Incarceration and the Family Environment:

Examining the Influence on Child and Adolescent Behavior

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Doctor of Philosophy

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Dedication

This work is dedicated to my parents, Thomas and Sarah Whalen, and my partner in the trenches, Jeremy Rowe. Mom and Dad, thank you for managing to both lead the way and walk alongside me throughout my years in school. Jeremy, thank you for your boundless faith, compassion, and humor. I love you all.

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Three Manuscript Dissertation Overview

This dissertation presents a line of research that expands the current literature on the impact of family member incarceration by specifically focusing on how family dynamics and youth behavioral outcomes are influenced. Within this line of studies, I first examine historical reports of childhood adversity and antisocial behaviors among adult offenders who grew up as children of a parent who was arrested or incarcerated; second, I explore the impact of family relationships and household member incarceration on teenage pregnancy; finally, I evaluate the impact of maternal communication patterns and parental incarceration on negative sexual health outcomes, including sexual activity, teenage pregnancy, contraceptive use, and history of sexually transmitted diseases.

The Curry School Guidelines that were in place as of the date of my dissertation proposal required the doctoral candidate to take a lead role on two research papers, make a major contribution to a third research paper, and submit an additional document that articulates the conceptual link among manuscripts. I am the lead author on two of the studies described here, and contributed in a substantial way as second author on the third. The first study, in which I was second author, *From One Generation to the Next: Childhood experiences of antisocial behavior and parental incarceration among adult inmates* has been published in the Journal of Offender Rehabilitation (Will, Whalen & Loper, 2014). The second study*, Teenage Pregnancy in Adolescents with an Incarcerated Household Member*, has been published in the Western Journal of Nursing Research (Whalen & Loper, 2014). The third study, *Sexual Health of Girls with an Incarcerated Parent: The role of maternal communication*, will be submitted to the appropriate referred journal upon completion. The remainder of this document covers the rationale for the proposed line of research (pp. 10- 20), the link to the published manuscript for

study 1 (pp. 21- 22), the link to the published manuscript for study 2 (pp. 23- 24), and the completed manuscript for study 3 (pp. 25- 81). The final document is a letter from the lead author of my first article (Joanna Will) attesting to my contribution to the manuscript and study.

Familial Incarceration and Associated Child Behaviors

There were over 1,700,000 children experiencing parental incarceration as of midyear 2007 (Glaze & Maruschak, 2008). There is a need to identify the ways that this experience affects child and adolescent development in order to inform the design and evaluation of interventions that might be used to prevent negative developmental outcomes. Identified negative outcomes include lower academic achievement (Trice & Brewster, 2004), mental illness (Dallaire & Wilson, 2010), social stigma (Hagen & Myers, 2003), family disruption (Arditti & Few, 2006), crime (Huebner & Gustafson, 2007), and other forms of antisocial behavior (Murray & Farrington, 2008).

Theories explaining these negative outcomes, including attachment and strain theory, point to the separation between the parent and child and the associated loss of parental supervision and disrupted emotional attachment as possible explanations for these outcomes. In addition, the loss of economic and social support resulting from the removal of a contributing adult in the household and increases in social stigma put the child of an incarcerated parent at elevated risk by separating the family from supportive community resources.

Explanations for the Negative Impact of Parental Incarceration

Attachment theory suggests that physical closeness and frequency of interaction influence the affectional bond between a parent and their child (Bowlby, 1977). A strong attachment with a parent or caregiver is linked to favorable social and emotional outcomes (Main, 2000), including helpful, trusting, and cooperative character traits. It is likely that the experience of parental criminality or incarceration impacts the child's attachment to and trust of their parent. Insecure attachment styles, which are linked to a number of negative developmental outcomes, can limit the potential for meaningful communication with parents or caregivers. This disrupted

attachment may be more likely in situations involving parental criminal behavior and incarceration.

Social learning theory also likely provides some explanation of the link between parental incarceration and negative developmental outcomes (Hagan & Dinovitzer, 1999). Children who grow up witnessing criminal behavior may be more likely to accept and develop those negative behaviors themselves. Furthermore, many of the negative behaviors that are associated with parental incarceration (parental substance use, low parental education levels, single parenthood) may be reenacted in the children that grow up in these environments. It is also possible that many of these behaviors are more likely to develop in children who receive less supervision, as would be suggested by social control theory (Hagan & Dinovitzer, 1999). This perspective emphasizes the protective nature of effective parental monitoring and discipline (East, Khoo, & Reyes, 2006), suggesting that those children who do not receive such supervision are at greater risk for negative behavioral outcomes.

In addition to the negative effects of limited access to their parent and exposure to criminal behavior (Clompton & East, 2008), the incarceration of a parent often leads to subsequent disruptions and strain in the child's home environment (Arditti & Few, 2006). Despite the economic strain that is often present before the experience of parental incarceration, families tend to be even more financially strained after the incarceration (Arditti, Shute, & Jost, 2003). These families are also more likely to experience material hardship and receive public assistance than those without an incarcerated parent (Geller, Garfinkel, Cooper & Mincy, 2009). Children of incarcerated parents also frequently experience residential instability (Poehlmann et al., 2008).

Finally, the impact of social stigma and related lack of connection to community support systems may also explain this link. Caregivers may ask children to keep the incarceration of their parent a secret. This type of secrecy is associated with increases in children's feelings of stigma, leading to increased likelihood of behavior problems (Hagen & Myers, 2003). In fact, lower levels of secrecy can be protective for children with little social support (Hagen & Myers, 2003). This type of social stigma can have clear negative repercussions for children by limiting their access to supportive resources in both home and school environments. It is also possible that the combination and interaction of the risk factors associated with familial incarceration create additional accumulated risk greater that that accounted for by the individual stressors alone (Dallaire, 2007).

Three Studies: The Impact of Incarceration on Child and Adolescent Behavior

Many of the negative outcomes associated with parental incarceration directly overlap with risk factors for poor teenage sexual health and childhood antisocial behaviors. Low socioeconomic status, substance use, young or single parenthood, negative peer influence, and poor family communication are each individually associated with both teenage pregnancy and parental incarceration. Several projects, including this line of research, indicate that parental incarceration may have a unique impact on child and adolescent behavior beyond the influence of other risk factors. The three studies comprising this dissertation examine the impact of parental incarceration on (1) historical reports of childhood antisocial behavior; (2) the frequency of teenage pregnancy in a large, nationally representative sample; (3) teenage sexual health and the potential influence of mother- daughter sexual health communication.

My first study in this sequence of studies, *From One Generation to the Next: Childhood experiences of antisocial behavior and parental incarceration among adult inmates,* examined

differences in the historical experiences of first- and second-generation offenders. Historical experiences of interest included adverse childhood experiences, juvenile conduct disorder markers, and criminal offenses prior to age eighteen. This study used data from a study of adjustment patterns among offenders. The sample included 250 men and 168 women incarcerated in one of ten prisons participating in the project. Of this sample, 235 individuals met criteria for second-generation inmate status, by indicating that one or more of their parents had either been arrested or incarcerated.

Preliminary analyses revealed significant differences between the first-generation and second-generation groups on several demographic variables. Proportionally more men and minority members reported having a justice-involved parent. Individuals in the second-generation group were also younger than first-generation offenders. Higher levels of family adversity were also found with second-generation offenders. Second-generation offenders that reported having either a mother or mother and father incarcerated were more likely to report juvenile violent or nonviolent offenses than first generation offenders. Trend effects were also found for juvenile drug offenses and juvenile detention.

As predicted, childhood adversity partially mediated the relation between generation status and reports of juvenile conduct disorder, but a unique direct effect was maintained, indicating unique variability attributable to second-generation status. In contrast, a mediation model was not supported for the association between juvenile male violent and non-violent offending and childhood adversity, indicating that this relation is likely mediated by other unobserved variables. It is noteworthy that while a link between generation status and antisocial behavior was evident for conduct disorder for both men and women, it was observed only for men with criminal behaviors.

Consistent with Moffitt and Caspi's (2001) suggestion that girls have later onset of offending, these findings suggest that girls may instead exhibit the negative impact of parental incarceration through poor social and behavioral outcomes, as captured by the conduct disorder scale. While male second generation offenders demonstrated these negative outcomes through violent acts, this relation was not evident with females, indicating that women may be affected by parental incarceration in different ways. These results emphasize the need for additional exploration of the behavior of daughters of incarcerated parents. Adolescent sexual health is particularly relevant for this population, and an area that has received little exploration in the context of parental or familial incarceration. The second study of this dissertation examined this area of adolescent behavior.

The second study, *Teenage Pregnancy in Adolescents with an Incarcerated Household Member*, built upon the initial study by looking more specifically at the impact of family dynamics on teenage pregnancy as a possible negative behavioral outcome for adolescent girls. I examined whether having an incarcerated household member was associated with teenage pregnancy, over and above the impact of ethnicity, socioeconomic status, and family environment factors. This study used data from the National Longitudinal Survey of Youth: Child and Young Adult Surveys (1992- 2010), and included a sample of 1,229 girls, 140 (11.4%) of whom reported experiencing household incarceration prior to age ten.

Preliminary analyses revealed that girls who experienced household incarceration were more likely to be Hispanic and to come from a family receiving federal financial assistance. In addition, girls in this group reported engaging in fewer activities with their parents and higher levels of conflict between family members. Inspection of the individual subgroups within the household incarceration group revealed that, in contrast to the pregnancy rates of girls who did

not have an incarcerated household member (n = 124 of 1090, 11.4%), pregnancy was reported by over one quarter of the girls who reported parental incarceration (10 of 39, 25.6%), as well as 16.4% (10 of 61) of those with an incarcerated sibling, and 28.6% of those with another relative incarcerated (8 of 28). These findings indicate that girls with an incarcerated parent or other family member experience particularly high risk for teen pregnancy.

A series of three weighted logistic regression analyses was used to evaluate the relation between identified demographic variables, family-related variables, and household incarceration and teenage pregnancy. Our initial model revealed a significant relation between demographic variables and teenage pregnancy. The addition of family environment variables in our second model afforded increased prediction of teenage pregnancy beyond that accounted for by the demographic variables alone, indicating family relationship variables as potential mediating mechanisms of the relation between parental incarceration and teenage sexual health. Our final model demonstrated that, while controlling for demographic and family environment variables, girls who experienced the incarceration of a household member had a greater likelihood of becoming pregnant before age 20.

While these findings demonstrate the web of adversities associated with familial incarceration, as well as point to the heightened risk for negative sexual health outcomes for adolescents who have experienced familial incarceration, they fail to explore the processes involved in this relation. Further exploration of this association and the family processes involved is essential to the application of this research to intervention development. Parental communication is one such process that may impact teenage sexual behavior. However, this relation has not yet been investigated in the context of parental incarceration. In my second study, data concerning the length and frequency of household incarcerations were not available,

and age at the time of household incarceration was not consistently reported. Thus, I was unable to ensure that the household incarceration reported occurred prior to youth reports of teenage pregnancy. Furthermore, I was not able to identify potential parent-child communication variables that could explain my findings. In order to inform future interventions, more information is needed about context and communication factors associated with these poor outcomes, leading to my third study.

The final study, *Sexual Health of Girls with an Incarcerated Parent: The role of maternal communication,* further explores family environment and sexual health variables in the context of parental incarceration. While there are many risk and protective factors associated with adolescent sexual health outcomes, family perspectives and communication about sexual behaviors continue to be a primary focus of intervention research and development. This attention is likely due to the possibility of tailoring parent-teen sexual health conversations to the unique needs and situation of the adolescent. However, there are many factors that may impact the efficacy of the parent's message, including the source of the information, the message itself, the audience, the type of communication used, and the context in which the message is delivered (Jaccard, Dodge, & Dittus, 2002). It is likely that parental incarceration indirectly impacts each aspect of communication, due to the well-established impact on the greater family financial and relational dynamics and increased isolation from the community support systems in which these important conversations take place (Dallaire, 2007; Poehlmann, 2005).

Though previous research has demonstrated the association between parental perspectives and communication and teenage sexual behavior, the relation between parent-teen communication and adolescent sexual health has not yet been considered through from the perspective of the stress on family dynamics inherent to parental incarceration. The third study

focused specifically on the adolescent's experience of maternal communication and her sexual health experiences in the context of parental incarceration.

I analyzed a sample of 6,441 teenage girls, with 11.1% reporting parental incarceration, from the National Longitudinal Study of Adolescent Health (Add Health) to assess the influence of parental incarceration on four negative sexual health outcomes: sexual activity, teenage pregnancy, contraceptive use, and sexually transmitted diseases. I further explored the way that mother-daughter sexual health communication patterns may impact this relation. Preliminary analyses revealed that girls who experienced parental incarceration were more likely to have used alcohol, have used drugs, have had a mother who received federal aid, have come from a home without two biological parents, be an ethnic minority, and have a mother with a lower level of education. Girls in the parental incarceration group also reported higher perceived peer approval of sexual activity, higher perceived maternal approval of both contraceptive use and sexual activity, and were more likely to talk to their mothers about a personal problem. Finally, these girls were also more likely to be sexually active, have experienced pregnancy during adolescence, and have a history of STDs. However, they also reported more frequent use of contraceptives than did girls who had not experienced parental incarceration.

I conducted a series of four logistic regression analyses for each of the dichotomous outcome variables, and for the ordinal outcome of contraceptive use. Models predicting all outcomes were significant and demonstrated the predictive value of several demographic, control and maternal communication variables. My analyses showed that the individual parental incarceration variable significantly predicted girls' reports of sexual activity and less frequent contraceptive use, while the interaction between parental incarceration and several communication variables significantly predicted the outcomes of teenage pregnancy and sexually

transmitted diseases. A similar series of regression analyses identified the impact of maternal vs. paternal incarceration for each of the outcomes that were significant in our main analyses. In this secondary series of analyses, maternal incarceration was significantly associated with sexual activity, though maternal vs. paternal incarceration was not significantly predictive of contraceptive use.

Implications of This Research

Each of the studies included in this dissertation consider the negative impact of incarceration from a family systems perspective, pointing to the negative impact of parental or family incarceration on development and child and adolescent behavior. These findings support the importance of developing, funding, and implementing interventions for youth who experience familial incarceration. Providing additional systems of social support within communities with high rates of incarceration may be particularly helpful. As attention to the negative impacts of familial incarceration continues to grow, this research provides a conceptualization of these systems that will be useful to correctional administrators, policy makers, and community-based workers in the future. Furthermore, these findings reinforce the importance of continued exploration of the risks associated with familial and parental incarceration. As discussed in the limitations of each individual study, there is limited data available on this topic. It is essential that future research projects focusing on child and adolescent development and behaviors include questions targeting these experiences in order to provide data that will allow future researchers to better understand and describe this experience.

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From One Generation to the Next: Childhood experiences of antisocial behavior and parental incarceration among adult inmates

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Abstract

The recent climb in U.S. incarceration rates is paralleled by a growing number of children experiencing parental incarceration, some of whom follow their parents to prison as second-generation offenders. This study examines the historical experiences of 470 first- and second-generation incarcerated adults. Second-generation offenders reported more conduct disorder behaviors occurring prior to age 15, proportionately more juvenile criminal offending, and more childhood adversity than first-generation offenders. Childhood adversity partially mediated the relation between generation status and conduct disorder, but second-generation status maintained a unique direct effect. Similar analyses regarding juvenile offending among males did not support an adversity mediation model.

Link to Published Manuscript:
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Teenage Pregnancy in Adolescents with an Incarcerated Household Member

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Abstract

This study examines the association between the incarceration of a household member and adolescent pregnancy, and evaluates whether this association extends beyond that of other variables associated with sexual health. We used data from 12 waves of the National Longitudinal Survey of Youth: Child and Young Adult. After eliminating males and individuals who did not respond to key questions, a sample of 1,229 girls (ages 14-19) was analyzed. Girls who experienced the incarceration of a household member faced more demographic and family environment risk factors than those who did not. Regression analyses demonstrated that the addition of a household incarceration variable afforded superior prediction of teenage pregnancy relative to the prediction based on demographic and family features alone. Programs that are directed toward reducing teen pregnancy will benefit from attention to the home situation of the at-risk girl, particularly the experience of household member incarceration and related family dynamics.

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Sexual Health of Girls with an Incarcerated Parent: The role of maternal communication[1]

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[1] This research uses data from Add Health, a program project directed by Kathleen Mullan Harris and designed by J. Richard Udry, Peter S. Bearman, and Kathleen Mullan Harris at the University of North Carolina at Chapel Hill, and funded by grant P01-HD31921 from the Eunice Kennedy Shriver National Institute of Child Health and Human Development, with cooperative funding from 23 other federal agencies and foundations. Special acknowledgment is due Ronald R. Rindfuss and Barbara Entwisle for assistance in the original design. Information on how to obtain the Add Health data files is available on the Add Health website (http://www.cpc.unc.edu/addhealth). This research uses data from the AHAA study, which was funded by a grant (R01 HD040428-02, Chandra Muller, PI) from the National Institute of Child Health and Human Development, and a grant (REC-0126167, Chandra Muller, PI, and Pedro Reyes, Co-PI) from the National Science Foundation. This research was also supported by grant, 5 R24 HD042849, Population Research Center, awarded to the Population Research Center at The University of Texas at Austin by the Eunice Kennedy Shriver National Institute of Health and Child Development. Opinions reflect those of the authors and do not necessarily reflect those of the granting agencies. No direct support was received from grant P01-HD31921 or grant R01 HD040428-02 for this analysis.

Abstract

This study examined the impact of parental incarceration on adolescent sexual health (sexual activity, pregnancy, sexually transmitted diseases, and contraceptive use), using a sample of adolescent girls (*n*= 6,441) from the National Longitudinal Survey of Adolescent Health. Results confirmed previous research that identifies the myriad of demographic risk factors faced by girls who experience the incarceration of a parent. We also confirmed findings from previous research concerning the association between girls' communication patterns with their mothers and peers and adolescent sexual health. With statistical control for both of these categories of variables, parental incarceration increased the likelihood of sexual activity. Among girls who reported being sexually active, parental incarceration increased the likelihood of pregnancy, sexually transmitted diseases, and failure to use contraceptives. Three interactions between communication patterns and parental incarceration suggested mechanisms for future study that may explain these patterns. Findings demonstrate the importance of developing and implementing sexual health interventions for girls with an incarcerated parent, specifically those whom have experienced maternal incarceration.

Introduction

As the United States has the one of the highest rates of teenage births of any industrialized country (Kearney & Levine, 2012), adolescent sexual health continues to be a national priority. High public cost, as well as associated risk factors for teen mothers and their children indicate the importance of understanding the pathways associated with sexual risk in order to inform the development of related interventions. Family influences, specifically parent-teen sexual health communication patterns, have received a considerable amount of attention due to the potential benefits of this avenue for intervention. While the importance of such communication has been emphasized in previous studies, the individual elements of the communication process itself have just begun to receive attention. Our study used data from the National Longitudinal Study of Adolescent Health to examine the link between mother-child communication processes and adolescent sexual health, specifically focusing on the influence of parental incarceration.

A Communication Perspective

Greater daily communication with parents is related to positive sexual health outcomes for girls, such as increased sexual health communication with a partner before first having sex (Ryan, Franzetta, Manlove, & Holcombe, 2007). Parent-teen sexual risk communication is also associated with positive adolescent sexual health outcomes, including more conservative sexual attitudes and beliefs, greater ease of communication with sexual partners, greater comfort discussing sex, and decreased likelihood of sexual activity (Hutchinson & Montgomery, 2007). Adolescents' mothers, in contrast to their fathers, tend to have more frequent sexual health communication with their adolescent daughters and are also considered a better source of sexual health information by the teenager (Rosenthal & Feldman, 1999; Feldman & Rosenthal, 2000).

Additionally, mother-daughter sexual health communication is associated with fewer sexual risk behaviors, such as unprotected sex, and teenage pregnancies (Hutchinson & Montgomery, 2007). Miller, Benson and Gailbraith (2001) demonstrated that factors influencing the nature of parent-child communication, including connectedness, parental regulation, and parental disapproval are related to lower risk for teenage pregnancy. Furthermore, parent-child connectedness and communication can have interactive effects: children are more likely to discuss sexual risk with their same-sex parent, parents they feel close to, and when they report stronger communication with that parent and greater perceived importance of parental opinions (Hutchinson & Montgomery, 2007; Miller et al., 2001). Together these findings emphasize that adolescents with strong parental relationships are likely to benefit from parent-child sexual health communication.

In an effort to understand the impact of these communication factors and the interactions between them, Jaccard, Dodge and Dittus (2002) offer a conceptual framework for evaluating parent-child sexual health communication. This conceptualization stresses five main communication constructs found in classic communication theory: the source, message, medium, recipient, and context. Each of these variables likely influences the others, and all ultimately impact the adolescent's perception of the message and the related effect of the message on the teen's sexual behavior. Though familial incarceration is linked to increased risk for teenage pregnancy (Whalen & Loper, 2014), patterns regarding parental incarceration and sexual health have not yet been considered through the lens of these communication variables and processes.

Constructs of Classic Communication Theory. Using the Jaccard et al. (2002) framework, the initial building block in parent-child sexual health communication is the 'source,' of the information, in this case the parent. Young, Turner, Denny and Young (2004)

demonstrate that lower parent occupational status, unknown reasons for parental directives, less educated parents, and lower perceived parent educational expectations are associated with increased risk for pregnancy prior to high school graduation. Family dynamics and a teenager's relationship with each parent also have an impact on adolescent perceptions of that parent as a source of sexual health information. Youth are most likely to discuss sexual health with their same-sex parent (Hutchinson & Montgomery, 2007), which suggests that the influence of mother-daughter communication is particularly important to understanding the sexual health of adolescent girls. Girls are at increased risk for teenage pregnancy if they have a mother or sister who has experienced teenage pregnancy or have a single or teenage mother (East, Khoo & Reyes, 2006; Miller et al., 2001). Incarceration-related events may color a girl's evaluation of her mother, the 'source' in mother-daughter communication, and thus impact the communication process.

Perhaps the most obvious influential aspect of sexual health communication is the content of the parent's message. As such, much research has investigated the impact of the parent's approval of different aspects of adolescent sexual health. Less permissive parent attitudes are associated with adolescent virginity (Rose et al., 2005), while lax parenting styles, approval of teen sex and pregnancy, and low educational expectations are associated with increased teenage pregnancy (East, Reyes & Horn, 2007). Adolescent perception of parental disapproval of sexual activity is associated with decreased risk for sexual activity and pregnancy (Dittus & Jaccard, 2000). It is possible that stressors related to incarceration may impact the parent or caregiver's delivery of such messages.

The impact of the medium used for parent-teen sexual health communication has received little attention, presumably due to the assumption that verbal communication is the

typical approach used by parents. Previous research has demonstrated that the length and frequency of parent-child sexual health communication is related to decreased sexual risk (Ryan et. al, 2007). Contact with an incarcerated parent may be limited to letters or phone calls due to distance and travel expenses (Naser & Visher, 2006). However, phone calls home are often expensive (Naser & Visher, 2006), and letters may not be able to adequately address more complex topics, such as sexual health (Folk, Nichols, Dallaire & Loper, 2012). In addition, visits are often very short and require a long wait (Allard & Lu, 2006) and may lack meaningful contact (Shlafer & Poehlmann, 2010). As a result, such settings may limit the feeling of privacy and closeness between an incarcerated parent and their child, presenting an additional obstacle for the discussion of important personal topics, such as sexual health.

The fourth key variable influencing the communication process is the recipient, in this case the adolescent girl and any characteristics that impact her ability to attend to, comprehend, accept, retain, and retrieve the content of the message (Jaccard et al., 2002). Teenage mothers and fathers report high lifetime use of alcohol, marijuana, cocaine and meth (Lesser, Koniak-Griffin, Gonzalez-Figueroa, Huang & Comberland, 2007). African American and Hispanic teenagers are at particularly high risk for poor sexual health (De Genna, Cornelius, & Cook, 2007; Kivisto, 2001; Sayegh, Castrucci, Lewis, & Hobbs-Lopez, 2010). The recipient's choice of friends or peer-networks may also impact girls' attention to sexual risks. An individual's perceived portion of sexually active friends and friend pressure are associated with increased risk for pregnancy in adolescence (East et al., 2006). However, Teitelman, Bohinski, and Boente (2009) found that adolescent girls often experience conflicting messages about sex from the sources that they most commonly turn to for sexual health information (family, friends/peers, partners, school and media). Many of these individual traits that put youth at increased risk for

poor sexual health have been associated with parental incarceration in previous research (Murray & Farrington, 2008; Murray, Farrington & Sekol, 2012; Nichols & Loper, 2012; Will, Whalen & Loper, 2014).

Finally, the context of communication, including the temporal, physical, social and cultural features of the surrounding environment, impacts the transmission of the message (Jaccard et al., 2002). In a review of the literature on family risk factors for teenage pregnancy, Miller et al. (2001) found that dangerous neighborhoods increased the likelihood of teen pregnancy. While Medicaid family planning waivers are found to reduce teen birth rates, abstinence only education and religiosity are found to increase teen birth rates (Yang and Gaydos, 2010). Rose et al. (2005) found that adolescents in families who received public assistance were more likely to have had sexual intercourse. Similarly, Smith and Elander (2006) found that adolescents living in deprived areas were more likely to have sex at an early age, have lower expectations for themselves, and have decreased beliefs and knowledge about contraception. Furthermore, deprived families living in deprived areas have been identified as having even higher rates of early sexual activity than those who experience only one type of deprivation (Smith & Elander, 2006).

The Influence of Parental Incarceration

Parental incarceration clearly impacts each of these communication constructs, as it encompasses a widespread network of social and familial stressors. In addition to the negative effects of children's limited access to their parent and exposure to criminal behavior (Clompton & East, 2008), the incarceration of a parent often leads to subsequent disruptions in the child's home environment (Arditti & Few, 2006). These families are more likely to experience material hardship and receive public assistance than those without an incarcerated parent (Geller,

Garfinkel, Cooper & Mincy, 2009). Children of incarcerated parents also frequently experience residential instability (Poehlmann et al., 2008). This occurs more frequently in situations of dual parental incarceration, rather than paternal alone (Geller et al., 2009). In fact, children of incarcerated women experience particularly high levels of stressors (Hagen & Myers, 2003; Poehlmann, 2005).

Temporary caregivers may ask children to conceal the incarceration of their parent. Previous research has linked such secrecy with increases in the child's feelings of stigma, which, in addition to stressors, leads to increases in behavior problems (Hagen & Myers, 2003) and likely limited access to supportive resources in both home and school environments. This web of risk factors associated with parental incarceration indicates that this group of children are likely communicating with their mother or mother figure less frequently, and experience stressful emotional and home environments, ultimately resulting in added risk for poor sexual health.

Current Study

Parental incarceration has been shown to interfere with children's ability to connect to their community and individuals outside their family (Nesmith & Ruhland, 2008). However, few studies have focused on the way that this interference is associated with parent-child personal communication and negative sexual health outcomes. The current study examines the impact of mother-daughter sexual health communication on adolescent sexual health, specifically focusing on the impact of stress related to parental incarceration. Although sexual activity, in this case defined as sexual intercourse, could be considered normative for many teenage girls, we examined this outcome as the required gateway to the other sexual health outcomes that we examined, including teenage pregnancy, history of sexually transmitted diseases, and contraceptive use.

In the current study, we hypothesized that our findings concerning maternal communication variables would be consistent with previous research, indicating that close mother-daughter relationships, frequent and open communication, as well as approval of contraceptive use would be associated with lower levels of negative sexual outcomes. We anticipated that perceived peer and maternal approval of sexual activity would be associated with higher levels of sexual activity, teen pregnancy, failure to use contraceptives, and history of STDs. We also hypothesized that parental incarceration would be significantly associated with these negative sexual health outcomes.

Methods

Participants

We examined data from the National Longitudinal Study of Adolescent Health (Add Health), a study of youth from 7th to 12th grades who were recruited from 132 middle and high schools. These schools were considered to be representative of the U.S. population with regards to type, region, ethnicity, and urbanicity. This selection oversampled for the following groups of adolescents: Black with college-educated parents, those of Chinese, Cuban, and Puerto Rican descent, as well as twins and individuals with disabilities. A detailed description of selection procedures can be found at http://www.cpc.unc.edu/projects/addhealth.

The current study focused on the sexual health of adolescent girls included in the Add Health dataset. We created control, communication, and sexual health variables using data from Waves I (grades 7- 12) and II (grades 8- 12). As participants were first queried regarding parental incarceration at Wave IV (ages 24- 32), data from this wave was used to identify the subsample of girls who experienced the incarceration of a parent.

Individuals included in the current study were female and answered questions regarding household incarceration and other key independent and dependent variables. Only sexual health outcomes reported during Waves I and II were used in order to focus on sexual health during adolescence. As our outcomes target sexual behavior during teenage years using Waves I and II, only those who indicated parental incarceration prior to the time of the Wave I interview were included in the parental incarceration group.

The final sample for the current study consisted of 6,441 females for the outcome of sexual activity, 11.1% of whom reported parental incarceration. We selected this subset of respondents from an original pool of 20,747 individuals, but removed 14,306 individuals. We eliminated participants either because they identified as male at any survey wave (n= 10,273) or did not provide information regarding parental incarceration (n = 2,487; 2,133 or 85.8% of whom were not surveyed at Wave 4). Those who were either not queried or chose not to provide information regarding key questions were also eliminated (n= 1,530). The majority of these 1,530 individuals fell into the category of "legitimate skip", indicating that add health elected not to ask them a particular question based on their response to a previous question. For example, those girls who did not report having a mother or mother figure were not asked queried about their residential mother. As a result, these girls were removed from our study as they did not have the opportunity to respond to many key questions, including federal aid, maternal education, and maternal communication variables. We removed an additional 16 individuals due to randomly missing data on any of the key variables of interest (< 5% of all independent variables), as seen in previous studies (Khurana & Cooksey, 2012).

Those who did not report sexual activity at the time of each interview were not queried about pregnancy, contraceptive use, or history of sexually transmitted diseases. As a result, our

analyses of these outcomes were limited to youth who reported being sexually active by the time of the Wave II interview. Thus, an additional 4,501 individuals were removed from analysis of outcomes that assumed sexual activity. This limited the final sample for these analyses to 2,940 females, 14.5% of whom reported parental incarceration. Demographics for each sample can be found in Table 1.

Measures

Demographic and Control Variables. We identified demographic and control variables for both the teenage girl and her mother or mother figure using the Wave I and Wave II Add Health datasets. These variables include those that have been associated with adolescent sexual behaviors in previous research (Khurana & Cooksey, 2012), and target many aspects of the context in which parent-child sexual health communication occurs. We included these variables to evaluate the relation of communication and parental incarceration variables beyond these usual correlates (Johnson & Easterling, 2012).

Age. We calculated participants' age at Wave I based on the recorded date of the Wave I interview and the individual's birth date (M= 15.60).

Ethnicity. Add Health researchers constructed a 31-group variable indicating the combination of ethnic backgrounds endorsed by the participant. We recoded these responses into a dichotomous variable used to indicate minority status (minority/ non-minority), as seen in previous research (Boyer et. al, 2000).

Socio-Economic Status. We used responses to the question does your residential mother "receive public assistance, such as welfare?" to indicate socio-economic status. Wave I and II responses to this item were combined into a single, dichotomous variable to indicate if the adolescent's residential mother ever received public assistance.

Family Structure. Add Health researchers constructed a 7-group family structure variable based on the adolescent's report of her relationships with the individuals who resided in their household. This variable indicated the number and relationship of each of the adolescent's guardians. We recoded this variable into a dichotomous variable to indicate alternative family structure (two biological parents/ other guardian structure).

Substance Use. If an adolescent endorsed "getting drunk or very high on alcohol in the last 12 months" or ever reported using marijuana, cocaine, inhalants (glue/ solvents), other drugs (LSD, PCP, ecstasy, mushrooms, etc.), or injected any illegal drug, we identified them as having used alcohol or drugs, respectively. Wave I and II responses for each of these items were combined and coded into two dichotomous variables indicating if the adolescent ever endorsed drinking or drug use.

Maternal Education. Youth indicated their residential mother's highest level of education on a 10-point ordinal scale, ranging from "never went to school" (1) to "professional training beyond a four-year college or university" (10). We recoded participants' most recent response (taken from Wave I or II) to this question so that higher scores on this variable indicated higher levels of education for the individual's residential mother (range: 1.0- 10.0).

Communication Variables. Several items from the in-home survey reflected mother-daughter communication patterns. Each item was treated as a separate variable in our analyses. For individuals who were surveyed multiple times during adolescence, we used their most recent responses.

Maternal Closeness. Adolescents rated the degree to which they felt close to their mother/ mother figure on a 5-point Likert scale (1= "not at all", 2= "very little", 3= "somewhat",

4= “quite a bit”, 5= “very much”). Higher scores on this variable indicated higher levels of closeness between the participant and their mother or mother figure (range: 1.0- 5.0).

Maternal Approval. Two items asked participants to indicate on a 5-point Likert scale how their mother/ mother figure would feel about them “having sex at this time” and “using birth control at this time” (1= “strongly disapprove”, 2= “disapprove”, 3= “neither disapprove or approve”, 4= “approve”, 5= “strongly approve”). Higher scores on these variables indicated higher levels of perceived maternal approval (range: 1.0- 5.0).

Talking with Mother. Two questions asked adolescents to indicate if they had or had not talked to their mother/ mother figure about “someone [they] are dating or a party [they] went to” and about a “personal problem [they] were having” in the last four weeks. Due to high collinearity between these two variables, we removed the maternal dating communication variable from regression, and retained the maternal communication about personal problems variable, as preliminary analyses indicated that this item had a stronger relation with parental incarceration.

Peer Approval. Participants indicated on a 5-point Likert scale their belief that if they had sexual intercourse their “friends would respect [them] more.” We recoded adolescent responses to this question so that higher scores reflect higher perception of peer acceptance of sexual activity (1= “strongly disagree”, 2= “disagree”, 3= “neither agree or disagree”, 4= “agree”, 5 = “strongly agree”; range: 1.0- 5.0).

Parental Incarceration. We identified a subsample of girls who experienced the incarceration of a parent or parent figure based on the adolescents’ reports of the incarceration of their biological mother/ father or mother/ father figure during the Wave IV in-home survey. Reports of the participants’ age at the time of their parent or parent figure’s first and most recent

incarceration allowed us to ensure that the incarceration did not occur after the reports of demographic information, maternal communication patterns and sexual health outcomes that were used in the current study. To this end, only individuals reporting parental incarceration at or prior to the time of the Wave I interview (grades 7- 12) were included in the parental incarceration group. A secondary series of analyses was limited to girls who reported incarceration of either their mother/ mother figure or their father/ father figure. Adolescents who reported the incarceration of both or neither parents or parent figures were excluded from these groups.

Sexual Health. As with our demographic and communication variables, we used only Wave I and II responses to questions targeting sexual health in order to focus on behaviors occurring during adolescence. In each case, we combined these responses to indicate if the adolescent ever endorsed each of these experiences.

Sexual Activity. Sexual activity was based on Wave I and II responses to the "Yes/ No" question "Have you ever had sexual intercourse?".

Teenage Pregnancy. Teenage pregnancy was identified based on Wave I and Wave II responses to the "Yes/ No" question "Have you ever been pregnant?".

Sexually Transmitted Diseases. An adolescent's history of sexually transmitted diseases was indicated if they endorsed ever having had a doctor or nurse tell them that they had any of the following: chlamydia, syphilis, gonorrhea, HIV or AIDS, genital herpes, genital warts, trichomoniasis, hepatitis B, bacterial vaginosis, or non-gonococcal vaginitis. We coded these responses as a single dichotomous variable to indicate the adolescent's history of any sexually transmitted disease. Frequencies of reported history of each sexually transmitted disease can be found in Appendix B.2.

Contraceptive Use. Two in-home interview questions asked adolescents to indicate if they or their partner "used birth control the first time [they] had sexual intercourse" or "used birth control when [they] had sexual intercourse most recently." We summed responses to these to questions in order to code this outcome as a single ordinal variable, indicating if the adolescent never reported using contraceptives (0), reported using contraceptives during either their first or most recent sexual activity (1), or reported use both the first and last time they had sex (2). Higher scores on this variable indicate more frequent reported use of contraceptives (range: 0- 2.0). Frequencies of reported use of each method of contraception can be found in Appendix B.2.

Analytic Methods

Analyses used survey statistical procedures in Stata for complex samples (Stata Corp, College Station, TX). We followed recommended procedures regarding the use of weights and subpopulation selection provided by Add Health (http://www.cpc.unc.edu/research/tools/data_analysis/ml_sampling_weights).

We first conducted a series of preliminary univariate binary logistic regressions to evaluate differences between girls who either did or did not experience parental incarceration on key demographic, socio-economic, communication, and sexual health variables. We next examined our primary hypotheses through a four-model series of binary or multinomial logistic regressions for each of our sexual health outcomes. For each outcome, we initially evaluated the contribution of our control variables, followed by a model that added and evaluated the additional contribution of communication variables, which was in turn followed by a model that added and evaluated the additional contribution of parental incarceration. We then examined a final model that evaluated interaction effects between the communication and parental

incarceration variables. Adjusted Wald tests were conducted for each successive model in order to evaluate the predictive value added by the inclusion of additional independent variables.

A secondary series of logistic regressions examined outcomes that were significantly related to parental incarceration in the first set of analyses, but examined differences within the subpopulation of girls with an incarcerated parent. We investigated whether having an incarcerated mother (n = 73) or father (n = 512) differentially impacted outcomes. Those individuals who reported the incarceration of either both parents (n = 130), or no parents (n = 5,726) were excluded from these analyses.

We report results of weighted t- tests, logistic regression analyses, and Adjusted Wald tests, including logistic odds ratios and confidence intervals (95%). Significance tests were based on the criterion of $p < 0.05$. Odds ratios were interpreted based on the guidelines provided by Chen, Cohen, and Chen (2010) for effect sizes when predicted outcomes are present in 10% of the general population; small (OR= 1.46), medium (OR= 2.49), and large (OR= 4.14) .

Results

Preliminary Analyses

Girls who reported the incarceration of a parent differed from the remaining sample on most demographic and control variables as well as on several communication and sexual health variables. Girls with a history of parental incarceration more often reported a history of alcohol use ($t(128) = 2.13$, $p = 0.035$) and drug use ($t(128) = 3.89$, $p < 0.001$) than those in the no parental incarceration group. Girls in the parental incarceration group were more likely to be non-white ($t(128) = 6.13$, $p < 0.001$), and were also more likely to come from a household without two biological parents than those who had not experienced the incarceration of a parent

($t(128) = 12.78$, $p < 0.001$). Those who experienced parental incarceration were also more likely to report that their residential mother had received federal aid ($t(128) = 9.37$, $p < 0.001$) and achieved lower levels of education ($t(128) = -6.74$, $p < 0.001$).

Girls who reported the incarceration of a parent also reported higher perceived peer approval of sexual activity ($t(128) = 2.94$, $p = 0.004$), and higher perceived maternal approval of both sexual activity ($t(128) = 3.89$, $p < 0.001$) and contraceptive use ($t(128)= 3.99$, $p < 0.001$). Girls who experienced the incarceration of a parent were more likely to report discussing a personal problem with their mother or mother figure than those who had not experienced parental incarceration ($t(128)= 2.50$, $p= 0.014$). Girls in the parental incarceration group were more likely to report sexual activity ($t(128) = 6.11$, $p < 0.001$), pregnancy during adolescence ($t(128) = 2.97$, $p = 0.004$), and a history of sexually transmitted diseases than those who were not ($t(128) = 2.76$, $p = 0.007$). This group also reported more frequent use of contraceptives ($t(128) = -2.96$, $p = 0.004$) than those who had not experienced parental incarceration. A summary of descriptive analyses of key demographic, communication, and sexual health variables is provided in Table 2.

Regression Diagnostics

We evaluated the collinearity of our independent variables to ensure that correlations between independent variables did not impact our main analyses. Initial diagnostics indicated a high degree of collinearity between the maternal dating communication (VIF = 8.17) and maternal problem communication variables (VIF = 8.59, Mean VIF = 2.68). Further investigation demonstrated a significant correlation ($r = 0.326$, $p < 0.001$) between these two variables. The maternal dating communication variable was dropped from all subsequent

analyses in order to correct this problem (Mean VIF = 1.95). Results of all collinearity diagnostics can be found in Appendix C.

Regressions: Parental Incarceration.

Sexual Activity. The sequence of the first three models significantly predicted reports of sexual intercourse. The addition of communication variables in Model 2 (Model $F(12, 117) = 63.91$, $p \leq 0.001$; Adjusted Wald: $F(5, 124) = 46.91$, $p \leq 0.001$) added significant predictive value over demographic and control variables in Model 1 (Model $F(7, 122) = 100.91$, $p \leq 0.001$). The addition of the parental incarceration variable in Model 3 (Model $F(13, 116) = 61.64$, $p \leq 0.001$; Adjusted Wald: $F(1, 128) = 9.89$, $p = 0.0021$) added further significant predictive value over Model 2. Model 4 remained significant with the addition of the interaction terms (Model $F(18, 111) = 43.49$, $p \leq 0.001$), but did not afford a significant increase in predictive value when compared to the previous model (Adjusted Wald: $F(5,124) = 1.57$, $p = 0.1732$). Table 3 summarizes the final model for the prediction of sexual activity.

Teenage Pregnancy. The sequence of all four models significantly predicted teenage pregnancy. The addition of communication variables in Model 2 (Model $F(12, 117) = 11.58$, $p \leq 0.001$; Adjusted Wald: $F(5, 124) = 6.25$, $p \leq 0.001$) added significant predictive value over demographic and control variables in Model 1 (Model $F(7, 122) = 13.92$, $p \leq 0.001$). The addition of the parental incarceration variable in Model 3 (Model $F(13, 116) = 10.64$, $p \leq 0.001$; Adjusted Wald: $F(1, 128) = 1.13$, $p = 0.2899$) did not add significant predictive value over Model 2 for the outcome of teenage pregnancy. However, Model 4 represents the interaction effects of communication and parental incarceration status, adding significant predictive value over the other models (Model $F(18, 111) = 7.78$, $p \leq 0.001$; Adjusted Wald: $F(5,124) = 2.76$, $p = 0.0211$). Results of the final model can be found in Table 4. Significant interactions indicated

that girls in the parental incarceration group were at increased risk for teenage pregnancy if they reported talking to their mother about a personal problem or reported lower levels of peer approval of sexual activity (see Appendix F).

Sexually Transmitted Diseases. The sequence of all four models significantly predicted history of sexually transmitted diseases. The addition of communication variables in Model 2 (Model $F(12, 117) = 6.58$, $p \leq 0.001$; Adjusted Wald: $F(5, 124) = 3.93$, $p = 0.0024$) added significant predictive value over demographic and control variables in Model 1 (Model $F(7, 122) = 9.68$, $p \leq 0.001$). The addition of the parental incarceration variable in Model 3 (Model $F(13, 116) = 6.39$, $p \leq 0.001$; Adjusted Wald: $F(1, 128) = 0.95$, $p = 0.3309$) did not add significant predictive value over Model 2 for the outcome of sexually transmitted diseases. However, Model 4 represents the interaction of incarceration and communication variables and was found to add significant predictive value over the other models (Model $F(18, 111) = 5.22$, $p \leq 0.001$); Adjusted Wald: $F(5,124) = 2.35$, $p = 0.0448$). Results of the final model can be found in Table 5. The significant interaction again indicated that girls in the parental incarceration group were at increased risk for sexually transmitted diseases if they reported lower levels of peer approval of sexual activity (see Appendix F).

Contraceptive Use. The sequence of the first three models significantly predicted contraceptive use. The addition of communication variables in Model 2 (Model $F(24, 105) = 3.29$, $p \leq 0.001$; Adjusted Wald: $F(10, 119) = 2.90$, $p = 0.0028$) added significant predictive value over demographic and control variables in Model 1 (Model $F(14, 115) = 3.44$, $p \leq 0.001$). The parental incarceration variable was individually significant in Model 3 (Model $F(26, 103) = 3.17$, $p \leq 0.001$; Adjusted Wald: $F(2, 127) = 2.77$, $p = 0.0664$), though Model 3 did not add significant predictive value over Model 2. Model 4 remained significant with the addition of the

interaction terms ($F(36, 93) = 2.47$, $p = 0.0003$). However, the Adjusted Wald test showed that expanding the model did not significantly increase the predictive value of the model ($F(10, 119) = 0.92$, $p = 0.5169$). Results of Model 3 can be found in Table 6.

Regressions: Maternal vs. Paternal Incarceration

Sexual Activity. The sequence of three models again significantly predicted sexual activity. As expected, the addition of communication variables in Model 2 (Model $F(12, 117) = 10.28$, $p \leq 0.001$; Adjusted Wald: $F(5, 124) = 8.46$, $p \leq 0.001$) added significant predictive value over demographic and control variables in Model 1 (Model $F(7, 122) = 18.45$, $p \leq 0.001$). The addition of the maternal vs. paternal incarceration variable in Model 3 (Model $F(13, 116) = 10.11$, $p \leq 0.001$; Adjusted Wald: $F(1, 128) = 6.22$, $p = 0.0139$) also added significant predictive value over Model 2. Model 4 remained significant with the addition of the interaction terms ($F(18, 111) = 8.32$, $p \leq 0.001$). However, the Adjusted Wald test showed that expanding the model did not significantly increase the predictive value of the model ($F(5,124) = 1.28$, $p = 0.2746$). Results of Model 3 can be found in Table 7.

Contraceptive Use. None of the four models in these secondary analyses significantly predicted contraceptive use. As such, results are not reported here.

Discussion

Results of our analyses indicated a consistent pattern by which girls who experienced parental incarceration were at heightened risk for sexual activity as well as secondary negative sexual health outcomes. Specifically, after controlling for well-established demographic risk factors as well as patterns of maternal and peer communication, children with an incarcerated parent were more likely to be sexually active, defined as ever having sexual intercourse, and less likely to use contraceptives than girls who did not experience parental incarceration.

Furthermore, results of our secondary analyses demonstrated that maternal incarceration has a more pernicious impact on adolescent sexual activity when compared to paternal incarceration. This study sought to identify associations rather than causal relationships between communication variables, parental incarceration and sexual health outcomes, many of which showed only small effects. Therefore, in considering significant relationships, it is important to recognize potential bi-directional effects, leading to multiple plausible interpretations.

Consistent with previous studies (Johnson & Easterling, 2012), the current study provides a contextual picture of the lives of girls who experience parental incarceration in terms of the myriad of risk factors they face. Compared to girls who did not experience parental incarceration, those who did were more likely to report alcohol and drug use, alternative family structure, minority status, receiving federal aid, and lower levels of maternal education. This group also reported more sexual activity, teenage pregnancy, and sexually transmitted diseases. Together, these findings represent the wide contextual net of adversities that children with an incarcerated parent are likely to encounter. It is likely that the cumulative impact of these adversities potentiates the impact of each individual risk factor, leading to increased risk for negative outcomes (Dallaire, 2007).

Though not in itself a purely negative outcome, sexual activity is arguably the most critical of the sexual health outcomes we investigated, as the decision to engage in sexual intercourse serves as a gateway to subsequent sexual health outcomes, including pregnancy and sexually transmitted diseases. Our analyses supported the Jaccard et al. (2002) framework, demonstrating a web of demographic and communication factors that were associated with sexual activity. All demographic risk factors, with the exception of federal assistance, showed significant association with sexual activity. While the majority of these associations were shown

to have small effect sizes, both alcohol and drug use had significant medium associations with sexual activity. These findings suggest the importance of contextual risk on adolescent sexual health communication and behavior. Furthermore, lower levels of maternal closeness and greater perceived maternal and peer approval of sexual behaviors showed a significant small effect for the prediction of sexual activity. This finding supports the idea that the content of the message, in this case approval of teenage sexual behavior, plays a vital role in determining the impact of sexual health communication. However, it should be emphasized that this study examined relations not causes in patterns associated with sexual activity. Thus, while it is plausible that the mother's and peer's approval of sexual activity impacted whether girls chose to be sexually active, it is also possible that girls who had already made the decision to be sexually active were predisposed to perceive their mother and peers as approving of this behavior.

Though teenage sexual activity may be considered normative in many cases, sexual intercourse provides the needed context for the risk for other negative sexual health outcomes. We found that, beyond the influence of the context and content of sexual health communication, parental incarceration was uniquely associated with sexual activity by a factor of 1.60. This individual small effect size impact of parental incarceration falls in line with our preliminary finding that girls with an incarcerated parent reported greater maternal approval of sexual activity, as previous studies show that girls who perceive that their mothers approve of their sexual activity are more likely to be sexually active (Dittus & Jaccard, 2000). Our exploration of this outcome is perhaps our most important finding, as the decision to be sexually active applies to the largest population of young girls. Our results show that girls who experience the incarceration of a parent are most likely to take on the responsibility of sexual activity, thereby making themselves more susceptible to a number of other negative sexual health outcomes.

Just as sexual activity is a prerequisite for the other studied negative sexual health outcomes, the use of contraceptives is an important potential protective factor for adolescent girls who are sexually active. As such, it is important to understand the impact of contextual and communication factors on teen utilization of this type of protection among those girls who are sexually active. As expected, in contrast to girls who reported never using contraceptives, sexually active girls who indicated that they used contraceptives at least twice were more likely to report maternal approval of contraceptives. It is likely that girls who felt their mother approved of contraceptive use were most comfortable and able to access contraceptives. Girls who felt that their mother approved of contraceptives may have also felt most comfortable discussing sexual health with their mother, an attitude that has been linked to discussing sexual health with partners in previous research. Alternately, it is possible that girls who had elected to use contraceptives independently were inclined to perceive their mother as approving of this behavior regardless of her message. It is also possible that a mother or mother figure was more likely to indicate approval of this behavior after discovering that her daughter was sexually active, as marked by their knowledge of their use of contraceptives.

Unlike the pattern described above, which reflects the overall relation of maternal approval and contraceptive use among sexually active girls, for the smaller group of sexually active children of incarcerated parents there was a heightened likelihood of never using contraceptives. Our initial univariate analyses (both sexually active and non-active girls) indicated that girls with incarcerated parents were more likely to perceive maternal approval of contraceptives. Given this pattern, it is somewhat surprising that we did not observe a significant interaction effect, as it appears that the maternal approval and contraceptive-use patterns for sexually active girls with an incarcerated parent do not align with those of the larger group.

Nonetheless, our finding of the unique association between parental incarceration and contraceptive use, with statistical control for demographic and communication variables, demonstrates a small increased likelihood of failure to use contraceptives for those girls who in the parental incarceration group, despite our preliminary finding that this group reported higher levels of maternal approval of contraceptive use.

Teenage pregnancy represents the negative sexual health outcome with arguably the most impactful social and individual effects. As sexual activity serves as a gateway to many new risks and responsibilities, so does pregnancy at an early age, putting both the teenage mother and her child at significant risk for additional negative outcomes (Olsson et al., 2014). We again found several demographic risk factors to have significant small associations with teenage pregnancy, supporting the importance of contextual risk emphasized by Jaccard et al. (2002), and findings of previous research (DeRosa et al., 2010; Manlove, Ikramullah, Mincieli, Holcombe, & Danish, 2009). Jaccard et al.'s (2002) stress on the content of the message conveyed in parent-teen sexual health communication was again supported. We observed that maternal approval of contraceptive use to have a small significant relationship with heightened likelihood of teenage pregnancy. This relation is inconsistent with our previous finding that such approval was associated with increased use of protection. One plausible answer resides in the interpretation of the direction of our correlational pattern. It is plausible that the teen pregnancy came first, and that mothers who knew that their daughter had become pregnant tended to endorse their daughter's contraception use in efforts to prevent further pregnancy. Further research that examines longitudinal trends that capture the order of communications and outcomes will help to clarify this relation.

Our analysis of teenage pregnancy again showed the impact of parental incarceration through the lens of communication patterns, reflected in interaction effects. We found that parental incarceration had a marginally significant association with teenage pregnancy when girls reported lower levels of peer approval of sexual activity, and a small significant association when girls reported talking to their mother about a personal problem. Thus the source and content of sexual health communication were associated with teen pregnancy, consistent with the emphasis placed on such patterns by Jaccard et al. (2002). It is possible that communication about personal problems in the context of parental incarceration reflects the greater impact of strain or stigma. In these situations, maternal communication may serve as an avenue for family stress to be conveyed to teenagers, rather than an opportunity for teenagers to seek guidance from their mother; open and personal communication between a teenager and her mother may involve attending to immediate concerns about the incarcerated family member and related strain on family resources. It is also possible that this variable served as a marker for greater social stigma or stress; those girls with an incarcerated parent who talked to their mother about a personal problem could be more overwhelmed by personal problems than those who did not. Indeed it is also possible that, as we are unable to identify the sequence of communication and sexual behaviors, in some cases, the problem discussed with their mother was their own pregnancy.

This impact of social stigma may also explain the significant interaction effect of lower peer approval of sexual activity and parental incarceration in predicting teenage pregnancy. Lower levels of peer approval of sexual activity likely decrease the likelihood that a teenage girl will feel comfortable discussing safe sex practices with her friends. While previous research has demonstrated that an individual's perceived portion of sexually active friends and friend pressure

are associated with increased risk for pregnancy in adolescence (East et al., 2006), it is possible that in situations involving parental incarceration, sexually active girls feel most comfortable turning to their friends to discuss and learn about sexual health due to environmental stressors at home. In this case, low perceived peer approval of sexual activity may prevent them from engaging in these conversations and receiving appropriate social support around sexual health topics. Again, it is also possible that girls who had become pregnant prior to their reports of communication variables reported higher levels of peer disapproval of sexual activity, as a result of the stigma that they have faced due to their pregnancy.

The importance of several contextual and communication factors was again supported by small associations between demographic variables and the negative outcome of sexually transmitted diseases. The group of communication variables again significantly increased the predictive value of the model, supporting the Jaccard et al. (2002) framework. Specifically, a small significant association found was between peer approval of sexual activity and increased rates of history of sexually transmitted diseases, confirming previous research (Boyer et al., 2000).

The experience of sexually transmitted diseases was also related to parental incarceration. Though the addition of the individual parental incarceration variable did not significantly increase the predictive power of our model, the individual parental incarceration variable did show a small positive association with history of sexually transmitted diseases. However, as with teenage pregnancy, this impact was most apparent in the interaction between parental incarceration and specific communication patterns. Girls who both experienced parental incarceration and reported lowest levels of peer approval of sexual activity were more likely to report a history of sexually transmitted diseases. This finding is consistent with the similar

finding for the outcome of teenage pregnancy, again suggesting the possible impact of social stigma related to both parental incarceration and poor sexual health as reviewed above.

Maternal Versus Paternal Incarceration

A secondary goal of this study was to explore differences in reported sexual health of girls who reported maternal incarceration when compared to those who reported paternal incarceration. We elected to focuses these secondary analyses on the prediction of sexual activity, as this variable evidenced the strongest relation to parental incarceration. As expected, all demographic and communication risk factors showed small associations with sexual activity in these analyses. As shown in our main analyses, drug and alcohol use again showed stronger relations with reports of sexual intercourse, showing medium and large effects, respectively. Each of these relations was in the expected direction and each was consistent with the findings of our analysis of the impact of any parental incarceration on adolescent sexual activity. We found a medium relation between maternal incarceration, in contrast to paternal incarceration, adolescent sexual activity beyond that accounted for by other contextual and communication factors. As previously stated, this finding is particularly important due to the way in which sexual activity serves as a gateway or prerequisite to other serious negative sexual health outcomes. Girls who experience the incarceration of their mother or mother figure are likely to be vulnerable to this additional risk regardless of other demographic risk factors and parent-teen sexual health communication. This finding is also consistent with previous literature demonstrating the pernicious disruptive impact of maternal incarceration in particular (Murray & Murray, 2010; Novero, Loper & Warren, 2011). By focusing these analyses on only those girls who experienced either maternal or paternal incarceration, our sample size was greatly reduced.

It is possible that this loss of power led us to only find associations with sexual activity, as this allowed for the inclusion of the most girls in these secondary analyses.

This study focused upon the additional contribution of parental incarceration to the prediction of negative sexual health outcomes, beyond that afforded by demographic and communication variables. However, it is important to recognize the influence of communication variables in each sequence of analyses, as the inclusion of these variables afforded increased prediction of each outcome. This finding underscores the Jaccard et al. (2002) model, which emphasizes the relevance of teen sexual health communication, particularly mother-daughter communication, in predicting sexual health outcomes.

Limitations

While the National Longitudinal Study of Adolescent Health provided the best data with which to investigate our key questions of interest, our study was limited by characteristics of both the data and questions of interest. First, while we identify only those girls who experienced parental incarceration prior to their teenage years and reports of sexual health outcomes, we did not use a longitudinal design and therefore cannot assert a causal link between maternal communication or parental incarceration and adolescent sexual health. Similarly, small effect sizes limit the implications of our findings. In addition, the retrospective, self-report design of the in-home interviews may have impacted the data itself, as participants may have misremembered events associated with key variables, such as their age at parental incarceration or contraceptive use. The sensitive nature of the topics targeted in this study, parental incarceration and sexual health in particular, may have also led participants to provide responses they felt were more socially acceptable, rather than those based on their individual experiences.

Our study was also limited by the data collection procedures. As parental incarceration was only queried during the Wave IV interview, our study was limited to individuals who were followed throughout the entire study and responded to questions regarding their age at the time of their parent's incarceration. Similarly, as questions targeting sexual health outcomes were only asked if the participant indicated being sexually active at the time of the interview, our study of pregnancy, sexually transmitted diseases, and contraceptive use necessarily focused on girls who were sexually active by the time of the Wave II interview. Our primary variable of parental incarceration was missing in a large number of cases because individuals were no longer participating, were not queried on this variable, or otherwise refused to answer the question. However, only sixteen additional individuals were removed due to missing data on any of the other key variables of interest. This number is consistent with percentages seen in previous studies that elected to use listwise deletion (Khurana & Cooksey, 2012). Nonetheless, is possible that participants excluded differed significantly from those who were retained, thereby influencing the findings of our study.

Our analyses revealed some unexpected findings that merit further study. Specifically, we observed that girls who perceived greater maternal approval of their use of contraceptives were less likely to use them, and we observed heightened likelihood of pregnancy and sexually transmitted diseases among girls with an incarcerated parent whose peers disapproved of sexual activity. While we have suggested possible reasons for these patterns, these interesting effects indicate the need for further study of the beliefs and motives that may be present among the subset of sexually active girls whose actions are inconsistent with perceived messages from peers or their mother.

Conclusion

The findings of the current study demonstrate the individual association between parental incarceration and sexual activity and contraceptive use, as well as maternal incarceration and sexual activity. This risk is distinct from risk associated with demographic characteristics, other risky behaviors (e.g. substance use), and communication constructs. Parental incarceration was also related to teenage pregnancy and sexually transmitted diseases, but was most evident through interaction effects with specific communication variables. Our analysis revealed some counterintuitive findings that merit further study. Specifically, we found a heightened likelihood of pregnancy among girls with an incarcerated parent who discussed personal problems with their mother, and whose peers disapproved of sexual activity. These interesting effects suggest the need for further study of the beliefs and motives that may be present among sexually active girls who, in some cases, disregard messages from peers or their mother. These findings increase our understanding of the processes of risk associated with adolescent sexual health. As our country continues to struggle with the financial and social consequences of poor adolescent sexual health, it is important that we continue our efforts to understand such processes in order to best inform the development and implementation of appropriate intervention programs and preventative resources.

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Table 1. *Description of the Two Samples Demographic, Control, and Outcome Variables*

	Sample #1 (*n*= 6,441)	Sample #2 (*n*= 2,940)
	% (*n*)	
Alcohol Use	64.5% (4,152)	81.5% (2,395)
Alternative Family Structure	43.3% (2,789)	52.4% (1,540)
Drug Use	35.8 % (2,308)	54.8% (1,1610)
Federal Aid	11.7% (754)	13.6% (400)
Minority Status	39.2 % (2,527)	42.0% (1,236)
Residential Mother's Highest Level of Education		
No School	0.1% (9)	0.1% (2)
8th Grade or Less	5.9% (377)	5.2% (154)
> 8th Grade but Didn't Graduate High School	11.2% (723)	14.0% (413)
Vocational School Instead of High School Degree	0.9% (56)	1.1% (31)
GED	3.8% (242)	4.8% (142)
High School Graduate	29.8% (1,921)	31.1% (914)
Business/ Vocational School After High School	7.2% (466)	7.8% (230)
Some College/ Did Not Graduate	13.3% (859)	13.7% (402)
Graduated 4 Year College	19.7% (1,266)	16.2% (475)
Professional Training Beyond 4 year college	8.1% (522)	6.0% (177)
Parental Incarceration	11.1% (715)	14.5% (427)
Sexually Active	47.7% (3,071)	100% (2,940)
History of Sexually Transmitted Disease		11.8% (346)
Pregnancy		20.9% (613)
Reported Contraceptive Use		
No Reported Use		14.8% (434)
Reported Use at First or Last Occurrence Only		30.7% (904)
Reported Use at First and Last Occurrence		54.5% (1,602)

Note: Unweighted sample demographics are presented here. All analyses used survey weights. Sample 1 was used for analysis of the outcome of sexual activity. Sample 2 included only those girls who reported sexual activity by Wave II and was used for all other analyses.

Table 2. *Univariate Comparison of Parental Incarceration and No Incarceration Groups*

	Mean (SE)	Percentage	Mean (SE)	Percentage	*t*
Sample #1 (Weighted *N*= 8,787,460.8)	Parental Incarceration (weighted *N*= 932,518.54)		No Parental Incarceration (weighted *N*= 7,854,942.3)		
Control Variables					
Wave 1 Age (years)	15.3 (0.13)		15.41 (0.11)		-1.14
Alcohol Use		71.55%		65.84%	2.13*
Alternative Family Structure		77.37%		36.45%	12.78***
Drug Use		47.49%		35.75%	3.89***
Federal Aid		28.53%		9.35%	9.37***
Minority Status		43.11%		25.47%	6.13***
Residential Mother's Highest Level of Education	5.88 (0.12)		6.64 (0.09)		-6.74***
Communication Variables					
Maternal Closeness	4.34 (0.04)		4.32 (0.02)		0.42
Maternal Approval of Contraceptive Use	3.21 (0.09)		2.89 (0.05)		3.99***
Maternal Approval of Sexual Activity	2.13 (0.07)		1.91 (0.28)		3.89***
Peer Approval of Sexual Activity	2.06 (0.04)		1.93 (0.02)		2.94**
Talked to Mother about a Date or Party		60.73%		62.52%	-0.66
Talked to Mother about a Personal Problem		58.93%		52.09%	2.50**
Outcome Variables					
Sexually Active		61.95%		44.45%	6.11***
Sample #2 (Weighted *N*= 3,899,443.7)	Parental Incarceration (*N*= 553,858.32)		No Parental Incarceration (*N*= 3,345,585.30)		
Pregnancy		27.94%		19.04%	2.97**
History of Sexually Transmitted Disease		16.67%		10.96%	2.76**
Reported Contraceptive Use					2.96**
No Reported Use		18.83%		13.07%	
Reported Use at First or Last Occurrence Only		34.98%		30.36%	
Reported Use at First and Last Occurrence		46.19%		56.56%	

*$p \leq .05$. **$p \leq .01$. ***$p \leq .001$.

Note: Higher scores on communication variables indicate greater degrees of the variable assessed (e.g. higher levels of maternal approval or closeness). Parental incarceration variable: no= 0, yes= 1.

Table 3. *Sexual Activity and Parental Incarceration*

	Third Model			Successive Models	
	t(SE)	OR	95% Confidence Interval	Model *F* (df)	Adjusted Wald *F* (df)
Control Variables				100.91 (7, 122)***	N/A
Age (Wave 1)	13.88 (0.05)***	1.55	1.46, 1.65		
Alcohol Use	8.15 (0.29)***	2.53	2.02, 3.16		
Alternative Family Structure	3.08 (0.13)**	1.34	1.11, 1.63		
Drug Use	12.83 (0.41)***	3.90	3.16, 4.82		
Federal Aid	0.59 (0.14)	1.08	0.84, 1.38		
Minority Status	2.19 (0.17)*	1.32	1.03, 1.70		
Residential Mother's Education Level	-4.42 (0.02)***	0.91	0.87, 0.95		
Communication Variables				63.91 (12,117)***	46.91 (5, 124)***
Maternal Closeness	-3.81 (0.04)***	0.83	0.76, 0.92		
Maternal Approval of Contraceptive Use	9.52 (0.04)***	1.35	1.27, 1.43		
Maternal Approval of Sexual Activity	7.37 (0.06)***	1.38	1.27, 1.51		
Peer Approval of Sexual Activity	5.95 (0.07)***	1.36	1.22, 1.50		
Talked to Mother about a Personal Problem	4.31 (0.13)***	1.45	1.22, 1.72		
Key Variable				61.64 (13, 116)***	9.89 (1, 128)**
Parental Incarceration	3.14 (0.24)**	1.60	1.19, 2.14		

*$p \leq .05$. **$p \leq .01$. ***$p \leq .001$

Note: Higher scores on communication variables indicate greater degrees of the variable assessed (e.g. higher levels of maternal approval or closeness). Parental incarceration variable: no= 0, yes= 1. Model 4, which includes interaction terms, is not presented here as it was not found to significantly contribute to the predictive power of the model (Model Summary: $F(18, 111)= 43.49$, $p< 0.001$; Adjusted Wald: $F(5, 124) = 1.57$, $p = 0.1732$).

Table 4. *Pregnancy and Parental Incarceration*

	Fourth Model			Successive Models	
	t(SE)	OR	95% Confidence Interval	Model *F*(df)	Adjusted Wald *F* (df)
Control Variables				13.92 (7, 122)***	N/A
Age (Wave 1)	5.08 (0.05)***	1.21	1.12, 1.30		
Alcohol Use	-1.27 (0.14)	0.80	0.56, 1.14		
Alternative Family Structure	1.64 (0.16)	1.24	0.96, 1.60		
Drug Use	3.64 (0.24)***	1.68	1.27, 2.24		
Federal Aid	1.28 (0.26)	1.30	0.87, 1.94		
Minority Status	5.20 (0.29)***	2.07	1.57, 2.73		
Residential Mother's Education Level	-3.38 (0.2)***	0.92	0.87, 0.97		
Communication Variables				11.58 (12, 117)***	6.25 (5, 124)***
Maternal Closeness	-0.44 (0.09)	0.96	0.80, 1.16		
Maternal Approval of Contraceptive Use	5.29 (0.09)***	1.39	1.23, 1.57		
Maternal Approval of Sexual Activity	-0.95 (0.07)	0.93	0.81, 1.08		
Peer Approval of Sexual Activity	0.73 (0.10)	1.07	0.89, 1.30		
Talked to Mother about a Personal Problem	-0.77 (0.14)	0.89	0.66, 1.20		
Key Variable				10.64 (13, 116)***	1.13 (1, 128)
Parental Incarceration	0.61 (1.95)	1.88	0.24, 14.56		
Interaction Terms				7.78 (18, 11)****	2.76 (5, 124)*
Maternal Closeness X Parental Incarceration	0.84 (0.25)	1.19	0.79, 1.81		
Maternal Approval of Contraceptives X Parental Incarceration	-1.79 (0.11)	0.78	0.59, 1.03		
Maternal Approval of Sex X Parental Incarceration	0.45 (0.20)	1.09	0.76, 1.56		
Peer Approval of Sex X Parental Incarceration	-2.20 (0.13)*	0.64	0.43, 0.96		
Talked to Mother about a Problem X Parental Incarceration	2.32 (0.67)*	2.10	1.12, 3.94		

*$p \leq .05$. **$p \leq .01$. ***$p \leq .001$

Note: Higher scores on communication variables indicate greater degrees of the variable assessed (e.g. higher levels of maternal approval or closeness). Parental incarceration variable: no= 0, yes= 1.

Table 5. *Sexually Transmitted Diseases and Parental Incarceration*

	Fourth Model			Successive Models	
	t(SE)	OR	95% Confidence Interval	Model *F*(df)	Adjusted Wald *F*(df)
Control Variables				9.68 (7, 122)***	N/A
Age (Wave 1)	4.52 (0.07)***	1.29	1.15, 1.44		
Alcohol Use	0.61 (0.21)	1.12	0.77, 1.64		
Alternative Family Structure	0.74 (0.17)	1.12	0.83, 1.52		
Drug Use	3.72 (0.28)***	1.78	1.31, 2.43		
Federal Aid	1.86 (0.07)	1.43	0.98, 2.10		
Minority Status	5.44 (0.37)***	2.36	1.73, 3.22		
Residential Mother's Education Level	-1.14 (0.04)	0.96	0.89, 1.03		
Communication Variables				6.58 (12, 117)***	3.93 (5,124)**
Maternal Closeness	1.10 (0.11)	1.12	0.92, 1.36		
Maternal Approval of Contraceptive Use	1.63 (0.09)	1.14	0.97, 1.33		
Maternal Approval of Sexual Activity	1.66 (0.10)	1.16	0.97, 1.38		
Peer Approval of Sexual Activity	2.52 (0.13)**	1.28	1.06, 1.56		
Talked to Mother about a Personal Problem	-1.19 (0.14)	0.82	0.58, 1.14		
Key Variable				6.39 (13, 116)***	0.95 (1, 128)
Parental Incarceration	1.98 (11.49)*	9.92	1.00, 98.15		
Interaction Terms				5.22 (18, 111)***	2.35 (5, 124)*
Maternal Closeness X Parental Incarceration	-1.28 (0.18)	0.73	0.45, 1.19		
Maternal Approval of Contraceptives X Parental Incarceration	0.36 (0.16)	1.06	0.78, 1.43		
Maternal Approval of Sex X Parental Incarceration	-0.80 (0.15)	0.87	0.62, 1.22		
Peer Approval of Sex X Parental Incarceration	-2.07 (0.15)*	0.60	0.36, 0.98		
Talked to Mother about a Problem X Parental Incarceration	1.77 (0.91)	2.13	0.91, 4.96		

*$p \leq .05$. **$p \leq .01$. ***$p \leq .001$

Note: Higher scores on communication variables indicate greater degrees of the variable assessed (e.g. higher levels of maternal approval or closeness). Parental incarceration variable: no= 0, yes= 1.

Table 6. *Contraceptive Use and Parental Incarceration*

	Third Model				Successive Models	
Base Outcome: Used Contraceptives Twice	Never Used		Used Once			
	t(SE)	Coef. (CI)	*t*(SE)	Coef.(CI)	Model *F*(df)	Adjusted Wald *F*(df)
Control Variables					3.44 (14, 115)***	N/A
Age (Wave 1)	-2.86 (0.06)**	-0.16 (-0.27, -0.49)	-1.11 (0.04)	-0.05 (-0.13, 0.04)		
Alcohol Use	-1.62 (0.20)	-0.33 (-0.74, 0.07)	0.40 (0.17)	0.07 (-0.27, 0.41)		
Alternative Family Structure	-0.39 (0.18)	-0.07 (-0.42, 0.28)	2.58 (0.11)**	0.29 (0.07, 0.51)		
Drug Use	1.56 (0.17)	-0.27 (-0.07, 0.61)	1.82 (0.12)	0.22 (-0.02, 0.45)		
Federal Aid	-0.87 (0.23)	-0.20 (-0.66, 0.25)	-1.16 (0.16)	-0.19 (-0.51, 0.13)		
Minority Status	1.79 (0.16)	0.28 (-0.03, 0.59)	0.18 (0.13)	0.03 (-0.23, 0.28)		
Residential Mother's Education Level	-0.86 (0.03)	-0.03 (-0.09, 0.04)	-2.11 (0.03)*	-0.05 (-0.10, -0.00)		
Communication Variables					3.29 (24,105)***	2.90 (10, 119)**
Maternal Closeness	-1.18 (0.08)	-0.09 (-0.25, 0.06)	-1.07 (0.07)	-0.07 (-0.20, 0.06)		
Maternal Approval of Contraceptive Use	-2.36 (0.07)*	-0.16 (-0.30, -0.03)	-1.52 (0.05)	-0.08 (-0.18, 0.02)		
Maternal Approval of Sexual Activity	0.04 (0.08)	-0.00 (-0.15, 0.16)	1.63 (0.06)	0.10 (-0.02, 0.22)		
Peer Approval of Sexual Activity	1.71 (0.09)	0.15 (-0.02, 0.31)	2.73 (0.06)	0.15 (0.04, 0.26)		
Talked to Mother about a Personal Problem	-1.74 (0.14)	-0.24 (-0.51, 0.03)	-0.69 (0.13)	-0.09 (-0.33, 0.16)		
Key Variable					3.17 (26, 103)***	2.77 (2,127)
Parental Incarceration	2.35 (0.24)*	0.56 (0.09, 1.04)	1.20 (0.17)	0.20 (-0.13, 0.53)		

*$p \leq .05$. **$p \leq .01$. ***$p \leq .001$

Note: Higher scores on communication variables indicate greater degrees of the variable assessed (e.g. higher levels of maternal approval or closeness). Parental incarceration variable: no= 0, yes= 1. Model 4, which includes interaction terms, is not presented here as it was not found to significantly contribute to the predictive power of the model (Model Summary: $F(36, 93) = 2.47$, $p < 0.001$; Adjusted Wald: $F(10, 119) = 0.92$, $p = 0.5169$).

Table 7. *Sexual Activity: Maternal vs. Paternal Incarceration*

	Third Model			Successive Models	
	t(SE)	OR	95% Confidence Interval	Model *F*(df)	Adjusted Wald *F*(df)
Control Variables				18.45 (7, 122)***	N/A
Age (Wave 1)	4.42 (0.15)***	1.53	1.27, 1.85		
Alcohol Use	4.93 (1.51)***	4.78	2.55, 8.94		
Alternative Family Structure	0.57 (0.51)	1.26	0.56, 2.82		
Drug Use	4.35 (1.05)***	3.59	2.01, 6.41		
Federal Aid	0.08 (0.30)	1.02	0.58, 1.82		
Minority Status	0.93 (0.41)	1.33	0.72, 2.45		
Residential Mother's Education Level	-4.38 (0.05)***	0.75	0.65, 0.85		
Communication Variables				10.28 (12, 117)***	8.46 (5, 124)***
Maternal Closeness	1.13 (0.23)	1.24	0.85, 1.80		
Maternal Approval of Contraceptive Use	4.83 (0.20)***	1.73	1.38, 2.16		
Maternal Approval of Sexual Activity	2.12 (0.20)*	1.36	1.02, 1.82		
Peer Approval of Sexual Activity	1.96 (0.21)*	1.36	1.00, 1.84		
Talked to Mother about a Personal Problem	0.46 (0.32)	1.14	0.65, 1.97		
Key Variable				10.11 (13, 116)***	6.22 (1,128)**
Maternal vs. Paternal Incarceration	2.49 (1.60)**	3.32	1.28, 8.59		

*$p \leq .05$. **$p \leq .01$. ***$p \leq .001$

Note: Higher scores on communication variables indicate greater degrees of the variable assessed (e.g. higher levels of maternal approval or closeness). Maternal vs. paternal incarceration variable: paternal= 0, maternal =1. Model 4, which includes interaction terms, is not presented here as it was not found to significantly contribute to the predictive power of the model (Model Summary: $F(18, 111) = 8.32$, $p < 0.001$; Adjusted Wald: $F(5, 124) = 1.28$, $p = 0.2746$).

Appendix A. Description of Data

A.1 Group Membership of Adolescent Girls in Relation to Parental Incarceration

		Unweighted *N* (%)
Included	No parent incarcerated	7,030 (67.1%)
	Parent incarcerated before or at Wave 1	957 (9.1%)
Excluded	Parent incarcerated and released before birth	74 (0.7%)
	Age at parent's incarceration unknown	254 (2.4%)
	Parent incarcerated before birth but release date unknown	4 (0.0%)
	Parent incarcerated before birth and still incarcerated at Wave I	12 (0.1%)
	Parent incarcerated before birth and release date after Wave I	10 (0.1%)
	Wave 4 data not collected	2,133 (20.4%)

A.2 Missing Data of Add Health Female Participants (reasons given at Wave 1)

Variable	Missing	Refused	Legitimate Skip	Don't Know	Not Applicable
Females Eligible for Sample #1 (*N*= 10,474)					
Age (Wave 1)	8	0	0	0	0
Alcohol Use	0	26	0	8	1
Alternative Family Structure	0	0	0	0	0
Drug Use	0	33	0	11	1
Federal Aid	0	0	453	33	1
Minority Status	0	0	0	0	0
Residential Mother's Education Level	1	6	536	483	0
Maternal Closeness	0	3	453	5	0
Peer Approval of Sexual Activity	0	22	692	41	1
Maternal Approval of Sexual Activity	0	24	483	8	0
Maternal Approval of Contraceptive Use	0	26	483	35	0
Talked to Mother about a Date or Party	0	3	453	4	0
Talked to Mother about a Personal Problem	0	3	453	4	0
Parental Incarceration					
Biological Mother	2,133	1	0	140	0
Biological Father	2,133	4	0	590	0
Mother Figure	2,133	0	7,429	1	0
Father Figure	2,133	0	6,572	25	0
Sexual Activity	0	37	0	13	2
Sexually Active Females Eligible for Sample # 2					
Pregnancy	0	11	8	4	0
History of STDs	0	1	0	1	0
Contraceptive Use	0	10	192	3	1
Note: Girls who did not identify a mother or mother figure in initial sections of the in-home surveys were not asked questions about their residential mother. The 2,133 missing parental incarceration data attrited prior to the Wave IV interview, and so did not have the opportunity to answer these questions.					

A.3 Survey questions from Add Health

Parental Incarceration Items: *Wave IV, Section 2*

1. (Has/did) your biological mother ever (spent/spend) time in jail or prison?
2. How old were you when your biological mother went to jail or prison?
3. How old were you when your biological mother was released from jail or prison (most recently)?
4. (Has/did) your biological father ever (spent/spend) time in jail or prison?
5. How old were you when your biological father went to jail or prison?
6. How old were you when your biological father was released from jail or prison (most recently)?
7. (Has/did) your (mother figure) ever (spent/spend) time in jail or prison?
8. How old were you when your (mother figure) went to jail or prison?
9. How old were you when your (mother figure) was released from jail or prison (most recently)?
10. (Has/did) your (father figure) ever (spent/spend) time in jail or prison?
11. How old were you when your (father figure) went to jail or prison?
12. How old were you when your (father figure) was released from jail or prison (most recently)?

Control Variables: *Wave I, Sections 14, 28 and Wave II, Sections 14, 27*

1. How far in school did (residential mother) go?
2. Does (residential mother) receive public assistance, such as welfare?
3. Over the past 12 months, on how many days have you gotten drunk or "very, very high" on alcohol?
4. During your life, how many times have you used marijuana?
5. During your life, how many times have you used cocaine?
6. During your life, how many times have you used inhalants, such as glue or solvents?
7. During your life, how many times have you used any (other type of illegal drug, such as LSD, PCP, ecstasy, mushrooms, speed, ice, heroin, or pills, without a doctor's prescription)?
8. During your life, have you ever injected (shot up with a needle) any illegal drug, such as heroin, or cocaine?
9. Family Structure constructed variable provided by Add Health
10. Race constructed variable provided by Add Health

Communication Variables: *Wave I, Sections 16, 17, 34 and Wave II, Sections 16, 17, 33*

1. How close do you feel to your Mother/ Adoptive Mother/Stepmother/ Foster Mother/ etc.?
2. Which of the things listed on this card have you done with your Mother/ Adoptive Mother/Stepmother/ Foster Mother/ etc. in the past 4 weeks?
    a. Gone shopping
    b. Played a sport
    c. Gone to a religious service or church-related event
    d. Talked to someone you're dating, or a party you went to
    e. Gone to a movie, play, museum, concert, or sports event
    f. Talked about a personal problem you were having

   g. Had a serious Argument about your behavior
   h. Talked about your school work or grades
   i. Worked on a project for school
   j. Talked about other things you're doing in school
   k. None
3. If you had sexual intercourse, your friends would respect you more.
4. How would (your mom) feel about your having sex at this time in your life?
5. How would (your mom) feel about your using birth control at this point in your life?

Outcome Variables: *Wave I, Sections 24, 32 and Wave II, Sections 23, 31*

1. Have you ever had sexual intercourse? When we say sexual intercourse, we mean when a male inserts his penis into a female's vagina.
2. Did you or your partner use any method of birth control the first time you had intercourse?
3. Which method of birth control did you or your partner use the first time you had sexual intercourse? (up to 3 allowed)
   a. Condoms (rubbers)
   b. Withdrawal
   c. Rhythm (safe time)
   d. Birth control pills
   e. Vaginal sponge
   f. Foam, jelly, crème, suppositories
   g. Diaphragm, with or without jelly
   h. IUD (intrauterine device)
   i. Norplant
   j. Ring
   k. Depo Provera
   l. Contraceptive film
   m. Some other method
4. Did you or your partner use any method of birth control when you had sex most recently?
5. Which method of birth control did you or your partner use? (up to 3 allowed)
   a. Condoms (rubbers)
   b. Withdrawal
   c. Rhythm (safe time)
   d. Birth control pills
   e. Vaginal sponge
   f. Foam, jelly, crème, suppositories
   g. Diaphragm, with or without jelly
   h. IUD (intrauterine device)
   i. Norplant
   j. Ring
   k. Depo Provera
   l. Contraceptive film
   m. Some other method
6. Have you ever been told by a doctor or nurse that you had…
   a. Chlamydia

   b. Syphilis
   c. Gonorrhea
   d. HIV or AIDS
   e. Genital Herpes
   f. Genital warts
   g. Trichomoniasis
   h. Hepatitis B
   i. Bacterial Vaginosis
   j. Non-Gonococcal Vaginitis
7. Have you ever been pregnant? Be sure to include if you are currently pregnant and any past pregnancy that ended in abortion, stillbirth, miscarriage, or a live birth after which the baby died.

Appendix B. Sample Description

B.1 Demographic Frequencies

	Parent Incarceration	No Parent Incarceration	Total Sample
		% (unweighted *N*)	
Race			
White	47.4% (339)	62.4% (3,575)	60.8% (3,914)
Black	33.1% (237)	19.4% (1,109)	20.9% (1,346)
Native American	1.8% (13)	1.1% (61)	1.1% (74)
Asian- Pacific Islander	1.8% (13)	5.9% (338)	5.4% (351)
Other	9.8% (70)	6.5% (371)	6.8% (441)
Mixed Race	6.0% (43)	4.8% (272)	4.9% (315)
Family Structure			
Two Biological Parents	21.1% (151)	61.1% (3,501)	56.7% (3,652)
Biological Mother and Non-Biological Father	25.7% (184)	11.6% (666)	13.2% (850)
Biological Father and Non- Biological Mother	2.5% (18)	1.7% (95)	1.8% (113)
Two Stepparents	1.7% (12)	1.8% (102)	1.8% (114)
Single Mother	40.0% (286)	20.8% (1,190)	22.9% (1,476)
Single Father	0% (0)	0.2% (12)	0.2% (12)
Other	9.0% (64)	2.8% (160)	3.5% (224)
Residential Mother's Highest Level of Education			
No School	0.3% (2)	0.1% (7)	0.1% (9)
8^{th} Grade or Less	6.7% (48)	5.7% (329)	5.9% (377)
> 8^{th} Grade but Didn't Graduate High School	17.9% (128)	10.4% (595)	11.2% (723)
Vocational School Instead of High School Degree	1.1% (8)	0.8% (48)	0.9% (56)
GED	8.1% (58)	3.2% (184)	3.8% (242)
High School Graduate	30.3% (217)	29.8% (1,704)	29.8% (1,921)
Business/ Vocational School After High School	6.6% (47)	7.3% (419)	7.2% (466)
Some College/ Did Not Graduate	12.4% (89)	13.4% (770)	13.3% (859)
Graduated 4 Year College	12.6% (90)	20.5% (1,176)	19.7% (1,266)
Professional Training Beyond 4 year college	3.9% (28)	8.6% (494)	8.1% (522)

B.2 Sexual Health Frequencies

	Parent Incarceration	No Parent Incarceration	Total Sample
		% (unweighted *N*)	
Sexually Transmitted Diseases			
Chlamydia	6.8% (29)	5.3% (134)	5.5% (163)
Syphilis	0.5% (2)	0.8% (20)	0.7% (22)
Gonorrhea	3.0% (13)	1.0% (26)	1.3% (39)
HIV or AIDS	0.5% (2)	0.2% (6)	0.3% (8)
Genital Herpes	1.4% (6)	1.0% (25)	1.1% (31)
Genital Warts	3.5% (15)	1.9% (49)	2.2% (64)
Trichomoniasis	2.3% (10)	1.4% (36)	1.6% (46)
Hepatitis B	0.2% (1)	0.5% (13)	0.5% (14)
Bacterial Vaginosis	0.2% (1)	3.1% (79)	3.4% (100)
Non-Gonococcal Vaginitis	0.7% (3)	0.8% (21)	0.8% (24)
Contraceptives			
Condoms	75.2% (321)	80.2% (2,016)	79.5% (2,337)
Withdrawal	20.8% (89)	25.6% (644)	24.9% (733)
Rhythm	4.2% (18)	4.4% (111)	4.4% (129)
Birth Control Pills	26.0% (111)	28.8% (724)	28.4% (835)
Vaginal Sponge	0.9% (4)	0.5% (13)	0.6% (17)
Foam, Jelly, Creme, Suppositories	2.8% (12)	3.9% (98)	3.7% (110)
Diaphragm	0% (0)	0.2% (6)	0.2% (6)
Intrauterine Device	0% (0)	0.3% (7)	0.2% (7)
Norplant	1.6% (7)	0.5% (13)	0.7% (20)
Ring	0.7% (3)	1.0% (24)	0.9% (27)
Depo Provera	12.2% (52)	7.0% (175)	7.7% (227)
Contraceptive Film	1.6% (7)	2.5% (63)	2.4% (70)
Other Method	2.3% (10)	3.4% (86)	3.3% (96)

Appendix C. Regression Diagnostics

C.1 Initial Collinearity Diagnostics

Variable	VIF	Square Root VIF	Tolerance	*R* squared
Control Variables				
Age (Wave 1)	1.19	1.09	0.8411	0.1589
Alcohol Use	1.34	1.16	0.7439	0.2561
Alternative Family Structure	1.13	1.07	0.8816	0.1184
Drug Use	1.28	1.13	0.7828	0.2172
Federal Aid	4.99	2.23	0.2006	0.7994
Minority Status	1.05	1.03	0.9500	0.0500
Residential Mother's Education Level	1.67	1.29	0.5975	0.4025
Communication Variables				
Maternal Closeness	1.52	1.23	0.6567	0.3433
Maternal Approval of Contraceptive Use	1.91	1.38	0.5232	0.4768
Maternal Approval of Sexual Activity	2.63	1.62	0.3797	0.6203
Peer Approval of Sexual Activity	1.07	1.04	0.9303	0.0697
Talked to Mother about a Date or Party	8.17	2.86	0.1223	0.8777
Talked to Mother about a Personal Problem	8.59	2.93	0.1165	0.8835
Key Variable				
Parental Incarceration	1.03	1.02	0.9679	0.0321
	Mean VIF= 2.69			

C.2 Secondary Collinearity Diagnostics

Variable	VIF	Square Root VIF	Tolerance	*R* squared
Control Variables				
Age (Wave 1)	1.18	1.09	0.8447	0.1553
Alcohol Use	1.34	1.16	0.7465	0.2535
Alternative Family Structure	1.13	1.06	0.8831	0.1169
Drug Use	1.28	1.13	0.7841	0.2159
Federal Aid	4.60	2.15	0.2173	0.7827
Minority Status	1.04	1.02	0.9587	0.0413
Residential Mother's Education Level	1.67	1.29	0.5990	0.4010
Communication Variables				
Maternal Closeness	1.51	1.23	0.6612	0.3388
Maternal Approval of Contraceptive Use	1.91	1.38	0.5242	0.4754
Maternal Approval of Sexual Activity	2.62	1.62	0.3815	0.6185
Peer Approval of Sexual Activity	1.07	1.04	0.9324	0.0676
Talked to Mother about a Personal Problem	4.96	2.23	0.2016	0.7984
Key Variable				
Parental Incarceration	1.03	1.02	0.9685	0.0315
	Mean VIF= 1.95			

Appendix D. Presence Versus Absence of Parental Incarceration: Successive Models

D.1 Sexual Activity Hierarchical Regression

Sexual Activity (Weighted *N*= 8,787,460.8)	Model 1	Model 2	Model 3	Model 4
		t (SE)		
Control Variables				
Age (Wave 1)	16.09 (0.05)***	13.60 (0.05)***	13.88 (0.05)***	13.79 (0.05)***
Alcohol Use	11.03 (0.35)***	8.25 (0.29)***	8.15 (0.29)***	8.16 (0.30)***
Alternative Family Structure	6.26 (0.16)***	3.86 (0.13)***	3.08 (0.13)**	3.13 (0.13)**
Drug Use	15.93 (0.43)***	12.93 (0.42)***	12.83 (0.41)***	12.87 (0.41)***
Federal Aid	2.30 (0.17)*	0.99 (0.14)	0.59 (0.14)	0.48 (0.13)
Minority Status	1.85 (0.16)	2.34 (0.17)*	2.19 (0.17)*	2.21 (0.17)*
Residential Mother's Education Level	-4.43 (0.02)***	-4.60 (0.2)***	-4.42 (0.02)***	-4.42 (0.02)***
Communication Variables				
Maternal Closeness		-3.75 (0.04)***	-3.81 (0.04)***	-3.80 (0.04)***
Maternal Approval of Contraceptive Use		9.52 (0.04)***	9.52 (0.04)***	8.54 (0.04)***
Maternal Approval of Sexual Activity		7.22 (0.06)***	7.37 (0.06)***	6.83 (0.06)***
Peer Approval of Sexual Activity		5.93 (0.07)***	5.95 (0.07)***	5.63 (0.07)***
Talked to Mother about a Personal Problem		4.35 (0.13)***	4.31 (0.13)***	4.07 (0.14)***
Key Variable				
Parental Incarceration			3.14 (0.24)**	-1.70 (0.20)
Interaction Terms				
Maternal Closeness X Parental Incarceration				1.78 (0.22)
Maternal Approval of Contraceptives X Parental Incarceration				1.75 (0.12)
Maternal Approval of Sex X Parental Incarceration				0.73 (0.14)
Peer Approval of Sex X Parental Incarceration				0.18 (0.15)
Talked to Mother about a Problem X Parental Incarceration				-0.54 (0.22)
Model Summary	*F*(7, 122) 100.91***	*F*(12, 117) 63.91***	*F*(13, 113) 61.64***	*F*(18, 111) 43.49***
Adjusted Wald		*F*(5, 124) 46.91***	*F*(1, 128) 9.89**	*F*(5, 124) 1.57

*$p \leq .05$. **$p \leq .01$. ***$p \leq .001$.

Note: Higher scores on communication variables indicate greater degrees of the variable assessed (e.g. higher levels of maternal approval or closeness). Parental incarceration variable: no= 0, yes =1.

D.2 Pregnancy Hierarchical Regression

Pregnancy (Weighted *N*= 3,899,443.7)	Model 1	Model 2	Model 3	Model 4
			t (SE)	
Control Variables				
Age (Wave 1)	6.20 (0.04)***	5.27 (0.04)***	5.35 (0.04)***	5.08 (0.05)***
Alcohol Use	-0.88 (0.15)	-1.02 (0.15)	-1.04 (0.15)	-1.27 (0.14)
Alternative Family Structure	2.61 (0.19)**	1.83 (0.17)	1.63 (0.16)	1.64 (0.16)
Drug Use	3.70 (0.24)***	3.65 (0.24)***	3.60 (0.24)***	3.64 (0.24)***
Federal Aid	1.48 (0.25)	1.46 (0.26)	1.26 (0.26)	1.28 (0.26)
Minority Status	4.93 (0.29)***	5.24 (0.30)***	5.23 (0.30)***	5.20 (0.29)***
Residential Mother's Education Level	-3.21 (0.02)**	-3.32 (0.02)***	-3.18 (0.02)**	-3.38 (0.2)***
Communication Variables				
Maternal Closeness		-0.10 (0.08)	-0.11 (0.08)	-0.44 (0.09)
Maternal Approval of Contraceptive Use		5.17 (0.07)***	5.19 (0.07)***	5.29 (0.09)***
Maternal Approval of Sexual Activity		-0.85 (0.06)	-0.83 (0.06)	-0.95 (0.07)
Peer Approval of Sexual Activity		-0.33 (0.08)	-0.34 (0.08)	0.73 (0.10)
Talked to Mother about a Personal Problem		0.15 (0.14)	0.12 (0.14)	-0.77 (0.14)
Key Variable				
Parental Incarceration			1.06 (0.22)	0.61 (1.95)
Interaction Terms				
Maternal Closeness X Parental Incarceration				0.84 (0.25)
Maternal Approval of Contraceptives X Parental Incarceration				-1.79 (0.11)
Maternal Approval of Sex X Parental Incarceration				0.45 (0.20)
Peer Approval of Sex X Parental Incarceration				-2.20 (0.13)*
Talked to Mother about a Problem X Parental Incarceration				2.32 (0.67)*
Model Summary	*F*(7, 122) 13.92***	*F*(12, 117) 11.58***	*F*(13, 116) 10.64***	*F*(18, 111) 7.78***
Adjusted Wald		*F*(5, 124) 6.25***	*F*(1, 128) 1.13	*F*(5, 124) 2.76*

*$p \leq .05$. **$p \leq .01$. ***$p \leq .001$.

Note: Higher scores on communication variables indicate greater degrees of the variable assessed (e.g. higher levels of maternal approval or closeness). Parental incarceration variable: no= 0, yes =1.

D.3 Sexually Transmitted Diseases Hierarchical Regression

Sexually Transmitted Diseases (Weighted *N*= 3,899,443.7)	Model 1	Model 2	Model 3	Model 4
		t (SE)		
Control Variables				
Age (Wave 1)	4.64 (0.08)***	4.41 (0.07)***	4.45 (0.07)***	4.52 (0.07)***
Alcohol Use	0.82 (0.22)	0.58 (0.21)	0.5 5(0.21)	0.61 (0.21)
Alternative Family Structure	1.47 (0.20)	0.92 (0.18)	0.70 (0.17)	0.74 (0.17)
Drug Use	3.78 (0.28)***	3.70 (0.28)***	3.63 (0.28)***	3.72 (0.28)***
Federal Aid	2.27 (0.31)*	1.94 (0.30)*	1.76 (0.29)	1.86 (0.07)
Minority Status	5.75 (0.36)***	5.61 (0.38)***	5.53 (0.38)***	5.44 (0.37)***
Residential Mother's Education Level	-1.06 (0.03)	-1.09 (0.03)	-0.99 (0.03)	-1.14 (0.04)
Communication Variables				
Maternal Closeness		0.66 (0.09)	0.65 (0.09)	1.10 (0.11)
Maternal Approval of Contraceptive Use		2.18 (0.08)*	2.17 (0.08)*	1.63 (0.09)
Maternal Approval of Sexual Activity		1.39 (0.09)	1.40 (0.09)	1.66 (0.10)
Peer Approval of Sexual Activity		1.38 (0.11)	1.36 (0.11)	2.52 (0.13)**
Talked to Mother about a Personal Problem		-0.22 (0.17)	-0.24 (0.17)	-1.19 (0.14)
Key Variable				
Parental Incarceration			0.98 (0.25)	1.98 (11.49)*
Interaction Terms				
Maternal Closeness X Parental Incarceration				-1.28 (0.18)
Maternal Approval of Contraceptives X Parental Incarceration				0.36 (0.16)
Maternal Approval of Sex X Parental Incarceration				-0.80 (0.15)
Peer Approval of Sex X Parental Incarceration				-2.07 (0.15)*
Talked to Mother about a Problem X Parental Incarceration				1.77 (0.91)
Model Summary	*F*(7, 122) 9.68***	*F*(12, 117) 6.58***	*F*(13, 116) 6.39***	*F*(18, 111) 5.22***
Adjusted Wald		*F*(5, 124) 3.93**	*F*(1, 128) 0.95	*F*(5, 124) 2.35*

*$p \leq .05$. **$p \leq .01$. ***$p \leq .001$.

Note: Higher scores on communication variables indicate greater degrees of the variable assessed (e.g. higher levels of maternal approval or closeness). Parental incarceration variable: no= 0, yes =1.

D.4 Three Group Contraceptives Hierarchical Regression

Contraceptives (Weighted *N*= 3,899,443.7)	Model 1		Model 2		Model 3		Model 4	
					t (SE)			
Base Outcome: Reported Contraceptive Use Twice	Never	Once	Never	Once	Never	Once	Never	Once
Control Variables								
Age (Wave 1)	-3.62 (0.05)***	-1.48 (0.04)	-2.96 (0.06)**	-1.19(0.04)	-2.86 (0.06)**	-1.11 (0.04)	-2.85 (0.06)**	-1.14 (0.04)
Alcohol Use	-1.62 (0.20)	0.51 (0.17)	-1.49 (0.20)	0.44 (0.17)	-1.62 (0.20)	0.40 (0.17)	-1.62 (0.20)	0.36 (0.17)
Alternative Family Structure	-0.36 (0.16)	2.82 (0.11)**	0.15 (0.17)	2.82 (0.11)**	-0.39 (0.18)	2.58 (0.11)**	-0.42 (0.17)	2.57 (0.11)**
Drug Use	1.63 (0.17)	1.99 (0.12)*	1.61 (0.17)	1.86 (0.12)	1.56 (0.17)	1.82 (0.12)	1.59 (0.17)	1.79 (0.12)
Federal Aid	-0.41 (0.23)	-0.67 (0.16)	-0.47 (0.23)	-1.00 (0.16)	-0.87 (0.23)	-1.16 (0.16)	-0.92 (0.23)	-1.25 (0.16)
Minority Status	2.44 (0.15)**	0.53 (0.13)	2.08 (0.15)*	0.27 (0.13)	1.79 (0.16)	0.18 (0.13)	1.77 (0.16)	0.21 (0.13)
Residential Mother's Education Level	-1.18 (0.03)	-2.39 (0.03)**	-1.12 (0.03)	-2.21 (0.03)*	-0.86 (0.03)	-2.11 (0.03)*	-0.80 (0.03)	-2.03 (0.03)*
Communication Variables								
Maternal Closeness			-1.14 (0.08)	-1.06 (0.07)	-1.18 (0.08)	-1.07 (0.07)	-1.63 (0.09)	-1.70 (0.07)
Maternal Approval of Contraceptive Use			-2.31 (0.07)*	-1.50 (0.05)	-2.36 (0.07)*	-1.52 (0.05)	-2.35 (0.08)*	-1.47(0.06)
Maternal Approval of Sexual Activity			0.01 (0.08)	1.63 (0.06)	0.04 (0.08)	1.63 (0.06)	0.09 (0.09)	1.48 (0.06)
Peer Approval of Sexual Activity			1.69 (0.09)	2.72 (0.06)**	1.71 (0.09)	2.73 (0.06)	1.23 (0.10)	2.00 (0.06)*
Talked to Mother about a Personal Problem			-1.66 (0.14)	-0.65 (0.13)	-1.74 (0.14)	-0.69 (0.13)	-1.04 (0.16)	-0.45 (0.13)
Key Variable								
Parental Incarceration					2.35 (0.24)*	1.20 (0.17)	-1.34 (1.10)	-2.36 (0.96)*
Interaction Terms								
Maternal Closeness X Parental Incarceration							2.06 (0.19)*	2.13 (0.20)*
Maternal Approval of Contraceptives X Parental Incarceration							0.66 (0.15)	0.39 (0.13)
Maternal Approval of Sex X Parental Incarceration							0.06 (0.22)	0.33 (0.15)
Peer Approval of Sex X Parental Incarceration							0.64 (0.22)	1.36 (0.16)
Talked to Mother about a Problem X Parental Incarceration							-1.20 (0.40)	-0.57 (0.36)
Model Summary	*F*(14, 115) 3.44***		*F*(24, 105) 3.29***		*F*(26, 103) 3.17***		*F*(36, 93) 2.47***	
Adjusted Wald			*F*(10, 119) 2.90**		*F*(2, 127) 2.77		*F*(10, 119) 0.92	

*$p \leq .05$. **$p \leq .01$. ***$p \leq .001$.

Note: Higher scores on communication variables indicate greater degrees of the variable assessed (e.g. higher levels of maternal approval or closeness). Parental incarceration variable: no= 0, yes =1.

Appendix E. Maternal Versus Paternal Incarceration: Successive Models

E.1 Sexual Activity Hierarchical Regression

Sexual Activity (Weighted *N*= 778, 478.27)	Model 1	Model 2	Model 3	Model 4
		t (SE)		
Control Variables				
Age (Wave 1)	6.33 (0.15)***	4.67 (0.15)***	4.42 (0.15)***	4.34 (0.15)***
Alcohol Use	5.38 (1.20)***	4.73 (1.48)***	4.93 (1.51)***	4.79 (1.46)***
Alternative Family Structure	1.74 (0.69)	0.80 (0.56)	0.57 (0.51)	0.64 (0.51)
Drug Use	5.13 (1.11)***	4.25 (1.01)***	4.35 (1.05)***	4.34 (1.05)***
Federal Aid	0.77 (0.37)	-0.01 (0.29)	0.08 (0.30)	-0.10 (0.29)
Minority Status	0.57 (0.35)	0.99 (0.42)	0.93 (0.41)	0.77 (0.40)
Residential Mother's Education Level	-3.66 (0.05)***	-4.33 (0.05)***	-4.38 (0.05)***	-4.22 (0.05)***
Communication Variables				
Maternal Closeness		0.99 (0.23)	1.13 (0.23)	1.11 (0.25)
Maternal Approval of Contraceptive Use		4.79 (0.19)***	4.83 (0.20)***	4.22 (0.20)***
Maternal Approval of Sexual Activity		2.03 (0.19)*	2.12 (0.20)*	2.37 (0.21)*
Peer Approval of Sexual Activity		2.14 (0.21)*	1.96 (0.21)*	1.71 (0.22)
Talked to Mother about a Personal Problem		0.51 (0.32)	0.46 (0.32)	0.16 (0.30)
Key Variable				
Maternal vs. Paternal Incarceration			2.49 (1.60)**	-0.07 (2.13)
Interaction Terms				
Maternal Closeness X Parental Incarceration				-0.75 (0.35)
Maternal Approval of Contraceptives X Parental Incarceration				2.20 (0.88)*
Maternal Approval of Sex X Parental Incarceration				-1.20 (0.28)
Peer Approval of Sex X Parental Incarceration				0.95 (1.16)
Talked to Mother about a Problem X Parental Incarceration				1.27 (7.35)
Model Summary	*F*(7, 122) 18.45***	*F*(12, 117) 10.28***	*F*(13, 116) 10.11***	*F*(18, 111) 8.32***
Adjusted Wald		*F*(5, 124) 8.46***	*F*(1, 128) 6.22**	*F*(5, 124) 1.28

*$p \leq .05$. **$p \leq .01$. ***$p \leq .001$.

Note: Higher scores on communication variables indicate greater degrees of the variable assessed (e.g. higher levels of maternal approval or closeness). Parental incarceration variable: no= 0, yes =1.

E.2 Contraceptives Hierarchical Regression

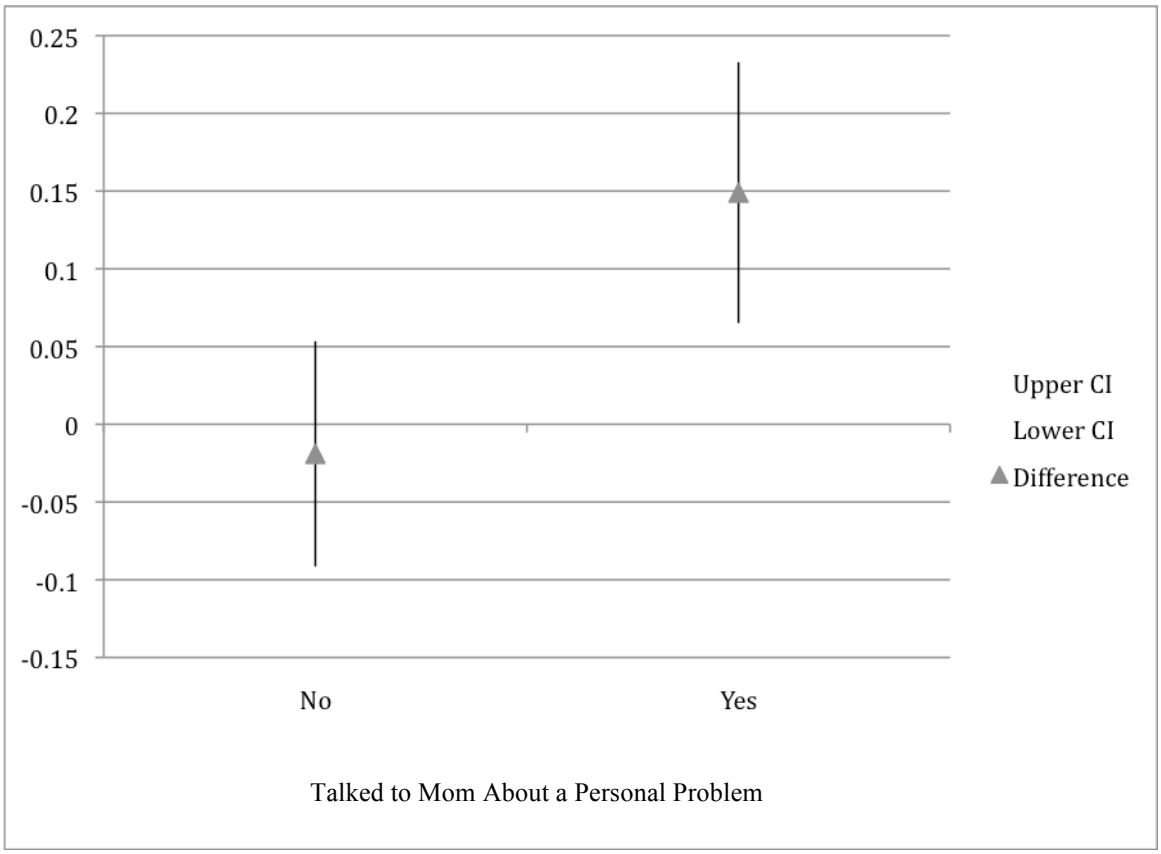
Contraceptives (Weighted *N*= 463, 971.53)	Model 1		Model 2		Model 3		Model 4	
					t (SE)			
Base Outcome: Reported Contraceptive Use Twice	Never	Once	Never	Once	Never	Once	Never	Once
Control Variables								
Age (Wave 1)	0.16 (0.12)	0.78 (0.12)	0.47 (0.13)	0.91 (0.13)	0.50 (0.12)	0.91 (0.13)	0.62 (0.12)	1.04 (0.13)
Alcohol Use	-0.74 (0.51)	0.28 (0.49)	-0.51 (0.51)	0.35 (0.44)	-0.50 (0.52)	0.34 (0.44)	-0.39 (0.51)	0.37 (0.46)
Alternative Family Structure	-0.45 (0.41)	0.63 (0.36)	-0.40 (0.45)	0.28 (0.38)	-0.37 (0.44)	0.29 (0.37)	-0.52 (0.44)	0.18 (0.36)
Drug Use	-0.51 (0.38)	0.61 (0.31)	-0.46 (0.38)	0.76 (0.32)	-0.49 (0.38)	0.76 (0.31)	-0.41 (0.40)	0.86 (0.33)
Federal Aid	0.16 (0.46)	0.58 (0.40)	0.08 (0.48)	0.41 (0.39)	0.16 (0.48)	0.42 (0.39)	-0.00 (0.51)	0.23 (0.40)
Minority Status	-1.63 (0.38)	0.25 (0.32)	-2.06 (0.38)*	0.07 (0.34)	-2.07 (0.37)*	0.07 (0.34)	-2.25 (0.40)*	0.04 (0.33)
Residential Mother's Education Level	-0.81 (0.09)	-0.61 (0.07)	-0.65 (0.09)	-0.26 (0.08)	-0.53 (0.09)	-0.26 (0.07)	-0.41 (0.09)	-0.24 (0.08)
Communication Variables								
Maternal Closeness			0.67 (0.17)	1.60 (0.21)	0.63 (0.16)	1.60 (0.22)	0.23 (0.17)	1.29 (0.22)
Maternal Approval of Contraceptive Use			-0.20 (0.16)	0.35 (0.14)	-0.15 (0.16)	0.36 (0.14)	-0.62 (0.16)	0.14 (0.15)
Maternal Approval of Sexual Activity			-0.67 (0.22)	-0.2 5(0.16)	-0.77 (0.22)	-0.26 (0.17)	-0.73 (0.23)	-0.30 (0.17)
Peer Approval of Sexual Activity			2.02 (0.21)*	2.32 (0.18)	2.07 (0.22)*	2.31 (0.19)*	1.73 (0.26)	1.39 (0.20)
Talked to Mother about a Personal Problem			-1.89 (0.39)	-1.29 (0.39)	-1.79 (0.39)	-1.31 (0.38)	-1.68 (0.44)	-1.77 (0.41)
Key Variable								
Maternal vs. Paternal Incarceration					-1.16 (0.68)	-0.23 (0.45)	-1.97 (5.17)*	-2.06 (2.99)*
Interaction Terms								
Maternal Closeness X Parental Incarceration							1.12 (0.92)	0.68 (0.50)
Maternal Approval of Contraceptives X Parental Incarceration							1.55 (0.88)	0.91 (0.49)
Mom Approval of Sex X Parental Incarceration							-0.34 (0.77)	0.14 (0.64)
Peer Approval of Sex X Parental Incarceration							-0.03 (0.69)	1.57 (0.53)
Talked to Mother about a Problem X Parental Incarceration							-0.01 (1.21)	0.88 (1.07)
Model Summary	*F*(14, 115) 0.81		*F*(24, 105) 1.56		*F*(26, 103) 1.40		*F*(36, 93) 1.44	
Adjusted Wald			*F*(10, 119) 1.23		*F*(2, 127) 0.69		*F*(10, 119) 1.25	

*$p \leq .05$. **$p \leq .01$. ***$p \leq .001$.

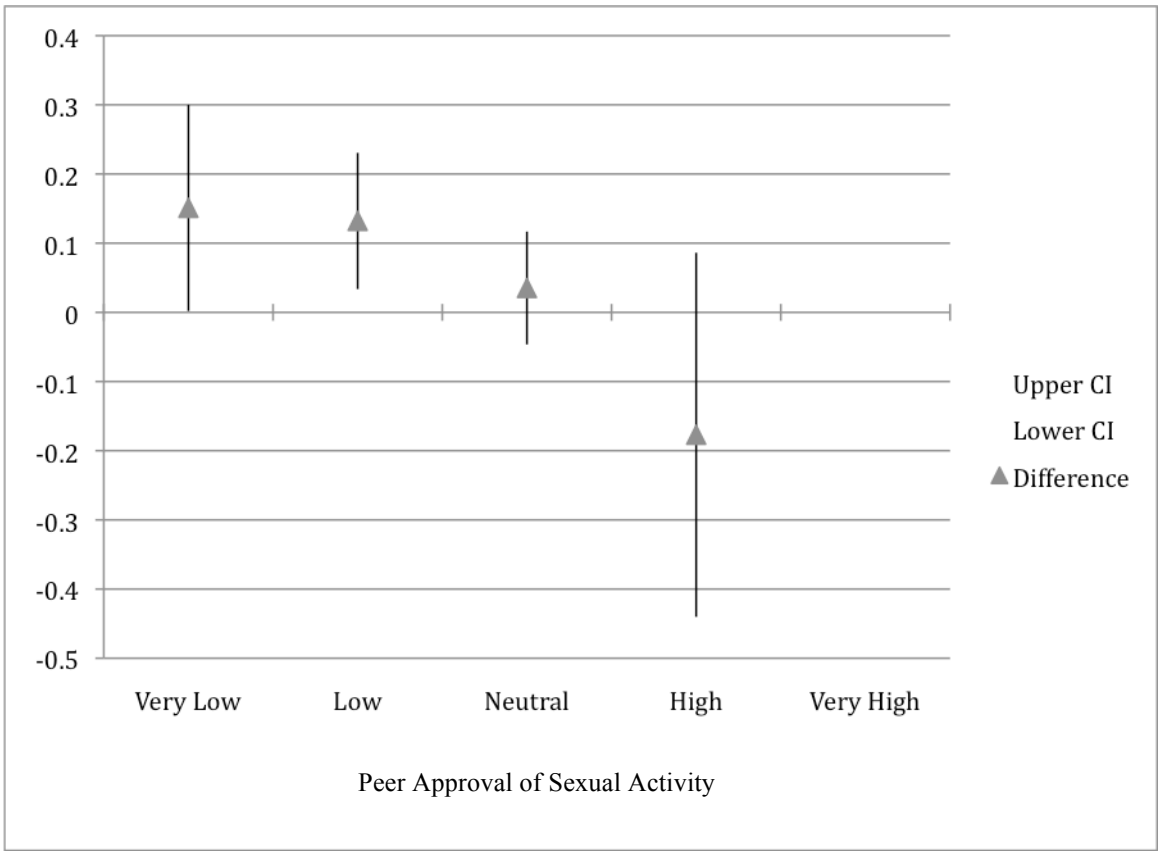
Note: Higher scores on communication variables indicate greater degrees of the variable assessed (e.g. higher levels of maternal approval or closeness). Parental incarceration variable: no= 0, yes= 1.

Appendix F. Investigation of Significant Interactions

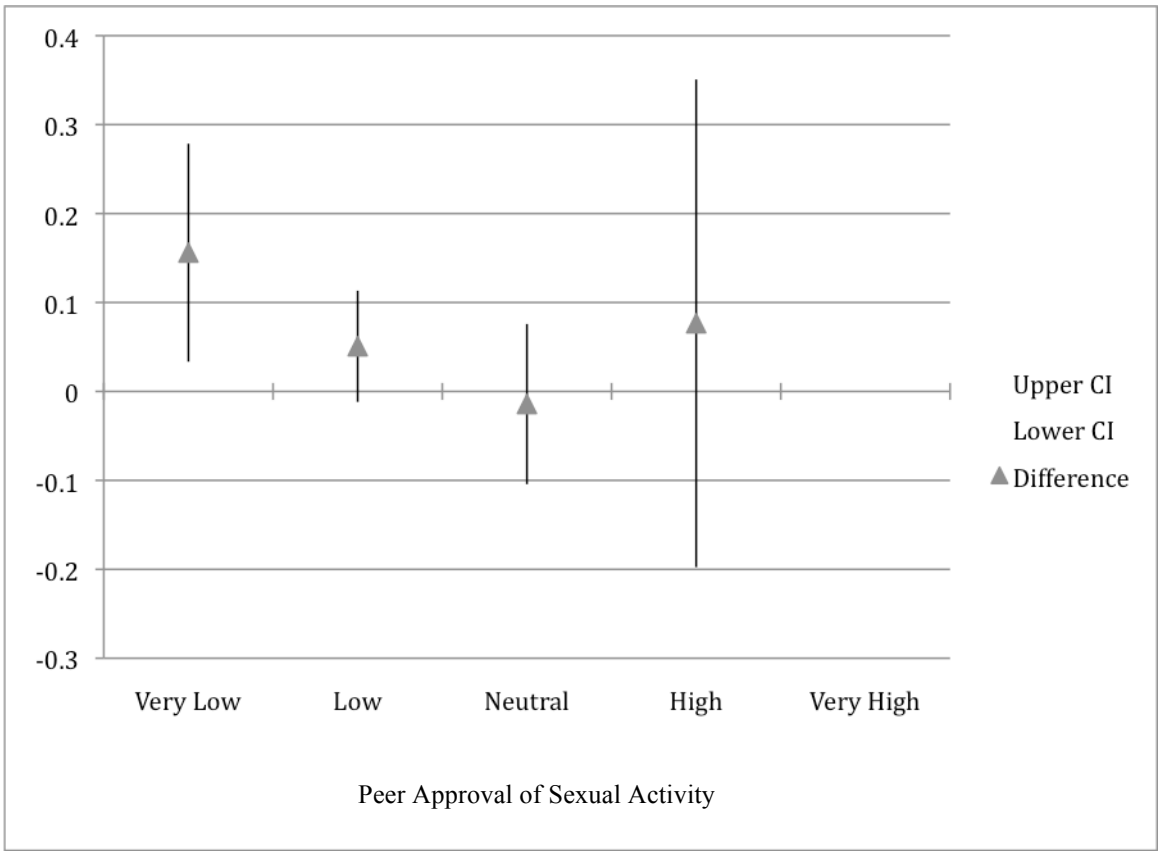
F.1 Talking to Mother about a Problem X Parental Incarceration Interaction for the Outcome of Pregnancy



F.2 Peer Approval of Sexual Activity X Parental Incarceration Interaction for the Outcome of Pregnancy



F.3 Peer Approval of Sexual Activity X Parental Incarceration Interaction for the Outcome of Sexually Transmitted Diseases



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Dear Dr. Loper,

The intent of this letter is to document Mathilde Logan Whalen's contributions to the manuscript *From one generation to the next: Childhood experiences of antisocial behavior and parental incarceration among adult inmates*. This manuscript has been submitted for publication and is currently under review. As the second author, Logan maintained an essential role in the project and manuscript preparation. She made substantial contributions to the writing of the methods and discussions section, including sections on how our results could be understood from the various theoretical approaches of attachment, social control, and strain theory. Throughout the manuscript preparation process, she provided insight and edits to the manuscript. Logan was integral to the success of the project and manuscript preparation. Please feel free to contact me with any questions or concerns.

Sincerely,

Joanna Will, M.Ed.

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