = Standard Error, OR = Odds Ratio

* p≤.05, ** p≤.01, ***p≤.001

Table 10. Regression of Adult Arrest on Maternal Incarceration, Sibling Gender, Individual and Parental Characteristics

Variable	Model 1		Model 2		Model 3	
	OR	SE	OR	SE	OR	SE
Maternal Incarceration	1.42	0.267	1.22	0.237	1.09	0.221
Same Gender Dyad	0.98	0.067	0.96	0.067	0.96	0.069
Male			2.57 ***	0.14	2.63 ***	0.143
Age			1.02	0.018	1.02	0.018
Black			1.21 *	0.105	1.22 *	0.101
Hispanic			0.84	0.112	0.89	0.122
Other			0.83	0.094	0.86	0.093
Education			0.67 ***	0.03	0.70 ***	0.031
Maternal Smoking					1.32 ***	0.073
Paternal Incarceration					1.43 ***	0.117

n= 14,470 SE = Standard Error, OR = Odds Ratio

* p≤.05, ** p≤.01, ***p≤.001

Table 11. Regression of Adult Arrest on Maternal Incarceration, Sibling Relationship Quality, Individual and Parental Characteristics – Female Subsample

Variable	Model 1		Model 2		Model 3	
	OR	SE	OR	SE	OR	SE
Maternal Incarceration	1.97 **	0.471	1.46	0.357	1.24	0.325
Same Gender Dyad	0.84	0.086	0.82	0.087	0.83	0.092
Age			0.99	0.025	0.99	0.026
Black			1.41 *	0.199	1.39 *	0.197
Hispanic			0.86	0.159	0.93	0.181
Other			0.91	0.144	0.95	0.150
Education			0.67 ***	0.045	0.71 ***	0.049
Maternal Smoking					1.40 ***	0.103
Paternal Incarceration					1.73 ***	0.215

n= 7,702 SE = Standard Error, OR = Odds Ratio

* p≤.05, ** p≤.01, ***p≤.001

Table 12. Regression of Adult Arrest on Maternal Incarceration, Sibling Relationship Quality, Individual and Parental Characteristics – Male Subsample

Variable	Model 1		Model 2		Model 3	
	OR	SE	OR	SE	OR	SE
Maternal Incarceration	1.22	0.302	1.04	0.264	0.97	0.254
Same Gender Dyad	1.03	0.077	1.04	0.076	1.04	0.076
Age			1.03	0.022	1.03	0.022
Black			1.11	0.123	1.12	0.121
Hispanic			0.82	0.137	0.88	0.142
Other			0.78	0.106	0.81	0.105
Education			0.68	*** 0.032	0.69	*** 0.032
Maternal Smoking					1.28	** 0.102
Paternal Incarceration					1.27	* 0.124

n= 6,768 SE = Standard Error, OR = Odds Ratio

* p≤.05, ** p≤.01, ***p≤.001

CHAPTER 5

RESULTS – CONDITIONAL EFFECTS

Summary

The aim of this study is to help explain the heterogeneous findings with respect to the effect of maternal incarceration. Specific analyses examine whether residing with a sibling during adolescence, having a sibling relationship characterized by high levels of warmth or conflict, or having a sibling who is of the same gender, provides a protective mechanism for young adults who have experienced maternal incarceration. Alternatively, the study also intends to examine whether these sibling indicators may exacerbate the effect of maternal incarceration, and whether these effects are different for males versus females. In the previous chapter, the direct effects of maternal incarceration and sibling indicators on young adult arrest were examined. This chapter builds off of Chapter 4 and begins with an assessment of whether living with a sibling conditions the effect of maternal incarceration on adult arrests. Also examined is whether there exist any differences in conditioning effects for living with a sibling between daughters and sons. Next, the sibling relationship dimensions of warmth and conflict are assessed for any moderating effect in the full sample, and then again by gender. Then, the gender composition of sibling dyads is assessed for any conditioning effect on the full sample, and then again by gender. Finally, analysis is performed to assess the robustness of the findings under a variety of different conditions.

Adult Arrest and the Conditioning Effect of Siblings

Co-residing Siblings

The research examining the impact of maternal incarceration has found heterogeneous outcomes that include detrimental, positive, and even null effects for children and adolescents. For

children who have had an incarcerated mother, whether or not there is a sibling in the household may help explain why some individuals experience less harmful outcomes. Sibling relationships are unlike any other relationship due to their unique features based upon the frequency and duration of interactions, accessibility, and degree of common experiences. As a result, siblings are an important source of social support during childhood and adolescence. When two or more siblings are separated from their principal attachment figure and are cared for in the same setting, the distress of each may be somewhat diminished by interaction with the other (Heinicke and Westheimet, 1965). Living with a sibling may be a source of protection against the adversities experienced by having an incarcerated mother. Therefore, it is expected that adolescents who have experienced maternal incarceration, and lived with a sibling, will have lower odds of being arrested than those who did not live with a sibling.

Table 13 presents the results from the first set of multivariate models which regress adult arrest on maternal incarceration and living with at least one sibling during adolescence. As discussed in the previous chapter, there are individual and parental characteristics associated with both maternal incarceration and arrest that could present a relationship that is driven by one of these factors. By controlling for these correlates, we can better assess the relationship between adult arrest and maternal incarceration, and whether it is, in fact, associated with these known risk factors. The first model presents the key independent variables, individual demographic characteristics, parental characteristics, as well as an interaction term that is made up of the product of maternal incarceration and the hypothesized moderator of having a co-residing sibling (Maternal Incarceration X Co-residing Sibling). Similar to the analysis in the previous chapter, results show that being male, having a lower level of education, exposure to maternal smoking, and paternal incarceration are significant predictors of adult arrest. The interaction term testing

for the conditioning effect of living with a sibling is not significant, indicating that living with a sibling offers no protective effect against the harmful impact of maternal incarceration. Contrary to what was predicted, having a sibling who resides in the same household during adolescence does not appear to moderate the effect of maternal incarceration on adult arrest.

Analyses by Gender

Another important consideration in this work is whether maternal incarceration is equally traumatic and detrimental for daughters and sons. For instance, it may be that living with a sibling provides differential protective effects for males compared to females. If, as the research has suggested, daughters are impacted more than sons by losing their mother to incarceration, they may be more likely to seek comfort from a sibling. This could explain why the prior model showed no significant conditioning influence of co-residing siblings on the effect of maternal incarceration on adult arrest. If there are, indeed, meaningful gender differences in this protective effect, pooling together males and females in the same model may obscure important findings

To test for whether living with a sibling moderates the effect of maternal incarceration differently for daughters compared to sons, the models are re-estimated for females and then for males. Model 2 presents the results for the female subsample and, as expected, indicates living with sibling is associated with lower odds of arrest. Also, exposure to maternal smoking, paternal incarceration, being black, and having a lower level of education are positively associated with adult arrest for females. Living with a sibling does not buffer the effect of maternal incarceration for females, as indicated by the nonsignificant interaction term. The estimations are repeated for the male subsample and presented in Model 3. Two key differences in the analysis between males and females are that, for sons who have experienced maternal incarceration, race and living with a sibling are not significant indicators of arrest. A lower level of education, exposure to maternal

smoking, and paternal incarceration are significant for males, but as with females, there is no moderating effect provided by living with a sibling

Contrary to expectations, the effect of maternal incarceration on adult arrest is not a function of whether or not the respondent had a sibling residing with them during adolescence for either males or females. However, these models only identify potential effects of co-residing siblings without considering the nature of the sibling relationship. It may be that gender differences could still emerge when the impact of siblings is considered with regard to the warmth or conflict present in the relationship

Sibling Relationship Quality

Looking next at sibling relationship quality, it is anticipated that having a more loving and supportive relationship will alleviate the negative effects of having an incarcerated mother. One consideration for null findings of any conditioning effect of co-residing siblings on arrest may be that just the mere presence of a sibling living in the same household is not enough to alleviate the negative effect of maternal incarceration. Instead, whether having a sibling mitigates the effect of maternal incarceration may be due more to what kind of relationship the siblings share. The sibling relationship quality helps differentiate patterns of adjustment to environments marked by stressful experiences. The emotional and financial strains resulting from the mother's absence, the stigma of having an incarcerated mother, as well as potentially being uprooted to a different living environment, contribute to harmful outcomes for children. Siblings who have loving relationships, and provide more support and comfort to one another, may be better able to help each other overcome these hardships. Alternatively, if a sibling relationship is characterized by conflict and hostility, this relationship contributes additional strain, possibly exacerbating the negative effects of maternal incarceration.

Presented in Table 14 are the results from multivariate models regressing adult arrest on maternal incarceration and sibling relationship dimensions of warmth and conflict. Model 1 includes the key independent variables, individual demographics, parental characteristics, and an interaction term (Maternal Incarceration X Warmth). The key finding to observe in this model is that there is no significant buffering effect of having a warm sibling relationship on the effect of maternal incarceration on adult arrest.

The same specification is used in Model 2 except that the interaction term is the cross-product of maternal incarceration and the relationship quality of conflict (Maternal Incarceration X Conflict). Here again, contrary to what was predicted, the effect of maternal incarceration on adult arrest is not exacerbated by an adversarial sibling relationship.

Analyses by Gender

Again, it is important to consider whether the influence of adolescent sibling relationships on adult arrest might differ for males and females, since examining them in a single model may be obscuring meaningful effects. Studies examining differences in the quality of sibling relationships as a function of sibling gender composition generally find higher quality relationships for sisters who have higher levels of warmth and lower levels of conflict. To this end, Table 15 presents results for models that have been re-estimated using only the female subsample. Model 1 regresses individual demographic characteristics, parental characteristics, and an interaction term comprised of maternal incarceration and the relationship quality of warmth for females only. The same specification is used in Model 2 except that the interaction term is comprised of maternal incarceration and conflict. Contrary to expectations, the effect of maternal incarceration is not buffered by warm sibling relationships nor aggravated by conflicting sibling relationships for females.

Based upon prior work, it is anticipated that the loss of a mother due to incarceration is not as traumatic and detrimental for sons as it is for daughters. It is further expected that warmer relationships between brothers buffer any effect of maternal incarceration and males will have lower odds of arrest, while adversarial relationships will exacerbate the effect of maternal incarceration resulting in higher odds of arrest. Model 3 presents results for the model that has been re-estimated using the male subsample to test for a conditioning effect of warm sibling relationships on the effect of maternal incarceration on arrest. Model 4 does the same but examines sibling conflict rather than warmth. The interaction terms indicate that the effect of maternal incarceration on male and female adult arrest is not a function of whether the respondent reported a sibling relationship high in warmth or high in conflict. As noted with both the pooled sample and female subsample, paternal incarceration is significant, but not so for the male subsample. When examining adversarial sibling relationships, while there appears to be a difference in the effect of paternal incarceration for daughters compared to males, it does not reach statistical significance.

Sibling Gender Composition

Next, turning to sibling gender composition, in sibling pairs where gender is the same, the social influence one sibling has over another is assumed to be stronger. In continuing the analyses to assess whether gender differences exist, same-gender sibling pairs are examined to identify whether brother or sister pairs versus a mixed-sibling pair or having no sibling conditions the effect of maternal incarceration. The null findings assessing the conditioning effect of warm or conflictual relationship qualities may be indicative of more complex relationship dynamics that are in play and that are not captured by using the relationship quality of just one sibling. Because prior work has found that same-gender sibling pairs generally exhibit higher quality relationships,

it is anticipated that these dyads are more likely to lessen the effect of maternal incarceration and experience a lower odds of adult arrest compared to either mixed-gender dyads or having no sibling.

Table 16 presents results for models assessing whether same-gender sibling dyads condition the effect of maternal incarceration on adult arrest. Model 1 includes the key independent variables, individual demographic characteristics, parental characteristics, and an interaction term (Maternal Incarceration X Same-gender). The key finding in this model is that the interaction of maternal incarceration and same-gender sibling dyads is statistically significant (OR=2.16, $p \leq .05$), suggesting that the effect of maternal incarceration on adult arrest is, indeed, conditional upon whether or not there is a sibling dyad with the same gender. However, the pattern of effects is not as anticipated. Based on theory and prior research, it was hypothesized that there would be a positive effect of maternal incarceration on adult arrest, but that this effect would be lessened by the presence of a same-gender sibling. That expectation would be supported by a positive effect of maternal incarceration, and a negative effect for the interaction term. However, the effect of maternal incarceration is not significant, which suggests that there is no effect of maternal incarceration on adult arrest for mixed-gender sibling dyads. Moreover, the effect of the interaction term is positive, which indicates that the effect of maternal incarceration is positive and significant, but only for respondents with a same-gender sibling.

There are two potential explanations for this unexpected finding. First, perhaps the adverse effects of having an incarcerated mother are actually more internalized when there is a closer connection between siblings. While there is support for the expectation that same-gender siblings have a protective effect, this differential effect, depending on whether or not the mother was incarcerated, was not anticipated. However, social learning theory may provide an explanation for

this unexpected finding. It is plausible that witnessing a mother engage in illegal behaviors teaches her children “normal” and accepted practices within the family and community, and that having same-gender siblings, whom one shares a strong bond, may prompt further reinforcement by continued engagement in the same behaviors, thus providing more social support for engagement in anti-social activities. Alternatively, the same would be true for a mother engaging in pro-social behaviors with her children who then imitate, and subsequently reinforce, these ideas and behaviors with one another.

On the other hand, the pattern of effects can also be interpreted in an alternative fashion that may lend itself to an equally or more plausible conclusion. Consistent with expectations, the odds-ratio of 0.94 for same-gender sibling indicates that those with a sibling of the same gender and who do not have an incarcerated mother tend to have a lower likelihood of adult arrest, though the coefficient does not quite reach statistical significance. The coefficient for the interaction term indicates that this protective effect of having a same-gender sibling is negated when the respondent has a mother who was incarcerated. Thus, having a same-gender sibling may reduce the likelihood of adult arrest, but only in families where the mother is not incarcerated.

Analyses by Gender

In prior work examining sibling relationships, same-gender siblings and those with warm relationships are more likely to model one another. Sister dyads tend to be the most intimate and brother dyads are more adversarial (Feinberg, Solmeyer, and McHale, 2012; McHale et al., 2009; Rowe and Gulley, 1992; Trim et al, 2006). As such, it is anticipated that when sister pairs, compared to brothers, experience maternal incarceration, there will be a more protective effect on adult arrest. To assess whether maternal incarceration and sibling gender composition affects sister pairs differently than brothers, the models were re-estimated on only the female subsample

and presented in Model 2. Here, education, maternal smoking and parental incarceration are still significantly associated with arrest, but now being black is also significant. This is particularly noteworthy since results estimated with the pooled sample did not show race as significant, suggesting a need for further consideration in examining differences between males and females experiencing maternal incarceration.

Again, the interaction term is of greatest interest in this model, as it indicates whether having a same-gender sibling conditions the effect of maternal incarceration on adult arrest, and specifically whether this conditional effect is different for daughters and sons. The results in Model 2 are very similar to the findings for the pooled sample, and in fact, the coefficients for same-gender dyads and for the interaction effect are even stronger. Similar to the pooled model, this shows that the effect for females of having a sister is opposite depending on whether or not the mother experienced incarceration. Females with a sister are more likely to be arrested when their mother has been incarcerated, but if the mother has not been incarcerated, having a sister reduces the likelihood of arrest. That is, the buffering effect sister pairs have on adult arrest disappears when the mother has experienced incarceration.

One explanation for this finding is guided by strain theory. If a mother is absent due to incarceration, child care and other maternal duties may be assigned to daughters rather than sons, as societal norms strongly channel females into these maternal roles. The strain of having a mother incarcerated is exacerbated by resentment among sisters with the new role of care-taker by one sister. The sister left in charge -- or who takes charge -- may feel resentment towards her mother for leaving the responsibilities to her, while another daughter may resent having to be taken care of by a sibling in addition to dealing with the loss of her mother.

Unlike sister pairs, relationships shared by brothers have been found to be more adversarial than those shared by sisters. Therefore, it is anticipated that relationships high in conflict exacerbate the effect of maternal incarceration, and result in higher odds of arrest. The models were re-estimated for the male subsample and are presented in Model 3. In contrast with the results for the female subsample, the interaction term for maternal incarceration and brother dyads is not significant. Contrary to predictions, brother pairs have no mitigating influence on the effect of maternal incarceration on adult arrest. Other notable differences in the results between sons and daughters are seen in the effects of race and paternal incarceration. The effect of being black is different for males and females who have experienced maternal incarceration. Moreover, paternal incarceration has a statistically significant greater effect on daughters (OR=1.73, $p \leq .001$) than on sons (OR=1.27, $p \leq .05$) suggesting daughters are more traumatized by parental incarceration, regardless of which parent.

Supplementary Analyses

Criminal Offending

Additional analyses were performed to assess the robustness of the findings under a variety of different conditions. First, the models were replicated using self-reported criminal offending as the outcome instead of adult arrest, and subsequently the effect of incarceration of either parent is examined. Examining criminal offending, which is correlated with arrest rates, but still conceptually distinct, allows for the identification of a possible mechanism by which maternal incarceration could affect adult arrest. Furthermore, if the findings are similar for criminal offending and arrest, this would rule out the possibility that any observed effects when predicting adult arrest could be at least partially due to a stigmatic or labeling effect of having an incarcerated parent, as opposed to the hypothesis of the current study that the impact of parental incarceration

is more direct. Criminal offending was measured in the Add Health study at Wave IV when respondents were asked whether he or she engaged in fourteen different types of criminal behaviors within the previous twelve months⁸.

All models were re-estimated for each research question using criminal offending as the outcome⁹. Having at least one sibling is associated with higher levels of adult offending, but only for those experiencing maternal incarceration, and this effect is found only for males. In other words, males who experience maternal incarceration are more likely to engage in criminal offending, but only if they have a sibling. As with the unexpected effect of same-gender siblings and adult arrest discussed above, social learning theory helps provide a meaningful explanation. Children learn either predominantly anti-social or predominantly pro-social attitudes and behaviors from their parents. These attitudes and behaviors are then imitated and reinforced by the strong bonds shared by the distinctive relationships of siblings.

When examining the effect of sibling relationship quality, males who experience maternal incarceration, and reported having a sibling relationship high in warmth, will be more likely to engage in adult offending. In other words, males who have not experienced maternal incarceration and have a warm sibling relationship will be less likely to engage in criminal offending. Findings also reveal a protective effect of warm sibling relationships, but only if the mother has not experienced incarceration. Again, when examining self-reported offending, a conditioning effect is found where the sibling relationship for brothers is protective unless the mother has been imprisoned in which case the effects are amplified. Once more, social learning theory can provide a plausible explanation for this effect. Brothers who are raised in an environment where parents are engaged in prosocial behaviors are less likely to learn or imitate definitions favorable to

⁸ A list of criminal offending questions asked of the respondents at Wave IV is included in Appendix B.

⁹ Criminal offending regression tables available from the author.

criminal offending. A relationship that is more positive, warm, and supportive reaffirms normative prosocial patterns. Conversely, brothers exposed to parental anti-social behaviors learn normative attitudes and practices that make offending more acceptable. In this environment, brothers who share a loving and supportive relationship are more likely to encourage familial norms and practices that may include offending.

Parental Incarceration

One question that remains prominent with respect to outcomes of children who have experienced parental incarceration is whether the effects are different when a child experiences maternal incarceration versus having a father, or both parents, incarcerated. Another test of robustness entailed an assessment of whether similar results are obtained for the sibling indicators when testing for the effect of incarceration of any parent rather than the impact of having an incarcerated mother, or father, separately. Adult arrest was regressed on the different sibling indicators, parental incarceration, individual demographic characteristics, and parental characteristics¹⁰. Parental incarceration was measured as the respondent reporting either the mother or father (or both) had been incarcerated prior to the respondent turning 18.

Most of the outcomes and effects are similar to the findings of the current study, including differential effects for males compared to females. One key difference was that for females, parental incarceration has a positive effect on female adult arrest if the sibling relationship is higher in conflict. This suggests daughters are more adversely affected by parental incarceration if they have poor relationships with their siblings, but this effect is not found for sons.

¹⁰ Parental incarceration regression tables available from author.

Conclusion

In examining whether sibling relationships condition the effect of maternal incarceration on adult arrest, several of the predicted effects are not supported. However, these unexpected findings are of great interest, and they still support the general notion that these inter-relationships are highly complex and, in many cases, gender-specific. In assessing whether living with a sibling during adolescence conditions the effect of maternal incarceration on young adult arrest, the results were not significant within the pooled sample. However, in further analysis when testing for robustness, there the effect of co-residing siblings on male self-reported criminal offending is protective, but only if a mother has not been incarcerated. Second, sibling relationships characterized by high levels of warmth and conflict were examined for any moderating effect in the full sample, and then by gender. Again, the findings did not support the prediction that warm sibling relationships would buffer the effects of maternal incarceration, nor would adversarial sibling relationships amplify the effect, on adult arrest. Yet, a conditioning effect was found for sibling relationship qualities when examining self-reported criminal offending, as well as with parental incarceration. Third, gender composition of sibling pairs was examined for any mitigating effect on the full sample, and then by gender. In what is perhaps the most interesting finding, sister pairs do condition the effect of maternal incarceration on adult arrest, but differently than anticipated. It was predicted that sisters who experienced maternal incarceration would provide a buffering effect on adult arrest, but instead, sisters who experience maternal incarceration are more likely to be arrested than sisters who have not had an incarcerated mother. Although these results were not as predicted, they still offer significant insight in helping explain differential outcomes for those who experience maternal incarceration, as well as support for the differences in effects experienced by daughters compared to sons.

Table 13. Regression of Adult Arrest on Maternal Incarceration and Sibling Interaction

Variable	Model 1- Full		Model 2 - Females		Model 3 - Males	
	OR	SE	OR	SE	OR	SE
Maternal Incarceration	0.70	0.227	0.65	0.342	0.72	0.316
Sibling	0.89	0.066	0.74 **	0.085	0.98	0.08
Mat Inc X Sibling	1.88	0.791	2.37	1.415	1.55	0.886
Age	1.02	0.018	0.99	0.026	1.04	0.022
Male	2.63 ***	0.143				
Black	1.22 *	0.102	1.39 *	0.195	1.13	0.12
Hispanic	0.89	0.125	0.93	0.183	0.89	0.143
Other	0.86	0.094	0.96	0.151	0.82	0.105
Education	0.70 ***	0.031	0.71 ***	0.049	0.69 ***	0.033
Maternal Smoking	1.32 ***	0.074	1.41 ***	0.104	1.28 **	0.1022
Paternal Incarceration	1.43 ***	0.118	1.72 ***	0.344	1.27 *	0.125
n=	14,470		7,702		6,678	

SE = Standard Error, OR = Odds Ratio

* p<=.05, ** p<=.01, ***p<=.001

Table 14. Regression of Adult Arrest on Maternal Incarceration and Sibling Relationship Quality Interaction

Variable	Model 1		Model 2	
	OR	SE	OR	SE
Maternal Incarceration	0.76	0.874	1.31	0.876
Warmth	0.91	0.042	0.929	0.044
Conflict	1.06	0.056	1.05	0.057
Mat Inc X Warmth	1.35	0.385		
Mat Inc X Conflict			1.15	0.262
Male	2.88 ***	0.363	2.87 ***	0.363
Age	1.00	0.039	0.99	0.038
Black	1.35	0.283	1.35	0.283
Hispanic	0.69	0.184	0.685	0.186
Other	1.05	0.211	1.04	0.209
Education	0.68 ***	0.066	0.681 ***	0.066
Maternal Smoking	0.16 ***	0.208	1.61 ***	0.211
Paternal Incarceration	1.37	0.199	1.39 *	0.202

n= 14,470

SE = Standard Error, OR = Odds Ratio

* p<=.05, ** p<=.01, ***p<=.001

Table 15. Regression of Adult Arrest on Maternal Incarceration and Sibling Relationship Quality Interaction by Gender

Variable	Model 1 - Females		Model 2 - Females		Model 3 - Males		Model 4 - Males	
	OR	SE	OR	SE	OR	SE	OR	SE
Maternal Incarceration	1.66	1.883	2.43	3.19	1.04	1.382	1.98	1.646
Warmth	0.87	0.081	0.88	0.078	0.94	0.061	0.94	0.062
Conflict	1.03	0.083	1.02	0.083	1.06	0.066	1.06	0.067
Mat Inc X Warmth	1.29	0.348			0.99	0.349		
Mat Inc X Conflict			1.22	0.434			0.78	0.175
Male								
Age	0.99	0.062	0.99	0.062	1.00	0.047	1.00	0.047
Black	0.94	0.254	0.949	0.252	1.59	0.455	1.58	0.455
Hispanic	0.60	0.315	0.623	0.313	0.69	0.219	0.68	0.229
Other	1.21	0.365	1.19	0.36	0.95	0.218	0.95	0.217
Education	0.73 **	0.086	0.73 **	0.087	0.66 ***	0.081	0.66 ***	0.081
Maternal Smoking	1.36	0.271	1.35	0.268	1.78 ***	0.301	1.78 ***	0.300
Paternal Incarceration	1.92 *	0.524	1.94 *	0.53	1.16	0.247	1.15	0.246
n=	1,980				1,814			

SE = Standard Error, OR = Odds Ratio

* p<=.05, ** p<=.01, ***p<=.001

Table 16. Regression of Adult Arrest on Maternal Incarceration and Sibling Gender Composition Interaction

Variable	Model 1 - Full		Model 2 - Females		Model 3 - Males	
	OR	SE	OR	SE	OR	SE
Maternal Incarceration	0.75	0.209	0.67	0.277	0.81	0.297
Same-gender Dyad	0.94	0.068	0.80	0.092	1.03	0.075
Mat Inc X Same-gender	2.16 *	0.757	2.92 *	1.576	1.58	0.835
Male	2.64 ***	0.144				
Age	1.02	0.018	1.00	0.026	1.03	0.022
Black	1.22	0.101	1.40 *	0.197	1.12	0.121
Hispanic	0.89	0.124	0.94	0.184	0.88	0.143
Other	0.86	0.093	0.96	0.149	0.81	0.105
Education	0.70 ***	0.03	0.71 ***	0.048	0.69 ***	0.032
Maternal Smoking	1.32 ***	0.073	1.40 ***	0.103	1.28 **	0.102
Paternal Incarceration	1.43 ***	0.118	1.73 ***	0.217	1.27 *	0.125
n=	14,470		7,702		6,678	

SE = Standard Error, OR = Odds Ratio

* p<=.05, ** p<=.01, ***p<=.001

CHAPTER 6

DISCUSSION AND CONCLUSION

A primary purpose of this study was to help explain the heterogeneous findings within the maternal incarceration literature and to expand our understanding of the complex relationship between maternal incarceration, sibling relationships, and adverse outcomes for children of incarcerated parents. Specifically, the goal was to identify factors that may buffer or exacerbate the effect of maternal incarceration on arrests in early adulthood. Prior research has examined differences between those children who overcome the adversity of maternal incarceration compared to those who do not. In particular, this study builds upon the recent literature on heterogeneity in maternal incarceration effects by examining how social support, specifically sibling relationships, moderate the effect of maternal incarceration on young adult arrests.

In assessing whether sibling relationships condition the effect of maternal incarceration on adult arrest, some of the predicted relationships are not supported, but the findings instead allude to very complex interactions that may be gender-specific. Indeed, gender-specific analyses reveal that sister dyads experience a greater likelihood of arrest as young adults when compared with respondents without a same-gender sibling, but only if they have experienced maternal incarceration. Interestingly, the same effect is not true for sister pairs whose mother was not previously incarcerated. Furthermore, there is no similar conditioning effect found for brother dyads, suggesting that maternal incarceration is experienced differently by sons when compared to daughters. While, these results were not initially predicted, these findings constitute an important contribution to our understanding of the factors related to differential outcomes of children who have experienced maternal incarceration. Additionally, the findings provide further insight into how maternal incarceration affects daughters differently than sons.

Summary of Findings

Drawing on existing theoretical and empirical literature, and using a nationally representative sample of adolescents, this study examined whether, living with a sibling, and interpersonal relationships between siblings help explain some of the heterogeneous outcomes of maternal incarceration. The first steps of the analytic process address the first research question, replicating prior work and testing for sibling effects, but with a larger sample and better measures of these sibling indicators in order to achieve more valid and reliable estimates. Separate analyses were also performed on male and female subsamples to further assess the effect of maternal incarceration and sibling indicators on adult arrest, as well as whether any gender-specific effects existed. Findings from these preliminary models provide several significant and meaningful contributions to the existing literature.

First, maternal incarceration was initially found to be associated with higher odds of being arrested as an adult, but this apparent effect appears to be explained by demographic and parental characteristics of individuals who have experienced maternal incarceration compared to those who have not. Specifically, factors such as lower levels of education, exposure to maternal smoking, and paternal incarceration are significantly associated with adult arrest.

Second, in the pooled model, assessing the effect of living with a sibling, and having a warm or conflicting relationship, neither maternal incarceration nor relationship quality has a direct effect on adult arrest. Instead, as with the previous findings regarding co-residing siblings, adult arrest is explained by the demographic, social, and environmental differences that exist between individuals experiencing maternal incarceration compared to those who have not. Also, particularly noteworthy with this finding is that one of the parental characteristics added to the model was paternal incarceration, which has a significant effect on adult arrest, increasing the odds

by about 39%, yet maternal incarceration had no effect. Thus, despite what some scholars have argued, having a father incarcerated may be more detrimental than having a mother who has been incarcerated. Additionally, when assessing the effects of maternal incarceration and sibling relationship qualities on arrest with the female subsample, a statistically significant effect exists for maternal incarceration on arrest when controlling for parental characteristics.

Third, when examining sibling gender composition, only gender, race, lower level of education, maternal smoking, and paternal incarceration are significant predictors of young adult arrest. Neither maternal incarceration nor same-gender siblings has a direct effect on adult arrest for the pooled or gender subsamples.

Fourth, differential effects of parental incarceration do exist between males and females. In models that control for sibling warmth and conflict, as well as key individual and parental characteristics, the odds ratio for the effect of maternal incarceration on adult arrest is significant and about 4.7 times larger for females than for males. Conversely, for males there is no direct effect of maternal incarceration on adult arrest.

These results suggest that selection, rather than maternal incarceration, better explains the variation in the likelihood of arrest as a young adult. It was predicted that a direct effect of experiencing the loss of a mother due to incarceration increased the likelihood of young adult arrest. Instead, it appears that any observed impact of maternal incarceration on arrest is largely explained by the demographic, social, and environmental differences between individuals experiencing maternal incarceration compared to those who have not. That is, there may be pre-existing negative parental and or familial characteristics, such as poor parenting, poor emotional or physical health, negative or difficult personality characteristics, substance use, or serious behavior problems, that may increase the likelihood of maternal incarceration while also exerting

negative effects upon adolescents, thus increasing the likelihood of arrest in adulthood (Brown, 2004; Capaldi and Patterson, 1991; McLanahan and Sandefur, 1994).

Maternal incarceration is the primary focus of this study and even though there is no significant effect of maternal incarceration in the preliminary models, it is still possible that a significant effect does exist, but it may only be present under certain circumstances. In line with what has been predicted, these conditioning circumstances could include not having a co-residing sibling, having a sibling relationship characterized by conflict not warmth, and when there is not a same-gender sibling. This motivates the need for examining the possibility of conditional relationships, even when the initial models find no significant effects of maternal incarceration.

After replicating prior work using more appropriate data, and after introducing several novel measures of the quality and nature of sibling relationships, the next step was to directly address the remaining research questions posed in this study. The second research question asked whether living with a sibling during adolescence attenuates the effect of maternal incarceration on arrest as a young adult. When controlling for individual demographic characteristics and key parental characteristics associated with young adult offending, the interaction term testing for the conditioning effect of living with a sibling was not significant, indicating that living with a sibling offers no protective effect against any harmful impact of maternal incarceration. Contrary to what was predicted, having a sibling who resides in the same household during adolescence, in and of itself, does not moderate the effect of maternal incarceration on adult arrest.

The third research question examined whether the quality of sibling relationships conditions the effect of maternal incarceration on arrest. Having a relationship that is supportive and caring with a sibling was expected to buffer the negative effects of maternal incarceration while a sibling relationship high in conflict was expected to exacerbate the negative effects of

maternal incarceration. When interaction terms were included to test for whether the nature of a sibling relationship conditions the effect of maternal incarceration on arrest, results reveal that adult arrest does not appear to be a function of maternal incarceration and either sibling relationship quality.

The fourth research question assessed whether having a sibling of the same gender moderates the effect of maternal incarceration on young adult arrest. In sibling pairs where gender is the same, the social influence one sibling has over another is assumed to be stronger. It was anticipated that siblings in same-gender pairs would serve as a stronger buffering against the negative impacts of maternal incarceration. Therefore, respondents with same-gender siblings would experience a lower odds of adult arrest compared to those without a same-gender sibling. Findings specify that there is, indeed, a mitigating effect of sibling gender on maternal incarceration, but not as anticipated. This significant interaction reveals that there is a protective effect of same-gender siblings on adult arrest, but only if the mother has not been incarcerated. In other words, same-gender dyads are more likely to be arrested if their mother has, in fact, experienced incarceration. This unanticipated result is not only significant, but interesting in its implications. The effect of having a same-gender sibling is associated with a lower odds of arrest unless the mother has been incarcerated, at which point the same-gender relationship exacerbates the effect of maternal incarceration on adult arrest.

Social learning theory is used as a framework for understanding these outcomes. Such that social learning theory provides an explanation of why individuals first participate in crime and deviance and why they continue to offend while also providing an explanation for why individuals do not become involved in crime and or deviance, instead opting to participate only in conforming behaviors (Akers, 1985, 1998; Akers et al., 1979). When examining the heterogeneous findings

within the maternal incarceration literature, explaining both pathways is equally as important. The social influence one sibling has over another is assumed to be stronger when they are of the same gender. Prior work has found that same-gender sibling pairs generally experience higher quality relationships because there is greater similarity in behavior compared to mixed-sibling pairs. Children observe and imitate the attitudes and behaviors of their parents and then through reward and or punishment, those attitudes and behaviors are reinforced. Witnessing a mother engage in illegal behaviors may teach a child what is “normal” and accepted within the context of their environment. These children then go on to imitate the same attitudes and behaviors exhibited by their mother which may be further reinforced by a sibling they share and experience a strong bond and a mutual adverse living situation. Conversely, if siblings are learning pro-social behaviors a mother is engaging in, her children are more likely to imitate and reinforce these attitude and behaviors with on one another.

The last research question addressed whether daughters and sons are affected differently when a mother has been incarcerated and whether the conditioning effects of either of the two dimensions of the sibling relationship vary by gender. This involved a more extensive examination of how various aspects of the sibling relationships might differentially mitigate the effect of maternal incarceration for males compared to females. First, daughters who have experienced maternal incarceration are found to have a higher odds of being arrested than those who did not have an incarcerated mother, but the same is not true for sons. Second, living with at least one sibling is associated with a lower odds of arrest for females, but again, not for males. The hypothesis suggesting that living with at least one sibling may attenuate the effect of maternal incarceration is not supported for either gender. In testing each gender subsample for whether

there exists a mitigating effect of sibling relationships characterized by high levels of warmth or conflict, results were null for both males and females.

Given the complexity of these gender-specific conditional effects, and the fact that they are often somewhat contrary to expectations, further elaboration of their meaning is warranted. Again, the findings reveal a statistically significant conditioning effect, but only for sisters, and different than what was anticipated. Females who have a sister are more likely to be arrested when their mother has been incarcerated, but if the mother has not been incarcerated, sister dyads are less likely to be arrested. The theorized protective effect of having a same-gender sibling does not apply when the siblings have experienced maternal incarceration. For males, no mitigating effect of brother dyads exists on adult arrest. Given the original prediction that same-gender siblings would have a protective effect, these results are not entirely surprising. However, what was not anticipated was the differential conditioning effect of sister pairs on adult arrest depending on whether or not the mother was incarcerated.

Given the circumstances of daughters who have a mother incarcerated, strain and social learning theories provide a meaningful framework for understanding this effect. The literature indicates that mothers are almost three times more likely than fathers to be the child's primary caregiver prior to incarceration (Glaze and Maruschak, 2010). Furthermore, there is a five-times greater likelihood that the children of incarcerated mothers will live with non-family members during the mother's imprisonment (Glaze and Maruschak, 2010). With the mother's absence, and living in a different, perhaps foreign environment, child care and other duties normally assumed by the mother may be relegated to the daughter(s) left behind. It is more typical for daughters to take on the motherly roles, rather than sons, as societal norms strongly channel females into these roles. For a young daughter, the emotional and psychological strain of having a mother

incarcerated is then exacerbated by resentment among sisters as they try to adapt to the new roles and environment. The sister in charge may feel anger and resentment for her mother abandoning her and for leaving the responsibilities to her. Yet, another daughter may resent having to be taken care of by a sibling, over and above dealing with the loss of her mother. With limited outlets, the daughters may act out their frustration through imitating the anti-social behaviors they have learned from their mother.

Supplementary Findings

In order to assess the robustness of the findings, additional analyses were performed. Models were first replicated using self-reported criminal offending as the outcome instead of adult arrest. With similar findings for criminal offending and arrest, the possibility that any observed effects when predicting adult arrest could be at least partially due to a stigmatic or labeling effect of having an incarcerated parent, as opposed to the hypothesis of the current study that the impact of parental incarceration is more direct, can be ruled out.

The results of the replication using criminal offending as the outcome reveal findings very similar to those obtained when predicting arrest. Specifically, maternal incarceration was found to be negatively associated with adult criminal offending, but only when residing with a sibling during adolescence. As with adult arrest, gender-specific findings reveal that maternal incarceration affects males differently than females when measuring self-reported offending. Sons who experience maternal incarceration are more likely to engage in criminal offending, but only if they live with a sibling during adolescence. Additionally, sons who experience maternal incarceration and reported having a higher level of a warm sibling relationship are more likely to engage in adult offending than those who report lower levels of sibling warmth.

The results assessing whether siblings mitigate the effect of maternal incarceration on offending were very similar to results for adult arrest. This suggests a potential mediation process by which incarceration and sibling relationships influence offending, which in turn affects likelihood of arrest. Moreover, these findings also bolster confidence that the observed effects for arrest are due more to the direct effects of maternal incarceration and moderating effects of siblings rather than due to any labeling effect of having an incarcerated parent.

Another test of robustness entailed an assessment of whether similar results are obtained for the sibling indicators when testing for the effect of incarceration of any parent rather than the impact of having an incarcerated mother or father, separately. For females, parental incarceration has a positive effect on adult arrest if the co-residing sibling relationship is higher in conflict. On the contrary, for males neither parental incarceration, nor conflict or warmth, are significant. This provides further empirical support for a gendered difference in the effects of parental incarceration. Findings reveal that daughters have a higher odds of adult arrest when either parent, or both parents, have been incarcerated, confirming that females are more effected by parental incarceration of any kind than are sons. This finding suggests that, for girls, the effect of parental incarceration, is exacerbated by the additional strain of a sibling relationship higher in conflict. Certainly caution is needed when interpreting the difference between males and females, as there may be other factors that are explaining the differences of the effect of parental incarceration on adult arrest that are not accounted for in these analyses. However, it is equally important to recognize that there is a difference, and the findings are statistically significant.

Study Limitations and Suggestions for Future Research

While the findings from this study contribute to the existing literature focusing on maternal incarceration, a number of limitations must be noted. Suggestions are also provided for how these

issues might be addressed, thus providing guidance on ways to further advance this literature. Specific attention is given to issues of data measurement, the importance of other family members and sibling types, the potential for race-specific effects, and the value of alternative methodological approaches.

As suggested by Sampson and Laub (2005), there is a need for follow-up of children who have experienced parental incarceration as they progress into adulthood. This allows for a better understanding of potential long-term effects, as well as providing a method to more appropriately address selection effects. As such, this study used the measure of whether the respondent had been first arrested at the age of 18 or older as the dependent variable. Hence, this measure does not include those respondents who were first arrested at a younger age, resulting in potentially biased estimates. It would be interesting to include those respondents first arrested at a younger age in future analysis to help better understand long-term effects of maternal incarceration.

In the current study, whether a respondent had at least one co-residing sibling during adolescence, measures of sibling relationship of warmth and conflict, and whether at least one sibling was of the same gender were tested as moderators. Given the findings in this study that siblings can play an important role with respect to maternal incarceration and adult outcomes, one direction for future research is to examine whether other types of siblings may also condition the effect of maternal incarceration on negative individual outcomes. More specifically, future research could examine whether the number of siblings has any bearing on the observed relationships, and whether similar effects might be observed for other types of siblings residing in the home beyond just the general brother and sister category. With the rate of divorce for first time marriages between 40 to 50 percent, and even higher for subsequent marriages, a growing number of blended families are sure to have different types of siblings residing together and

competing for shared space and attention (Major, Cozzarelli, Horowitz, Colyer, Fuchs, Shapiro, Stoiber, Malt, Teo, Winter, and Waldo, 2000). Examining how these relationships may change the dynamics in a family is important in that an individual may have multiple siblings and different numbers of siblings at various stages in his or her life, as well as different levels of closeness or conflict with each.

Specifically, assessing whether different types of siblings, such as full, half, step, or foster siblings have differential conditioning effects is especially relevant given the number of single mother and blended families that are affected by familial incarceration. Family structure has been associated with varying outcomes for adolescence and adulthood such that the “traditional nuclear” family containing only biological parents and full-siblings is associated with better academic outcomes for children (Ginther and Pollak, 2004). Additionally, youth in stepfamilies tend to fare worse, than those living with both biological parents with regard to academic achievement, completion of high school, and behavior problems (e.g. Astone and McLanahan, 1991; 1994; Day, 1992; McLanahan and Sandefur, 1994; Pong, 1997, Tillman, 2007).

In addition to increasing the complexity of family relationships, the presence of non-full siblings may also increase the ambiguity of family relationships. Previous research has indicated that children who experience warm and supportive sibling relationships attain greater social competence and responsibility, while those who experience stressful sibling relationships, in the form of sibling rivalry and aggression are more likely to express antisocial behavior (Hetherington and Jodl, 1994) Step-sibling relationships tend to be more emotionally withdrawn and provide less positive socio-emotional support compared to full-sibling relationships (Ahrons, 2004; Burns, 2000; Ganong and Coleman, 1994). Adolescent step-siblings who are living together may also engage in, or at least perceive, more competition for parental time, attention and resources than

full-siblings. Co-residing step-siblings during adolescence may engender stress which leads to more conflicted family dynamics. Regarding relationship quality, there may be less emotional closeness and contact between step- or half-siblings due to smaller proportion of their lives living together. Furthermore, unlike with full siblings, there is a lack of societal norms prescribing the level of interaction and closeness expected of “non-traditional” siblings.

Another possible extension of the current study would be to examine other dimensions of sibling relationships. Consideration of the importance of sibling warmth and conflict in the current study is a crucial first step in understanding how sibling relationships may influence the adverse consequences of parental incarceration. However, the sibling dynamic is complex and unique, and cannot be fully captured by using measures of only warmth and conflict to quantify the nature of the relationship. While much of the literature on siblings examines warmth and conflict, other dimensions, such as rivalry, status, and power are important in understanding the full nature of the relationship (Furman and Buhrmester, 1985). Additionally, the current study captures relationship quality as reported by only one sibling and does not capture whether these feelings are reciprocated by the other sibling. A more comprehensive approach allowing for measures of all relationship dimensions for each sibling within the family would provide a more accurate and reliable assessment of the role siblings play in mitigating the effect of maternal incarceration.

It is also important to note that the presence of a co-residing sibling is operationalized as having “at least one sibling” without specifying the total number of siblings each respondent has. The number of children in a home exerts influence on various outcomes, such as intelligence, school attainment, competence achievement, but also on employment, partnerships, and health outcomes. Families with more children, especially disadvantaged families, will have fewer available resources, such as parental time or monetary resources, to be shared among more children

and therefore, larger families will have a greater likelihood of negative outcomes (e.g. Downey, 1995; Karwath, Relikowski, and Schmitt, 2014). Thus, beyond examining the complex relationships between a wide variety of sibling types along several different dimensions, it is also important to evaluate whether the *number* of siblings residing in the home has an impact. Though this interplay of multiple relationship dimensions between varying types of siblings and differing numbers in the household quickly produce a very large array of potential sibling influences, consideration of all these factors will contribute greatly to our understanding of the mechanisms that drive the heterogeneous findings for maternal incarceration.

A related limitation of the current study is the inability to consider the impact of any siblings who did not reside in the home at the time of data collection. It is important to note that the measure of sibling relationship quality was not necessarily assessed for all of the respondent's siblings. Instead, respondents were asked relationship quality questions of only other siblings participating in the study, and therefore, not all sibling relationships were measured. The Add Health project did not collect data for siblings residing outside the respondents' home, such as a sibling who had moved out, or was living with different family members, or who may have even been incarcerated. Furthermore, there is no accounting for relationships with a sibling who has died, and how that relationship and loss might condition the effect of maternal incarceration. It is unknown whether these other sibling relationships exist, and whether the effect of a sibling outside the home may offer some protective and supportive influence. As a result, potentially missing from the analysis are those sibling relationships that may have had a significant impact on the respondent, either in allaying or aggravating the effects of maternal incarceration. Moreover, it may be that relationships with non-residing siblings are more influential than co-residing siblings.

Relatedly, it is worth understanding how sibling relationships may alter outcomes at various developmental stages and whether there is a difference in the effect siblings may have over the life course. Would siblings have more of an effect at a younger age, during adolescence, or later into adulthood? Do the effects remain consistent or do the effects change at different developmental periods?

While the Add Health data provides a maternal incarceration measure, like many data sources, it is limited. The data set lacks information regarding maternal criminality and offense type and severity, the number of incarcerations or length of stay(s), and whether the incarceration took place in a jail or prison. The inability to measure the “dosage” of parental incarceration, makes it more difficult to establish a true effect size. While maternal incarceration is measured as occurring prior to the respondent turning 18, there is no measure of how old the respondent is when this occurs. It is expected that the impact of maternal incarceration is different depending on the child’s stage of development when the mother is absent due to incarceration. If the incarceration occurred prior to a child being born versus when the child is in his or her teenage years, the effects for both short-term and long-term absences are likely to be different. We cannot be sure that the observed associations are due to the incarceration itself or the mothers’ behaviors that led to incarceration. Outcomes among offspring may differ based on length and type of maternal incarceration, or even the frequency and type of visitation between the mother and child.

The incarceration of mothers has been found to have a greater negative impact on high school graduation status than that of paternal incarceration (Huynh-Hohnbaum, Bussell, and Lee, 2015). This larger effect may be explained by examining the children’s living arrangements prior to incarceration. Mothers are found to be more likely than fathers to play a greater role in their children’s care and be primary caregivers prior to incarceration. As such, children might be more

likely to experience greater distress when their mothers are absent; therefore, it is possible that children experience an immediate and severe impact that may affect their ability to complete high school. (Davies, Brazzell, La Vigne, and Shollenberger, 2008). Consequently, missing from this study may be adolescents who have experienced maternal incarceration and dropped out of school, thus creating a potential sample selection bias. Exclusion of these adolescents is important to note, as their absence may result in conservative estimates of the relationship between maternal incarceration and adult arrest.

Current literature shows that maternal incarceration is associated with a multitude of different outcomes including; lower educational achievement, higher school dropout rates, depression, illegal drug use, and intergenerational incarceration. This study examined the role siblings have on just one outcome, young adult arrest, when a mother has been imprisoned. Assessing how sibling relationships may condition the effect of maternal incarceration on these other outcomes will build upon the extant literature and further add to the understanding of how youth and adults are impacted by an imprisoned mother.

Social relationships within the family unit are dynamic and integral in determining behaviors and outcomes. Researchers have found there are differences in family structure associated with detrimental outcomes. While researchers have examined other relationships and sources of social support, such as grandparents, a better understanding of the dynamics within these relationships, and how they affect youth's resiliency and different outcomes is warranted. Examining the relationships that may exist between children and other members residing in the home before, during, or after a mother's incarceration, will allow researchers to better understand what support or strain mechanisms may affect the child. These household members may include

the father, mother's boyfriend, partners, cousins, in-laws, uncles and aunts, as well as non-relatives.

While this study did not set out to assess cultural and ethnic differences with regard to maternal incarceration and siblings, this area warrants further examination. Differences exist between black and white family relations, even if there is a debate on whether these differences can be attributed primarily to differences in structural position, race and cultural differences, or socioeconomic standing (Sarkisian and Gerstel, 2004). Black families possess different patterns of family organization, and this support is organized in some ways differently than that of white families. Understanding whether characteristics of sibling relationships are part of these familial differences will provide an understanding of the nuances associated with differential outcomes associated with maternal incarceration.

Finally, taking advantage of a mixed methods approach by including observations and in-depth interviews with children and family members of incarcerated mothers would further enhance our understanding of the dynamics of sibling relationships and the effects of maternal incarceration that may not be fully captured with only survey data. By also employing qualitative research methods, scholars can obtain a better understanding of the impact of the complex interplay between family members, maternal incarceration and absence, siblings, and relationship qualities on deleterious outcomes for children.

Implications and Conclusion

This study not only draws attention to sibling relationships as an important consideration for youth experiencing maternal incarceration, but also further highlights how sons and daughters may cope differently with this particular form of adversity. A fundamental finding from this study is that sibling relationships are highly relevant for understanding the impact of parental

incarceration on adult offending and arrest. Given the fact that a substantial number of incarcerated parents have children younger than 18, appropriate services need to be made available to children and their families immediately after a parent is incarcerated. Interventions aimed at improving wellbeing outcomes of children of incarcerated parents should involve other members of the family, including the other parent, siblings, grandparents, and others living in the home.

These limitations, and others noted throughout this chapter, point to a broader implication of this study, and perhaps one of its most important conclusions. It will be very difficult to continue advancing research in this area, and to identify and implement meaningful policy interventions, without the development of more extensive data tailored specifically to address questions about the impact of parental incarceration on children. While this study provides an important contribution to our understanding, it represents only the first few steps that can be accomplished with existing data. Add Health provides meaningful data related to participants' social, economic, psychological, and physical well-being with contextual data on the family, neighborhood, community, and social networks; however this study was not designed to collect data specific to the details of parental incarceration. Precise measures of maternal incarceration are what is needed most to help inform scholars and practitioners on what may be actual effects of maternal incarceration compared to effects associated with other risks. Specifically, the timing, duration, frequency, and location of incarceration, are critical measures that allow researchers to better assess actual effects. Children experiencing the loss of a mother for two nights versus two months versus two years are likely to be effected differently, as are children who experience maternal incarceration at different ages. In order for researchers to better understand the effects of maternal incarceration, data that more precisely measures issues of temporal order and incarceration dosage is what is most needed.

Continued comparison and evaluation of incarceration costs, community supervision, and the collateral consequences of detrimental outcomes for children is warranted. This is especially pertinent if the current trend of increasingly more women, and thereby, more mothers, continue to be incarcerated. Taking an intergenerational perspective, daughters of these incarcerated mothers are equally, if not more likely, to experience arrest and involvement with the criminal justice system as adults. As demonstrated by the findings of this study, the loss of a same-gender parent may be more acutely felt during adulthood than childhood, especially by daughters who lose their mother. The risk of adult arrest for daughters of incarcerated mothers is higher than for sons, and special attention needs to be provided for these at-risk daughters.

The ways a mother can negatively influence her children are too voluminous to enumerate, but may include social and emotional problems, classroom behavior, poor academic attainment, peer relationships at school, and attitudes on acceptable behaviors. What job is considered as difficult and demanding as that of a parent: a role that comes with no formal training or education, nor any handbook to follow? When considering mothers in the correctional system, many have experienced poor parenting role models and multiple associated challenges (e.g., abuse histories, dysfunctional family relationships; Kjellstrand, Cearley, Eddy, Foney, and Martinez, 2012) that make it difficult to break the intergenerational cycle of incarceration. As such, parenting programs are increasingly recognized as an intervention with the potential to improve the health and well-being of both parents and children. An increasing body of research provides evidence of their effectiveness in reducing challenging behavior (Barlow and Stewart-Brown, 2000; Furlong, McGilloway, Bywater, Hutchings, Smith, and Donnelly, 2012; NICE and SCIE, 2006) and improving educational (Hallam, Rogers, and Shaw, 2004) and mental health outcomes (Barlow, Parsons, and Stewart-Brown, 2005) in children and the improved mental health and well-being of

parents (Barlow, Coren, and Stewart-Brown, 2003; Lindsay, Strand, and Davis, 2011) Recent evaluations of corrections-based programs have shown improved parenting attitudes (Palusci, Crum, Bliss, and Bavolek, 2008); decreased parent stress and depression and increased positive child interaction (Eddy, Martinez, and Burraston, 2013); increased knowledge of child development, less endorsement of corporal punishment, and a more mature view of the parenting role (Sandifer, 2008); and reduced distress around visitation (Loper and Tuerk, 2011). Certainly from a prevention perspective, implementation of parenting programs would ideally be used to intervene with high-risk mothers prior to their entry into jail or prison in order to break the cycle of incarcerations.

A more comprehensive understanding of how family structure and characteristics affect youth and young adult outcomes will allow a more appropriate treatment strategy, rather than a one-size-fits-all approach. This continued analysis allows for further development of effective prevention and intervention programs to help reduce the undesirable effects of parental imprisonment. In addition to looking at the needs of the incarcerated parent, understanding the additional support needs of the prisoners' families can assist in promoting pro-social outcomes while decreasing transgenerational incarceration. One suggestion is continued assessment of the cost-benefit of incarceration versus community supervision for non-violent offending mothers. By allowing mothers to stay in the community, there is less disruption for children who would, otherwise, be displaced. As previously discussed, this displacement is correlated with degraded educational outcomes for children. Additionally, ensuring that programs such as parenting classes, mental health counseling, therapy for drug abuse, and job search assistance, allows the mother to gain skills she needs to improve her situation, as well as her children's.

Another suggestion is providing age-appropriate support services to children experiencing maternal incarceration. The social stigma of an incarcerated mother may prevent a child from discussing feelings that may instead be acted out through anti-social behaviors. One option is the implementation of support groups comprised of other youth of incarcerated parents allowing a safe place to talk and vent. Another option is to have mentors within the school who can, not only be a confidante, but also act as a positive role model for these youth.

Yet, another way to improve short-term and long-term outcomes for children of incarcerated parents is to fully assess the familial dynamics and relationships at the time of incarceration to provide insight on potential risk factors. Rather than just completing an inventory on the mother going to jail or prison, ensure that all members of the household are identified and assessed for risk factors. For instance, if there is an adversarial relationship between daughters who have a mother incarcerated, this could be identified as a potential risk factor for criminal involvement and then appropriate steps could be taken to work with the daughters and monitor activities. Granted, a major hurdle is appropriating the necessary funds and resources to successfully implement needed programs.

Because minority children are disproportionately affected by paternal incarceration (Craigie, 2011), it is prudent to incorporate resources and services that are culturally sensitive for Black and Hispanic children, especially to daughters in black families. New policies can be used to address the problem by encouraging schools and mental health care specialists to screen for parental incarceration. Children, especially Blacks and Hispanics, who have experienced parental incarceration at an early age will be more susceptible to behavioral problems. Thus, programs that provide counseling and support for these children should be swiftly implemented.

As found in prior research (Harlow, 2003), and confirmed in this study, education is significantly associated with adult arrest after controlling for other individual and parental characteristics. If a mother is incarcerated, her children may have interrupted school attendance which can affect employment outcomes in adulthood (Mears and Siennick, 2015). Additionally, much research has shown that family structure is related to the academic outcomes of youth, as youth in traditional nuclear families tend to better academically than those in stepfamilies in terms of grades, test scores, graduation rates, and behavior problems (e.g. Astone and McLanahan, 1991; 1994; Day, 1992; McLanahan and Sandefur, 1994; Pong, 1997, Tillman, 2007). Findings in this study indicate that individuals with lower levels of education are more likely to engage in self-reported offending, as well as be arrested as adults. A better understanding of the factors underlying the poorer academic outcomes of these youth, families, and communities is needed so that appropriate improvements can be implemented to help these children attain educational success, and thereby achieving more successful and positive outcomes through adulthood.

In closing, this study contributes to prior literature on maternal incarceration through its examination of sibling relationships and the role they have in the association between maternal incarceration and young adult arrest. While prior scholars have suggested a need to examine possible factors that may contribute to differential outcomes of youth who have experienced maternal incarceration, specific mechanisms had not been identified. The current study expands upon the efforts in understanding the effect of maternal incarceration on young adult outcomes, and the integral role sibling relationships have on these outcomes. Additional research on these relationships may help inform programs aimed at strengthening families to effectively cope and persevere within the context of maternal incarceration.

APPENDIX A

ADD HEALTH DATA

This research uses data from Add Health, a program project designed by J. Richard Udry, Peter S. Bearman, and Kathleen Mullan Harris, and funded by a grant P01-HD31921 from the Eunice Kennedy Shriver National Institute of Child Health and Human Development, with cooperative funding from 17 other agencies. Special acknowledgment is due Ronald R. Rindfuss and Barbara Entwisle for assistance in the original design. Persons interested in obtaining Data Files from Add Health should contact Add Health, The University of North Carolina at Chapel Hill, Carolina Population Center, 206 W. Franklin Street, Chapel Hill, NC 27516-2524 (addhealth_contracts@unc.edu). No direct support was received from grant P01-HD31921 for this analysis.

APPENDIX B

ITEMS FOR SELF-REPORT OFFENDING SCALE

1. In the past 12 months, how often did you deliberately damage property that didn't belong to you?
2. In the past 12 months, how often did you steal something worth more than \$50?
3. In the past 12 months, how often did you go into a house or building to steal something?
4. In the past 12 months, how often did you use or threaten to use a weapon to get something from someone?
5. In the past 12 months, how often did you sell marijuana or other drugs?
6. In the past 12 months, how often did you steal something worth less than \$50?
7. In the past 12 months, how often did you take part in a physical fight where a group of your friends was against another group?
8. In the past 12 months, how often did you buy, sell, or hold stolen property?
9. In the past 12 months, how often did you use someone else's credit card, bank card, or automatic tell card without their permission?
10. In the past 12 months, how often did you deliberately write a bad check?
11. In the past 12 months, how often did you get into a serious physical fight?
12. In the past 12 months, how often did you hurt someone badly enough in a physical fight that he or she needed care from a doctor or nurse?
13. In the past 12 months, did you pull a knife or gun on someone?
14. In the past 12 months, did you shoot or stab someone?

APPENDIX C

IRB APPROVAL LETTER A



Office of the Vice President For Research
Human Subjects Committee
Tallahassee, Florida 32306-2742
(850) 644-8673 · FAX (850) 644-4392

APPROVAL MEMORANDUM

Date: 06/30/2016
To: Tracey Woodard [REDACTED]
Address: [REDACTED]
Dept.: CRIMINOLOGY AND CRIMINAL JUSTICE
From: Thomas L. Jacobson, Chair
Re: Use of Human Subjects in Research
Parental Incarceration and Siblings as Moderators

The application that you submitted to this office in regard to the use of human subjects in the research proposal referenced above has been reviewed by the Human Subjects Committee at its meeting on 06/08/2016. Your project was approved by the Committee.

The Human Subjects Committee has not evaluated your proposal for scientific merit, except to weigh the risk to the human participants and the aspects of the proposal related to potential risk and benefit. This approval does not replace any departmental or other approvals which may be required.

If you submitted a proposed consent form with your application, the approved stamped consent form is attached to this approval notice. Only the stamped version of the consent form may be used in recruiting research subjects.

If the project has not been completed by 06/07/2017 you must request a renewal of approval for continuation of the project. As a courtesy, a renewal notice will be sent to you prior to your expiration date; however, it is your responsibility as the Principal Investigator to timely request renewal of your approval from the Committee.

You are advised that any change in protocol for this project must be reviewed and approved by the Committee prior to implementation of the proposed change in the protocol. A protocol change/amendment form is required to be submitted for approval by the Committee. In addition, federal regulations require that the Principal Investigator promptly report, in writing, any unanticipated problems or adverse events involving risks to research subjects or others.

By copy of this memorandum, the chairman of your department and/or your major professor is reminded that he/she is responsible for being informed concerning research projects involving human subjects in the department, and should review protocols as often as needed to insure that the project is being conducted in compliance with our institution and with DHHS regulations.

This institution has an Assurance on file with the Office for Human Research Protection. The Assurance Number is IRB00000446.

Cc: Brian Stults <bstults@fsu.edu>, Advisor
HSC No. 2016.18353

APPENDIX D

IRB APPROVAL LETTER B



Office of the Vice President For Research
Human Subjects Committee
P O Box 3062742
Tallahassee, Florida 32306-2742
(850) 644-8673 - FAX (850) 644-4392

APPROVAL MEMORANDUM (for change in research protocol)

Date: 08/16/2016

To: Tracey Woodard [REDACTED]

Address: [REDACTED]

Dept: CRIMINOLOGY AND CRIMINAL JUSTICE

From: Thomas L. Jacobson, Chair

Re: Use of Human subjects in Research
Project entitled: Parental Incarceration and Siblings as Moderators

The application that you submitted to this office in regard to the requested change/amendment to your research protocol for the above-referenced project has been reviewed and approved.

Please be reminded that if the project has not been completed by 06/07/2017, you must request renewed approval for continuation of the project.

By copy of this memorandum, the chairman of your department and/or your major professor is reminded that he/she is responsible for being informed concerning research projects involving human subjects in the department, and should review protocols as often as needed to insure that the project is being conducted in compliance with our institution and with DHHS regulations.

This institution has an Assurance on file with the Office for Human Research Protection. The Assurance Number is IRB00000446.

Cc: Brian Stults <bstults@fsu.edu>, Advisor
HSC NO. 2016.18933

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BIOGRAPHICAL SKETCH

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