

Children's Antisocial Behavior, Mental Health, Drug Use, and Educational Performance After Parental Incarceration: A Systematic Review and Meta-Analysis

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Unprecedented numbers of children experience parental incarceration worldwide. Families and children of prisoners can experience multiple difficulties after parental incarceration, including traumatic separation, loneliness, stigma, confused explanations to children, unstable childcare arrangements, strained parenting, reduced income, and home, school, and neighborhood moves. Children of incarcerated parents often have multiple, stressful life events before parental incarceration. Theoretically, children with incarcerated parents may be at risk for a range of adverse behavioral outcomes. A systematic review was conducted to synthesize empirical evidence on associations between parental incarceration and children's later antisocial behavior, mental health problems, drug use, and educational performance. Results from 40 studies (including 7,374 children with incarcerated parents and 37,325 comparison children in 50 samples) were pooled in a meta-analysis. The most rigorous studies showed that parental incarceration is associated with higher risk for children's antisocial behavior, but not for mental health problems, drug use, or poor educational performance. Studies that controlled for parental criminality or children's antisocial behavior before parental incarceration had a pooled effect size of $OR = 1.4$ ($p < .01$), corresponding to about 10% increased risk for antisocial behavior among children with incarcerated parents, compared with peers. Effect sizes did not decrease with number of covariates controlled. However, the methodological quality of many studies was poor. More rigorous tests of the causal effects of parental incarceration are needed, using randomized designs and prospective longitudinal studies. Criminal justice reforms and national support systems might be needed to prevent harmful consequences of parental incarceration for children.

Keywords: parental incarceration, antisocial behavior, mental health, drug use, education

With prison populations growing rapidly in many countries worldwide (Walmsley, 2009), effects of incarceration on prisoners' well-being, health, and behavior have become urgent social concerns (Liebling & Maruna, 2005; Tonry & Petersilia, 1999). Equally important are possible far-reaching effects of incarceration beyond prison walls, on recidivism, employment opportunities for ex-prisoners, and on families and communities (Clear, 2007; Hagan & Dinovitzer, 1999; Murray, 2005; Murray & Farrington, 2008a; Walker, 1983). Children with incarcerated parents have been referred to as the "forgotten victims" of crime (Matthews,

1983), the "orphans of justice" (Shaw, 1992a) and the "unseen victims of the prison boom" (Petersilia, 2005, p. 34). They can experience multiple emotional and social difficulties during their parent's incarceration, which may develop into a range of adjustment problems in the long term. This article describes key aspects of children's experiences during parental incarceration and reports results from a systematic review and meta-analysis on the associations between parental incarceration and children's later antisocial behavior, mental health problems, drug use, and low educational performance.

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More parents than ever are behind bars. The United States has the largest prison population in the world, as well as the highest rate of imprisonment (756 per 100,000; Walmsley, 2009). The country's adult prison population was 1.5 million in 2009, and its adult jail population was 760,000 (Glaze, 2010). About half of U.S. prisoners are parents of children under age 18 years (Glaze & Maruschak, 2008). As shown in Figure 1, the number of children with a parent in state or federal prison increased from 950,000 in 1991 to 1.7 million in 2007, reaching 2.3% of the nation's children (Glaze & Maruschak, 2008). Estimates suggest that cumulatively, one in 25 White children and a staggering one in four Black children born in 1990 had experienced parental imprisonment by their 14th birthday (Wildeman, 2009). Less is known about how many children experience parental incarceration in other countries, but provisional estimates suggest that the numbers are substantial (Murray & Farrington, 2008a). Thus, given potential harm to literally millions of children, and the need to rationally appraise overall costs and benefits of incarcerating offenders, it is important to investigate possible effects of parental incarceration on children.

Several recent studies suggest possible long-term undesirable effects of parental incarceration on children. In an English study of 411 boys, those who experienced parental incarceration in their first 10 years of life had about double the risk for antisocial behavior, internalizing problems, and other adverse outcomes up to age 48 years, compared with boys without incarcerated parents (Murray & Farrington, 2005, 2008a, 2008b). Several comparison groups were used in this study: boys never separated from their parents, boys separated from their parents for other reasons (primarily parental divorce and death), and boys whose parents had been incarcerated before the boy's birth but not afterward. Associations with boys' adverse outcomes remained in these comparisons even after controlling for other risk factors in boys' childhoods, including parental criminal behavior. In the National Longitudinal Study of Youth, 1979, in the United States, maternal incarceration (compared with no maternal incarceration) was also associated with offspring criminal behavior in adulthood (Huebner

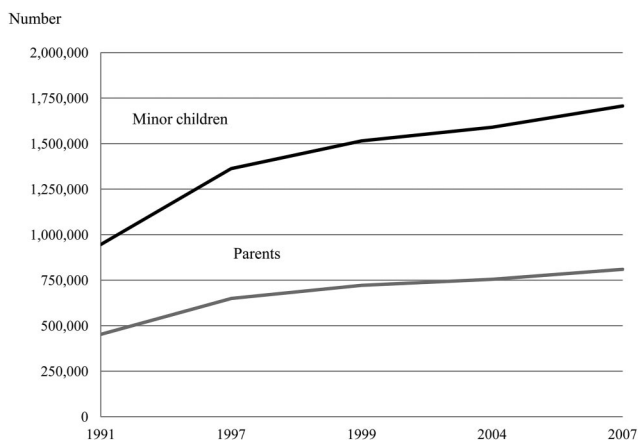


Figure 1. Estimated number of parents in U.S. state and federal prisons and their minor children. Data downloaded from <http://bjs.ojp.usdoj.gov/index.cfm?ty=pbdetail&iid=823>. From *Bureau of Justice Statistics Special Report: Parents in Prison and Their Minor Children*, by L. E. Glaze and L. M. Maruschak, 2008, Washington, DC: Bureau of Justice Statistics. Copyright 2008 by Bureau of Justice Statistics. Reprinted with permission.

& Gustafson, 2007). However, in an Australian longitudinal study (Kinner, Alati, Najman, & Williams, 2007), it was concluded that the risk for antisocial behavior and mental health problems was not higher for children with incarcerated fathers (compared with children without incarcerated fathers), after controlling for other childhood risk factors (see also, Murray, Janson, & Farrington, 2007, for similar results in Sweden).

Narrative reviews of these and other studies have drawn contrasting conclusions about the association between parental incarceration and children's adverse outcomes. Some suggest that the risks for children appear fairly strong (Murray, 2010; Murray & Farrington, 2008a). Others claim that there is no specific risk to children imparted by parental incarceration (Eddy & Reid, 2003) or that adequate tests are lacking (Hagan & Dinovitzer, 1999).

In the only meta-analysis on this topic to date, Murray, Farrington, Sekol, and Olsen (2009) reported quite large bivariate associations between parental incarceration and children's antisocial behavior ($OR = 2.5$ in random effects model) and mental health problems ($OR = 1.9$ in random effects model) in 16 studies. When covariates were controlled, these effect sizes were only slightly reduced. However, without a larger number of primary studies, other outcomes (such as drug use and educational performance) could not be examined, and statistical power was low, especially for examining variation in study results. The current article updates and extends this preliminary analysis in four principal ways: (a) As well as children's antisocial behavior and mental health, this review examines drug use and educational performance as child outcomes after parental incarceration; (b) a broader range of studies are included in the current meta-analysis: for example, studies comparing children with incarcerated parents and children separated from parents for other reasons are included in the current review but were not included in the previous meta-analysis; (c) the search for eligible studies was updated and extended in February 2011, resulting in many more primary studies for analyses; and (d) important questions that were not investigated in the previous review are examined in the current meta-analysis: for example, whether the effects of parental incarceration in the United States have declined over time (while incarceration rates have risen). Thus, this new meta-analysis, including 50 samples from 40 studies, provides the most comprehensive review on child outcomes after parental incarceration to date.

Definitions

We use the term *parental incarceration* to refer to any kind of custodial confinement of a parent by the criminal justice system, except being held overnight in police cells. Incarceration can refer to confinement in jails or prisons (e.g., in the United States, at the state or federal level). We do not examine the effects on children of parents being held as a prisoner of war (e.g., McCubbin, Dahl, Lester, & Ross, 1977; Najafi, Akochkian, & Nikyar, 2007), nor do we examine studies that investigated incarceration of "any household member" (e.g., Ramiro, Madrid, & Brown, 2010), as opposed to incarceration of a parent figure (biological or acting father or mother).

By *children's outcomes* we mean outcomes for children with incarcerated parents, not outcomes that necessarily happen in childhood. Outcomes might have occurred and been measured any time after parental incarceration first happened: while parents are in prison or after release, in childhood or in adulthood. It is important to

investigate a range of children's outcomes that might be affected by parental incarceration in order to specify and delimit its effects (Aneshensel, Rutter, & Lachenbruch, 1991). Children's antisocial behavior, mental health problems, drug use, and educational performance were chosen as outcomes for this meta-analysis because narrative reviews suggested that these outcomes have been studied most frequently, and because of theories predicting that parental incarceration will have adverse effects on these outcomes (Murray & Farrington, 2008a).

Antisocial behavior refers to a wide variety of behaviors that violate societal norms or laws (Rutter, Giller, & Hagell, 1998). We examine children's antisocial behavior (also called externalizing behavior) that does not necessarily involve crime, for example, persistent lying and deceit, as well as criminal behavior, as measured by self-reports, arrests, convictions, or incarceration of the child. In this review, *mental health problems* mainly refers to internalizing problems, such as anxiety and depression (Goldberg & Goodyer, 2005). However, we also include results from studies examining general mental disorder, which consists of other mental health problems as well as internalizing problems. A previous review, based on a smaller number of studies, included neuroticism and poor self-concept as mental health outcomes to try to increase statistical power (e.g., Murray, Farrington, Sekol, & Olsen, 2009). We do not include these outcomes in the current review because they are not clearly measures of mental health problems, and with more studies in this review, power is not such an issue.

We examine *drug use* in terms of illicit drugs. Studies that only measured alcohol or tobacco use were not included in the review. However, studies that used combined measures of illicit drug use and other forms of substance use were included. *Educational performance* refers to children's academic performance as measured through school grades and teachers', parents', and children's ratings of children's academic performance. Because not many studies reported results for children's school performance, we included results from studies that used standardized tests of children's cognitive ability, as well as studies using school performance test scores.

Circumstances in Which Parental Incarceration Takes Place

Children experience parental incarceration under different circumstances, and their reactions to the event might vary according to which parent is incarcerated, prior living arrangements, the quality of parent-child relationships before the incarceration, the child's age at the time of incarceration, the nature and length of the sentence, alternative care arrangements, contact with the incarcerated parent, how other family members cope with the event, and the wider social context (Hagan & Dinovitzer, 1999; E. I. Johnson & Waldfogel, 2004; Murray & Farrington, 2008a; Parke & Clarke-Stewart, 2003). This variation is important to bear in mind when considering *average* outcomes observed for children with incarcerated parents in large-scale studies and in meta-analyses. Below, we describe what is known about some of the different circumstances under which parents are incarcerated, based on results from national surveys of state and federal inmates in the United States, as reported in Glaze and Maruschak (2008), unless cited otherwise.

Among minor children with parents in U.S. state prisons in 2004, 22% were aged 4 years or younger, 30% were 5–9 years, 32% were 10–14 years, and 16% were 15–17 years (Glaze & Maruschak, 2008). More than one third was expected to reach 18 years of age while their parent was incarcerated. The vast majority of children with an incarcerated parent had a father in prison (91%). However, between 1991 and 2007, the number of children with mothers in prison more than doubled, up 131%, whereas the number of children with a father in prison grew by 77%.

In 2004, 57% of parents in state prison had a mental health problem, and 67% had a substance dependence or abuse problem (Glaze & Maruschak, 2008). The most common current offense for inmate mothers was a drug offense (35%), and the most common offense for inmate fathers was a violent offense (45%; E. I. Johnson & Waldfogel, 2002). Most inmate fathers (67%) and mothers (53%) had been incarcerated previously at least once (E. I. Johnson & Waldfogel, 2002).

Among state inmates, mothers (61%) were more likely than fathers (42%) to have been living with at least one of their children immediately before the incarceration (Glaze & Maruschak, 2008). Mothers were almost three times more likely (77%) than fathers (26%) to have provided most of the daily child care before incarceration, although nearly two thirds (63%) of fathers reported having shared the daily care. About half of imprisoned mothers and fathers provided the primary financial support for their children before incarceration (Glaze & Maruschak, 2008).

Incarcerated mothers (37%) were much less likely than fathers (88%) to report that their child was currently cared for by the other parent (Glaze & Maruschak, 2008). Incarcerated mothers were more likely to report that other people were looking after their children: grandparents (45% mothers, 13% fathers), other relatives (23% mothers, 5% fathers), foster homes or agencies (11% mothers, 2% fathers), and friends or others (8% mothers, 2% fathers).

Seventy percent of parents in state prison reported exchanging letters with their children during incarceration; 53% had spoken with their children on the telephone, and 42% had had a personal visit since incarceration (this refers to contact with any child, of any age, Glaze & Maruschak, 2008). Incarcerated mothers were more likely (56%) than incarcerated fathers (39%) to report at least weekly contact with their children.

In summary, national surveys of incarcerated parents in the United States show that the circumstances under which children experience parental incarceration vary a great deal. There may be significant variation in the effects of parental incarceration on children across these different situations, and investigation of how context matters is important. Potentially important differences exist between children whose mothers and fathers are incarcerated in terms of their living arrangements before the incarceration, offences for which their parents are incarcerated, alternative care arrangements during parental incarceration, and possibilities for contact with incarcerated parents. Probably, there are many other contextual factors that influence how children react to parental incarceration that have not been documented in the large-scale prisoner surveys reviewed above. For example, the quality of care given to children, levels of social support, family economic resources, and maybe even national penal and social contexts may moderate how parental incarceration impacts on children.

Children's Experiences of Parental Incarceration

Many studies of children with incarcerated parents are based on small samples and qualitative methods, providing in-depth descriptions of children's various experiences during parental incarceration (Bocknek, Sanderson, & Britner, 2009; Boswell, 2002; Braman, 2004; Henriques, 1982; Kampfner, 1995; Nesmith & Ruhland, 2008; Pellegrini, 1996; Poehlmann, 2005; Richards et al., 1994; Sack, 1977; Sack, Seidler, & Thomas, 1976; Sharp, Marcus-Mendoza, Bentley, Simpson, & Love, 1997/1998; Skinner & Swartz, 1989). These studies have documented many practical and emotional difficulties that can affect families and children of prisoners from arrest onward and provided an important starting point for understanding possible effects of parental incarceration on children.

Even before parental incarceration takes place, the arrest of a parent can cause children to feel shocked, bewildered, and scared (Fishman, 1983; Nijnatten, 1998; Richards et al., 1994). Arrest often occurs at night or in the early morning, when people are likely to be at home with their families (Braman, 2004). The experience can be unexpected and sometimes involve witnessing violence. An incarcerated mother in an English study described how, at the arrest, "the front and back door were crashed in simultaneously. The house was full of policemen with hammers looking for drugs. It was very frightening, my son was hysterical" (Richards et al., 1994, p. 54). In a survey of 192 incarcerated parents in Arkansas, 40% of parents reported that their children had been present at the arrest (Harm & Phillips, 1998). In 27% of those cases, weapons were drawn. Law enforcement officers explained why they were arresting the parent to just 20% of the children. Handcuffing the parent was postponed until parents were out of children's sight in only 3% of fathers' arrests and 30% of mothers' arrests. In Kampfner's (1995) study of 36 children with incarcerated mothers, many children had symptoms of posttraumatic stress disorder, including flashbacks of their mother's arrest (see also, Phillips & Zhao, 2010).

Following parental arrest, trial in court can be highly anxiety provoking for families and children. Uncertainty about the outcome of the trial means that families cannot plan concretely for their future (Fishman, 1983). Children cannot be assured of their parent's availability, and they may not understand court processes relating to their parent's trial, leaving them more bewildered by the events that surround them. During the trial, family members often hope for the best, which means that they may react to a custodial sentence with shock and disbelief (Fishman, 1983). Often, alternative care arrangements have not been made for children in advance (Richards et al., 1994).

When parents are incarcerated, families can experience multiple difficulties that might in turn lead to long-lasting maladjustment for children. One potential source of difficulty for families of prisoners is social stigma (Braman, 2004, p. 173; Condry, 2007). In some cases, the stigma of a relative's incarceration can lead to isolation, peer hostility, and rejection (Nesmith & Ruhland, 2008). For example, one boy with a father in prison described how "they bully me, say nasty things. I don't let them know I care, but sometimes I cry on the way home. The teachers don't know my Dad's in prison and I don't want to tell them" (Boswell, 2002, p. 19). The stigma associated with having a family member in prison is likely to explain why some families keep the incarceration secret from friends, neighbors, and work colleagues (Braman, 2004), which can push children into a

"forced silence" about their situation, making it even more difficult for them to receive support (Arditti, 2005; Myers, Smarsh, Amlund-Hagen, & Kennon, 1999, p. 20).

A related difficulty for some children is that often they are not given honest and developmentally sensitive explanations about the whereabouts of their incarcerated parent. In Morris's (1965) classic study of 469 wives of English prisoners, 38% said that the children did not know that their father was in prison. In Sack and Seidler's (1978) study in the United States, and in Shaw's (1987, 1992a) English study, about one third of children were told lies about the whereabouts of their incarcerated father, one third were told a fudged truth, and one third were told the whole truth. When children are confused or deceived (even with good intention), children may not be able to understand why their parent is missing, and their absence may be more difficult to cope with (Bocknek et al., 2009; Bretherton, 1997; Kobak, 1999). In a study of 54 children aged 2–7 years, those who were given emotionally open and developmentally appropriate information about their incarcerated mother's absence were more likely to have secure attachment representations of their current caregivers than were other children (but they were not more likely to have secure attachment representations of their incarcerated mothers, Poehlmann, 2005).

A third source of difficulty that children can experience during parental incarceration is lack of dependable and intimate contact with their incarcerated parent. Although most incarcerated parents have some contact with their children, in the United States, telephone communication can be limited by the high costs of collect calls. Many families have their phones disconnected within 2 months of incarceration because of these costs (Braman, 2004). Visits can also be limited because of long distance and costly travel, because visiting times can overlap with school hours, and because sometimes incarcerated parents need documented proof of parenthood for the visit to take place (Hairston, 1998; Murray, 2005, 2007). Some children cannot visit their incarcerated parent because they have no adult who will accompany them. Children's caregivers might not want to visit the person in prison, or they might think that children would be adversely affected by visiting their incarcerated parent (Arditti, Smock, & Parkman, 2005; Nesmith & Ruhland, 2008).

Moreover, prisons are generally not child-friendly places to visit, and children can find visitation distressing (Hairston, 1998; Nesmith & Ruhland, 2008; Richards et al., 1994). Typically, children wait for 30–60 min in a visitation area with little to do before being called for a 20 min visit in a crowded, noisy room (Arditti, 2005). To enter the visitation area, children might have to pass through a locked door, pass a metal detector, be sniffed by dogs, and sometimes be searched. Children can be scared of these procedures and the officers who enforce them. One female prisoner reported, "[the officers] are very insensitive to what kids go through and what it means to kids. They don't understand how threatening they are with their uniforms and such. My daughter is very intimidated by officers" (Richards et al., 1994, p. 34). In many prisons, inmates are restricted to their seat (bolted to the floor) during visitation, and sometimes physical contact between prisoners and visitors is prohibited. Although visitation conditions vary by prison and jurisdiction (Robertson, 2007), it seems that normal visitation environments do not facilitate the close contact that could reassure children of parental availability. In fact, in Poehlmann's (2005) study, it appeared that young children who

visited their mother in prison had less secure attachment representations of their mother than children who did not visit (see also, Poehlmann, Dallaire, Loper, & Shear, 2010).

A fourth difficulty for children during parental incarceration can be changes in caregiving arrangements and reduced quality of care (Kjellstrand & Eddy, 2011a, 2011b). Prisoners' partners can be left depressed, overworked, lonely, and struggling under the burdens of providing childcare and providing support for an incarcerated partner (Morris, 1965; Richards et al., 1994). Thus, supervision of children and attention to their needs might be impaired by the considerable stress that caregivers can experience during parental incarceration. Effects of strained caregiving on children can be exacerbated by loss of family income and home, school, and neighborhood moves after parental incarceration (Bocknek et al., 2009; Murray, 2005; Sharp et al., 1997/1998).

Families and children can also experience further difficulties when ex-prisoners return to the community. They may have adapted to new roles while their relative was inside (McDermott & King, 1992; Morris, 1965), and ex-prisoners themselves face significant barriers to successful reintegration, which may impose further burdens on the family. From the early 1990s, there has been large-scale cut-backs in prison vocational and education programs in the United States, as well as reduced parole supervision, which means that inmates are left more idle in prison and have fewer prospects for employment on release (Petersilia, 2003). These problems are exacerbated by stigma that reduces ex-prisoners' chances of finding and keeping employment and housing (Pager, Western, & Suggie, 2009; Petersilia, 2003; Uggen, Wakefield, & Western, 2005). Thus, when incarcerated parents return to the community, they may struggle to provide positive support for their families and children.

In summary, parental arrest, trial, incarceration, and return home can cause multiple difficulties for families and children. Accordingly, it has been theorized that parental incarceration might have long-lasting harmful effects on children's adjustment (for reviews, see Hagan & Dinovitzer, 1999; Murray & Farrington, 2008a). The principal mechanisms that have been considered are attachment relations regarding parent-child separation and quality of care (Murray & Murray, 2010; Poehlmann, 2010), social and economic strain in relation to reduced family income and loss of other kinds of social capital (Geller, Garfinkel, & Western, 2011; Hagan & Dinovitzer, 1999), social learning mechanisms in relation to reduced parental monitoring and involvement, changes in discipline (Kjellstrand & Eddy, 2011a), and stigma and labeling processes (Murray, 2007). However, each mechanism is only likely to operate under certain circumstances: for example, attachment disruption will only occur if the child has already formed secure attachment relations with the parent before they were incarcerated, which may not be the case if parents were minimally involved in children's lives. It has also been pointed out that in some instances, there might even be beneficial effects for children when a parent is incarcerated if the parent has been particularly antisocial, violent, or disruptive in the home (Cunningham & Baker, 2003, p. 12; Eddy & Reid, 2003, p. 241; Hagan & Dinovitzer, 1999, p. 125; Wildeman, 2010).

Lessons Learned From Research on Children's Adjustment to Parental Divorce

Research on the effects of parental divorce on children is much more advanced than research on parental incarceration. In this section, we draw on the divorce literature to consider themes that may be important for studying children with incarcerated parents. Richards (1992) highlighted the following as significant similarities between children's experiences of parental divorce and parental incarceration: sudden and often unexpected departure of a parent; loss of contact between children and their absent parent; reductions in family income; and caregivers becoming depressed, confused, and unable to cope. Before considering the research on parental divorce further, it is important to point out that unlike children experiencing parental divorce, many children with incarcerated parents were not actually living with both parents before the event and might have had very limited contact with their nonresident parent. Among 6–12-year old children with nonresidential fathers in the United States, almost 70% had less than weekly contact with them in 2002 (Amato, Meyers, & Emery, 2009). Thus, parental incarceration may not involve the same changes in parent-child contact as parental divorce. Another difference is that although parental incarceration sometimes leads to permanent parent-child separation (sometimes even via parental divorce), parental incarceration is usually time-limited, unlike parental divorce (in 2004, 2.3% of state inmate parents had no expected release date, and approximately 50% would be released within a year, Glaze & Maruschak, 2008).

There are a number of excellent narrative and meta-analytic reviews of research on the effects of parental divorce on children (Amato, 1993, 2001; Amato & Keith, 1991a, 1991b; Emery, 1999; Hetherington & Stanley-Hagan, 1999; Rodgers & Pryor, 1998; Sigle-Rushton & McLanahan, 2004), from which we highlight a few key points. The evidence clearly shows that compared with children living in intact families, children with divorced parents are at increased risk for a broad range of adverse outcomes, both in the short and long term. In meta-analyses, Amato (2001; Amato & Keith, 1991a, 1991b) found that parental divorce was significantly associated with children's conduct problems, psychological difficulties, and poor academic achievement, as well as other adverse outcomes. However, effect sizes were generally small and, with a few exceptions, they were smallest among more methodologically sophisticated studies. The largest effects were generally on children's conduct problems. Interestingly, effect sizes declined somewhat during the 1980s but then increased again in the 1990s.

Early research on children's adjustment to parental divorce was guided by a deficit model, and this research focused on family structure to explain the association with children's later outcomes, but increasingly, a life-course approach has been taken, emphasizing the importance of various family processes before, during, and after divorce (Hetherington & Stanley-Hagan, 1999). Amato (1993) reviewed five key theoretical perspectives that might explain the increased risk for adverse outcomes among children of divorce. First were theories suggesting that it is parental absence after divorce that explains children's outcomes because of reduced emotional and practical resources available to the child. Research comparing outcomes for children who experience parental divorce and children who experience parental death has been important in showing the limitation of this perspective: Despite the loss in-

volved, parental death does not carry the same level of risk for children as parental divorce (Emery, 1999; Rodgers & Pryor, 1998). A second theoretical perspective emphasizes the adjustment of the remaining parent. Because divorce is stressful for parents, quality of childrearing might be impaired, and this could explain children's outcomes. This has also been hypothesized as a potentially important factor explaining children's outcomes after parental incarceration. However, the evidence has not been conclusive on this hypothesized mechanism regarding parental divorce (Amato, 1993). Third, interparental conflict occurring before, during, and after divorce has been highlighted as an important factor explaining children's adjustment, and there is considerable empirical support for this point of view (Amato, 1993; Emery, 1999; Rodgers & Pryor, 1998). Fourth, economic hardship and loss of family income may be important, although it must be recognized that low socioeconomic status also predicts divorce and therefore may act as a confounding variable.

The fifth and most general theoretical perspective described by Amato (1993) was the "life stress perspective," which emphasizes that multiple stressful events, including both those described above and others, such as house and school moves and new marriages of parents, are important for understanding children's postdivorce adjustment. Although there is general support for this notion, some research suggests that it may not be the absolute number of stressful events that is important, but rather the particular characteristics of some types of change. Amato (1993) concluded that empirical evidence provided strongest support for the interparental conflict model, which implies a degree of spuriousness in the association between parental divorce and children's adverse outcomes; however, no single model can fully account for the findings.

A few important considerations should be taken from this more extensive work on parental divorce when studying children's outcomes after parental incarceration. First, the parental divorce literature indicates that a broad range of outcomes should be examined for children with incarcerated parents to capture potential diversity in its effects. Second, a simple deficit model is unlikely to adequately explain the effects on children of either parental divorce or parental incarceration. Third, neither parental divorce nor parental incarceration is randomly distributed in the population; therefore, observed associations with child outcomes might be spurious, and it is very important to consider other factors associated with parental incarceration, both before and after the event, to try to understand its effects on children. In the context of parental divorce, interparental conflict has emerged as a particularly important issue to consider. Regarding parental incarceration, parental crime and antisocial behavior are the most obvious covariates that should be taken into account when studying children's outcomes. Also, as in research on parental divorce, studies of parental incarceration should ideally include preincarceration measures of children's well-being, to examine whether children's problem behaviors actually increase from before to after the event.

Objectives of the Systematic Review

We conducted a systematic review and meta-analysis to summarize evidence on the following questions. To what extent is parental incarceration associated with children's later antisocial behavior, mental health problems, drug use, and poor educational

performance? Do these associations vary across different types of samples (children in the community, compared with children in clinics and courts)? Does parental incarceration predict worse outcomes for children than other forms of parent-child separation? Are associations between parental incarceration and children's outcomes moderated by the child's sex, maternal versus paternal incarceration, child age at parental incarceration, age at outcome measurement, type of outcome assessed, and country of study?¹ Do results vary according to study methodological characteristics?

We chose to analyze the possible moderators listed above because these variables were easy to code from primary studies and because they have been hypothesized to explain variation in the effects of parental incarceration on children (see Murray & Farrington, 2008a, for a review). For example, it has been suggested that incarceration of a mother might be more disruptive for children than incarceration of a father because mothers tend to be more involved in childcare and are more likely to be incarcerated farther from home than fathers (Murray & Farrington, 2008a). Johnston (1995) suggested that the effects of parental incarceration might be strongest when children experience the event in early childhood, when it is harder for children to cognitively process the event (however, in relation to parental divorce, there is no consistent difference in the effects on children according to their age at the time of the divorce: Emery, 1999; Hetherington & Stanley-Hagan, 1999; Rodgers & Pryor, 1998). With regard to timing of outcome measurement, Hagan and Dinovitzer (1999, p. 151) hypothesized that the strongest effects are likely to emerge in the transition from childhood to adulthood, during a period of increasing challenges and responsibility. Murray and colleagues (Murray et al., 2007) speculated that in countries where prison sentences are longer and social support systems are weaker (for example in the United States, compared with many European countries), effects of parental incarceration on children might be more pronounced.

Method

Search for Studies

We systematically searched for relevant studies until February 2011. We started with an initial set of reports on children with incarcerated parents collected in our previous research on this topic. Four methods were used to search for additional studies. First, keywords were entered into 23 electronic databases and Internet search engines. The keywords entered were (*prison** or *jail** or *penitentiary* or *imprison** or *incarcerat** or *detention*) and (*child** or *son** or *daughter** or *parent** or *mother** or *father**) and (*antisocial** or *delinquent** or *crim** or *offend** or *violence** or *aggressi** or *mental health* or *mental illness* or *internaliz** or *depress** or *anxiety* or *anxious* or *psychological** or *drug** or *alcohol** or *drink** or *tobacco* or *smok** or *substance* or *education** or *school* or *grade** or *achievement*).

¹ Ideally, we would have also investigated other moderators, such as living circumstances and quality of relationships before incarceration, what children are told about the event, length of parental incarceration, levels of social support, and type of prison in which parents were held. However, it was extremely rare for studies to report such information, making it impossible to study these variables as moderators.

Second, bibliographies of prior reviews were examined (Dallaire, 2007; S. Gabel, 2003; Hagan & Dinovitzer, 1999; Johnston, 1995; Murray, 2005; Murray & Farrington, 2008a; Myers et al., 1999; Nijnatten, 1998) as well as edited books on children of incarcerated parents (Eddy & Poehlmann, 2010; K. Gabel & Johnston, 1995; O. Harris & Miller, 2002; Y. R. Harris, Graham, & Carpenter, 2010; Shaw, 1992b; Travis & Waul, 2003). Third, experts in the field were contacted to request information about any other studies that we might not have located. The first group of experts contacted consisted of about 65 researchers and practitioners who we knew were professionals with an interest in children with incarcerated parents. The second group consisted of about 30 directors of major longitudinal studies in criminology (see Farrington & Welsh, 2007, pp. 29–36). We thought that longitudinal researchers might have important results that were eligible for this meta-analysis that had not been published or were hidden in articles that did not mention parental incarceration in titles, abstracts, or keywords. Finally, James Derzon and Aaron Alford kindly searched their extensive database of results on family factors and offending in longitudinal studies (see Derzon, 2010) to identify any other studies that we might not have located.

Inclusion Criteria

Five criteria were used to determine whether studies were eligible for inclusion in the meta-analysis. Studies had to have numerical results and meet all five criteria below to be included.

1. The study included children of incarcerated parents and at least one comparison group of children without incarcerated parents (i.e., children whose parents had not been incarcerated since the child's birth).
2. The study included a measure of children's antisocial behavior, mental health, drug use, or educational performance.
3. Children's outcomes were measured after parental incarceration first occurred.
4. The study used the same outcome measure for children with incarcerated parents and the comparison group.
5. At least one effect size was reported, or there was enough numerical information to calculate at least one effect size for the association between parental incarceration and a child outcome.

All studies meeting the above five criteria were included in the review. They could be published or unpublished. They may have been conducted in any country and may have been reported in English, German, Dutch, French, Spanish, Portuguese, Swedish, Danish, or Norwegian.

Screening for Eligible Studies

Our searches identified 14,690 references for screening to identify eligible studies. A flow chart of the screening process is shown in Figure 2. After examining the titles and abstracts of all the references and discarding obviously irrelevant ones, 454 reports

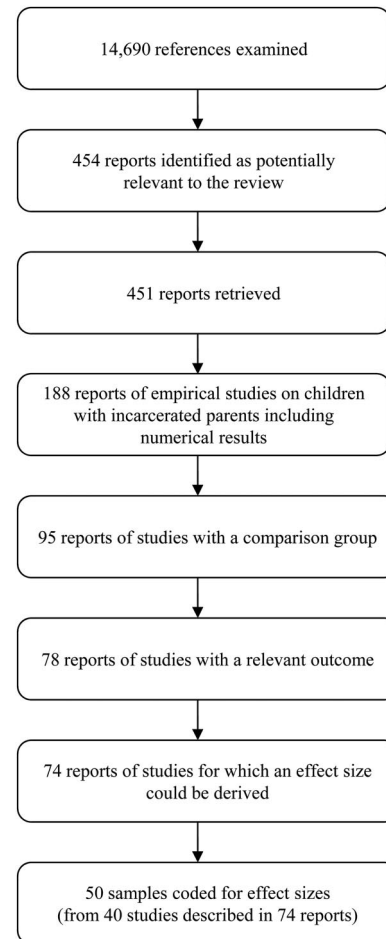


Figure 2. Flow chart of screening process.

were identified as potentially relevant to the review. Of these, 451 full-text documents were retrieved, and 188 described an empirical study of children of incarcerated parents with numerical results (and were not review articles or commentaries on previously reported research). Of these, 40 studies with 50 samples, reported in 74 documents, met all five eligibility criteria, and these were coded for the meta-analysis.

Four studies are briefly described here, which were not included in the meta-analysis because an effect size could not be derived from the results. Friedman and Esselstyn (1965) compared 117 children with incarcerated fathers and 211 control children in the same schools on academic performance and other aspects of pupil adjustment. They reported that a higher proportion of children with incarcerated fathers scored “above average” on academic achievement than did the control children, but exact proportions and significance tests were not reported. Guo, Roettger, and Cai (2008) tested for a gene–environment interaction between the DRD2*178/304 genotype and “dad jailed” in predicting delinquency in the sibling sample of the National Longitudinal Study of Adolescent Health (Add Health). The interaction was not significant. Further results for main effects were not available, and we were not able to include this study in the review (although we did include other results on main study participants in Add Health,

based on other analyses). Kampfner (1995) compared 36 children with incarcerated mothers and control children (*n* not reported) matched on age, race, sex, and social class. She reported that children with incarcerated mothers had significantly more post-traumatic stress symptoms than did control children, but further information was not available to calculate an effect size (and it was not clear whether “significant” meant statistically significant or substantially different). Naudeau (2005) compared rates of depression, drug use, and delinquency between 18 youths with incarcerated parents and 36 matched controls who had never experienced parental absence, in the 4-H Study of Positive Youth Development. It was reported that there were no significant differences between the groups on any of these outcomes, but further information was not available to calculate an effect size.

Coding of Studies

Studies included in the meta-analysis were coded for the following key features: reference information (title, authors, publication year, etc.), study location, sample characteristics (gender, age range, etc.), study design (prospective, retrospective, cross-sectional), details about the measure of parental incarceration, type(s) of comparison groups included, details of subsamples and multiple comparisons made, type(s) of outcomes measured and measurement details, statistical information used to derive an effect size, and methodological quality. If some statistical information was missing that was needed to calculate an effect size, study authors were contacted to try to obtain the relevant information. If other information was not available (e.g., details about the measurement of parental incarceration), this was coded as missing.

The methodological quality of studies included in the review was assessed on the Cambridge Quality Checklists, which were developed to evaluate the quality of risk factor studies in systematic reviews (Murray, Farrington, & Eisner, 2009). Each study was coded “yes” or “no” according to whether it had each of the following five characteristics (for further details about this checklist, scoring instructions, and rationale for cut-points, see Murray, Farrington, & Eisner, 2009)

1. An adequate sampling method, with either random or total sampling methods.
2. An adequate response rate, with response and retention rates $\geq 70\%$ and differential attrition between children of incarcerated parents and the comparison group $\leq 10\%$.
3. An adequate sample size of 400 or more.
4. A good measure of parental incarceration, meaning children with incarcerated parents were identified by sampling parents in a jail or prison, by using official criminal records to determine whether parents were incarcerated, or by asking parents themselves about their own history of incarceration. (Note, if children reported whether their parents were incarcerated, this was not coded as a good measure because it is possible that many children are not told the truth about the whereabouts of their incarcerated parent.)
5. A good measure of the child outcome, with a reliability coefficient $\geq .75$ and reasonable face validity; a criterion validity coefficient $\geq .3$; more than one instrument or information source used to assess the outcome; official records of arrest, conviction, or incarceration used to measure an antisocial outcome; a clinical diagnosis used to measure mental health problems; or standardized test or grade scores used to measure educational performance.

As recommended by Murray, Farrington, and Eisner (2009), in addition to coding the five items above and coding the basic study design (prospective, retrospective, or cross-sectional), we also coded the covariates that were controlled in each study. Most studies controlled at least some covariates either by matching or by using statistical modeling techniques, for example, in regression analyses. We coded the total number of covariates that were controlled in each study (excluding demographic covariates such as child sex, race, and social class) and coded whether parental criminality or antisocial behavior was controlled for (e.g., by including the number of prior parental criminal convictions as a covariate in multiple regression analysis). We also coded whether studies controlled for a pretest of children’s outcomes before parental incarceration, for example, by adjusting for pretest scores in regression analyses or by analyzing change scores. Arguably, parental criminality is the most important confounding variable to take into account when investigating the association between parental incarceration and children’s outcomes, and analysis of change (control for children’s outcomes before parental incarceration) helps rule out the possibility that children with incarcerated parents had raised levels of problem behavior before their parent was incarcerated.

Effect Sizes

The odds ratio was chosen as the effect size to represent the association between parental incarceration and children’s outcomes for five reasons. First, many primary studies reported results using odds ratios. Second, many measures of both parental incarceration and children’s outcomes were dichotomous (e.g., incarcerated or not, convicted or not). Third, the odds ratio is easily and often used as an effect size in meta-analysis and can be estimated from other commonly reported statistics. Fourth, the odds ratio is unaffected by differential base rates (the marginal distributions of the predictor or the outcome), giving greater comparability across studies and types of outcome. Fifth, the odds ratio is easily interpretable. The odds ratio represents how more or less likely children of incarcerated parents are to experience an outcome, compared with children without incarcerated parents.

The odds are equal to the number of children with the outcome divided by the number of children without the outcome. For example, among 60 children, if 20 are arrested and 40 are not arrested, the odds of arrest is $20/40 = 0.5$. The odds ratio is calculated by dividing the odds for children with incarcerated parents by the odds for comparison children. An odds ratio less than 1.0 indicates that children with incarcerated parents are less likely to have the outcome than are other children. An odds ratio that is larger than 1.0 shows an increased probability of the outcome for children with incarcerated parents. An odds ratio of 2.0 or larger indicates relatively strong prediction (Cohen, 1996).

If studies reported only other statistics, such as Cohen's d or mean differences and standard deviations (from which d can be calculated), we converted them into odds ratios using the formulas presented in Lipsey and Wilson (2001). An odds ratio based on d is interpretable like any other odds ratio: the increase (or decrease) in odds associated with parental incarceration. However, it is necessary to interpret the underlying continuous variable, which was used to calculate d , as dichotomous. For example, Stroble (1997) compared mean depression scores between children with incarcerated parents and children without incarcerated parents. In this study, $d = 0.3$, and we converted this into an odds ratio = 1.8. This can be interpreted as showing that parental incarceration was associated with 1.8 times the odds of high depression scores, compared with no parental incarceration. When the underlying continuous distribution is approximately normal, d is an appropriate metric for summarizing the relationship between the two variables and can be converted to an odds ratio without problem. However, we note that if the distribution is skewed (e.g., $SD > M$), d is reduced because of the high standard deviation, and an odds ratio based on d is likely to be conservative or too small.

Wherever possible, covariate-adjusted odds ratios were extracted from study results. Covariate-adjusted odds ratios indicate how many times greater (or smaller) the odds of the outcome is for children with incarcerated parents, compared with other children, while taking into account effects of covariates. For example, by comparing children of prisoners and children of parents with other criminal justice sentences, the resulting odds ratio shows how more or less likely children of prisoners are to experience the outcome, while taking into account parental crime and conviction. Covariate-adjusted odds ratios can be calculated directly from 2×2 tables comparing outcomes for children with incarcerated parents and matched controls, extracted directly from logistic regression results, or converted from other effect sizes, such as d , when covariates are taken into account in the calculation of d (based on output from multiple regression analyses).

Meta-Analyses

To synthesize the findings from the studies included in the review, we conducted meta-analyses of their results. We used the results from each study that were most controlled (adjusted for the most covariates). The meta-analyses proceeded in three stages. In the first stage, results for each child outcome (antisocial behavior, mental health problems, drug use, and poor educational performance) were pooled for all studies, and separately by type of sample (community samples and samples of children recruited from clinics and courts). Pooled results were also calculated separately for studies that compared children of incarcerated parents with children who were separated from parents for other reasons.

In the second stage of analysis, focusing on the outcome of child antisocial behavior (which was studied most frequently and showed the strongest association with parental incarceration, as well as the greatest variation in results), we examined possible moderating variables that might explain variation in effect sizes. In the third stage of analysis, we examined whether methodological characteristics of the studies were related to their findings.

Some studies were not included in some of the meta-analyses because they lacked relevant results. For example, some studies only provided results on children's antisocial behavior and no other outcome and so were only included in analyses of antisocial behavior. Thus, different numbers of studies are included in different analyses.

The meta-analyses were conducted using the inverse variance-weight approach recommended by Lipsey and Wilson (2001) and were performed in SPSS using the syntax written by Lipsey and Wilson (2001) and available on David Wilson's website (<http://mason.gmu.edu/~dwilsonb/ma.html>). Effect sizes were first calculated in Microsoft Excel and then copied into SPSS to run the meta-analyses. Random effects models were used to pool results across studies because of significant heterogeneity in the results that we believed was not due to sampling error alone (given the diverse characteristics of the studies, as we describe in the Results section).

Multiple Results From Single Studies

One issue that must be dealt with in meta-analysis is the assumption of the statistical independence of results. Studies sometimes have multiple results reported for the same outcome for the same sample (for example, in multiple publications). Using more than one result from the same sample in a meta-analysis can lead to underestimating error variance and inflating significance tests. To isolate independent findings for use in each meta-analysis, first we identified independent samples by doing the following.

1. Separate meta-analyses were conducted for antisocial behavior, mental health, drug use, and educational performance. Thus, only if a study reported multiple results for a single outcome would we need to address independence of findings further.
2. Samples of boys and girls were coded separately and used as the unit of analysis. (This was done even if combined results, for boys and girls together, were also reported.) Thus, only if a study reported multiple results either for boys or for girls for any particular outcome would we need to address independence of findings further. Although there might be some dependence between effect sizes derived for boys and girls in the same study, we assume that they are independent in these analyses.
3. Two studies reported results separately for main study participants and their siblings. For each study, we coded the main participants and their siblings separately (as two different samples) because different types of analyses were performed on each group.
4. Within a study, when more than one sample of children with incarcerated parents was compared with a single comparison group, the results from these multiple comparisons were averaged, and the average effect size was used in the analysis. For example, if a study compared both children of incarcerated mothers and children of incarcerated fathers with a single comparison group, the

mean odds ratio (and mean variance) from these two comparisons was used in analysis.²

5. Within a study, if a single group of children with incarcerated parents was compared with multiple comparison groups, we selected or combined the comparison groups to derive a single effect size for each analysis. Comparison groups were selected or combined to produce a single effect size reflecting the maximum control of covariates. In studies that included a comparison group of children separated from parents for reasons other than parental incarceration, results from that comparison were coded separately for specific analysis.

Sometimes, for a single sample or comparison, multiple results for the same outcome were reported. When this occurred, we did the following, in order, until we identified a single effect size for the sample.

1. If an outcome was measured at multiple time points, the measure longest after parental incarceration was selected for analysis, unless attrition since the previous measure was over 10%. For example, a measure of conviction at ages 30–40 years would be selected instead of a measure of conviction at ages 20–30 years, so long as the later measure did not have more than 10% attrition since the earlier measure.
2. If there were multiple covariate-adjusted effect sizes, the effect size reflecting maximum control for covariates was selected for analysis. For example, if one effect size estimated the effects of parental incarceration while controlling for family income and another effect size controlled for family income and parental criminality, the latter effect size was selected. Effect sizes that estimated change in children's outcomes from before to after parental incarceration (i.e., controlling for preincarceration child outcome scores) were always selected in preference to effect sizes that did not estimate change in children's outcomes.
3. Measures of an outcome with higher reliability or validity were selected in preference to measures with lower reliability or validity.
4. For antisocial behavior, measures of criminal behavior were selected in preference to measures of antisocial behavior that did not necessarily involve breaking the law. Measures of antisocial behavior that were closer to official delinquency (e.g., the Delinquency subscale on the Child Behavior Checklist) were selected instead of other measures (e.g., a total externalizing score). Measures of crime in general (e.g., conviction for any offence) were selected in preference to measures of specific types of crime (e.g., conviction for violence). Effect sizes based on conviction records were used in preference to self-reports. Measures using children's own reports were chosen in preference to measures based on other people's reports (e.g., caregivers' or teachers' reports) because parents and teachers may not know about children's delinquent behaviors. Children's self-reports were also selected in preference to measures of arrest.
5. For outcomes of mental health, drug use, and educational performance, more generic measures were selected in preference to subtypes of the outcome. For example, for mental health, measures of general internalizing problems were selected in preference to measures of depression or anxiety specifically. If a result for general internalizing problems was not reported but results for more than one specific internalizing problem (e.g., both depression and anxiety) were reported, these were combined into one effect size. If multiple results for educational performance were reported, standardized test scores were selected in preference to other measures of educational performance.
6. If there were still multiple results for a single type of outcome, results were combined to produce one summary effect size.

For some of the moderator variables that we investigate (e.g., whether it was the mother or the father who was incarcerated), multiple relevant results were reported for a single sample (i.e., one result for maternal incarceration and one result for paternal incarceration). Where this was the case, separate effect sizes were calculated for each category of the moderator (i.e., one effect size for maternal incarceration and one for paternal incarceration), following Steps 1–6, above. In analysis of that moderator variable, the result for the category that was most rare (i.e., maternal incarceration in this case) was selected for analysis. In all other analyses, the average effect size was used (i.e., for maternal incarceration and paternal incarceration combined).

Using these procedures for handling multiple comparisons, multiple measures of outcomes, and multiple results on moderator variables, each sample counted only once in each meta-analysis.

Results

Table 1 summarizes the characteristics of the 50 samples from the 40 studies included in the meta-analysis. Details of the individual studies and their references can be found in the Appendix. In total, the 50 samples included 7,374 children with incarcerated parents and 37,325 comparison children without incarcerated parents. Research on the associations between parental incarceration and children's outcomes has been increasing. Since 2000, results on 39 samples have been reported, compared with 11 in previous years. The samples were recruited in seven different countries: the United States, the United Kingdom, the Netherlands, Denmark, Sweden, Australia, and New Zealand. Most samples of children were recruited in the community rather than in juvenile courts or mental health clinics. Just fewer than half of the samples came from studies with a prospective design, which means that parental incarceration was measured at one point in time, and children's outcomes were assessed at a later point in time. Thirty-two samples included both children with incarcerated mothers and children with incarcerated fathers (but they were rarely analyzed separately). Children's parents had been incarcerated during childhood (age 0–10 years) in 10 samples, during adolescence (age 11–18 years) in two samples, and during both childhood and adolescence in 16 samples. In 12 samples, parental incarceration was measured in

² It was not possible to pool the groups of children of prisoners before calculating an effect size in these studies.

Table 1
Characteristics of Samples Included in the Meta-Analysis

Variable	Category	Number of samples (<i>k</i>)
Location	United States	36
	Europe (England, Sweden, Denmark, Netherlands)	11
	Australia/New Zealand	3
Report date	1970s	3
	1980s	2
	1990s	6
	2000s	21
	2010s/unpublished and no date	18
Sampling frame	Children in the community	40
	Children in clinics/courts	10
Study design	Prospective	21
	Retrospective	17
	Cross-sectional	12
Child sex	Boys only	14
	Girls only	7
	Both boys and girls	29
Parent incarcerated	Mother figure only	6
	Father figure only	12
	Both mother and father figure	32
Age of children at time of parental incarceration	Childhood (0–10 years) only	10
	Adolescence (11–18 years) only	2
	Both childhood and adolescence	16
	Parent ever incarcerated (including before child's birth)	12
	Not known	10
Age at child outcome	Juvenile (0–17 years) only	28
	Adult (18+ years) only	12
	Both juvenile and adult	9
	Not known	1
Informant for child outcomes	Child only	12
	Caretaker only	9
	Teacher only	2
	Peers only	1
	Clinical assessment only	1
	Official records only	15
	Multiple informants	10
Comparison group	Children separated from parents for other reasons	7
	Children with parent convicted but not incarcerated	5
	Children with parent incarcerated only before child's birth	4
	Other children in same study, but not matched as above	27
	Multiple comparison groups	7
Number covariates controlled ^a	0	9
	1–4	20
	5–9	10
	10–14	8
	15+	3
Controlled for parental criminality	Yes	13
	No	37
Controlled for pre-test of child outcome	Yes	4
	No	46

^a If different numbers of covariates were controlled for in different analyses, the maximum number was coded.

such a way that it might have occurred before children were born. In most samples, children's outcomes were assessed between birth and age 18 years, rather than in adulthood. A variety of informants (children themselves, caretakers, teachers, peers, clinical assessment, and clinical records) were used to assess children's outcomes. Only 10 samples of children were assessed using multiple informants.

Studies used several different types of comparison groups to assess the association between parental incarceration and children's outcomes. In nine samples,³ children with incarcerated parents were compared with children who were separated from their parents for

other reasons, such as parental divorce or parental death. These comparisons can help assess whether parent–child separation *per se* is the main factor explaining children's outcomes after parental incarceration. Several studies compared children with incarcerated parents to children whose parents were convicted but not incarcerated, to try to parse out the effects of parental incarceration from the effects of parental criminality. Another method used to try to control for paren-

³ Includes two samples in which multiple comparisons were made.

tal criminality was to compare children whose parents were incarcerated after the child's birth with children whose parents were incarcerated only before the child's birth. The logic of this comparison is that the two groups should be quite similar in background characteristics, but only children whose parents are incarcerated after birth are actually exposed to the event, helping isolate its environmental effects.

Through matching and statistical modeling, most studies controlled for some covariates when estimating the association between parental incarceration and children's outcomes (only nine samples were analyzed without control for any covariates). Most samples ($k = 30$) were analyzed controlling for between one and nine covariates. Only 13 samples were analyzed controlling for parental criminality, and only four samples were analyzed in terms of change in children's outcomes, by controlling for a "pretest" of the child outcome, measured before parental incarceration took place.

Meta-Analysis: Main Effects

Table 2 shows weighted mean effect sizes for the associations between parental incarceration and children's antisocial behavior, poor mental health, drug use, and low educational performance in all samples with relevant results. Across all samples, the pooled odds ratio for the association between parental incarceration and children's antisocial behavior was significant and fairly large ($OR = 1.6$, $CI [1.4, 1.9]$, $k = 45$). For poor mental health, the pooled odds ratio was nonsignificant across all samples and showed almost zero association with parental incarceration ($OR = 1.1$, $CI [1.0, 1.3]$, $k = 23$). Also, there was almost no association between parental incarceration and children's drug use ($OR = 1.1$, $CI [0.9, 1.3]$, $k = 12$). Parental incarceration was significantly associated with poor educational performance ($OR = 1.4$, $CI [1.1, 1.8]$, $k = 13$). For all four outcomes, the Q statistic was significant ($p < .01$), indicating heterogeneity in the results that could not be accounted for by sampling error alone.

Table 2 also shows the average effect sizes for different types of sample. We expected effect sizes to be larger among samples of children in the community than among samples of children recruited from clinics or courts (in which comparison children are also likely to be at risk for problem behavior). Within community samples, effect sizes were significant for antisocial behavior ($OR = 1.7$, $CI [1.4, 2.0]$, $k = 36$), mental health ($OR = 1.2$, $CI [1.0, 1.4]$; $k = 17$), and poor educational performance ($OR = 1.5$, $CI [1.1, 2.1]$, $k = 11$), but not for drug use. By contrast, within court and clinic samples, parental incarceration was significantly associated with increased risk only for children's antisocial behavior ($OR = 1.4$, $CI [1.1, 1.7]$, $k = 9$) and not for other child outcomes. However, the differences in effect sizes between community samples and clinic and court samples were not significant ($p > .05$ in QB tests of between-group heterogeneity, for all four outcomes).

Table 2 also shows average results for the subset of samples that compared children with incarcerated parents to children separated from parents for other reasons. The average effect size for this comparison was positive and significant for children's antisocial behavior ($OR = 1.4$, $CI [1.2, 1.6]$, $k = 9$), but not for the other outcomes.

Table 2
Average Associations Between Parental Incarceration and Children's Outcomes Across Different Types of Sample

Type of sample	Antisocial behavior			Mental health problems			Drug use			Poor educational performance		
	OR	[95% CI]	Q	OR	[95% CI]	Q	OR	[95% CI]	Q	OR	[95% CI]	Q
Children in the community	1.7**	[1.4, 2.0]	112.9**	1.2*	[1.0, 1.4]	22.9	1.0	[0.9, 1.1]	7.2	1.5**	[1.1, 2.1]	34.4**
Children in clinics/courts	1.4**	[1.1, 1.7]	8.3	0.9	[0.6, 1.3]	9.7	1.0	[0.6, 1.8]	20.3**	1.2	[0.8, 1.8]	1.5
Comparison group separated for other reasons	1.4**	[1.2, 1.6]	7.6	0.9	[0.7, 1.1]	10.6	0.8	[0.6, 1.1]	4.7	1.3	[0.8, 1.9]	4.2
All samples	1.6**	[1.4, 1.9]	121.3**	1.1	[1.0, 1.3]	45.0**	1.1	[0.9, 1.3]	27.6**	1.4**	[1.1, 1.8]	35.9**

Note. Results from random effects models. Samples with Comparison group separated for other reasons are a subset of the Children in the community and Children in clinics/courts samples. $OR =$ odds ratio; $CI =$ confidence interval; $Q = Q$ statistic for the test of heterogeneity within samples; $k =$ number of samples.
* $p < .05$. ** $p < .01$.

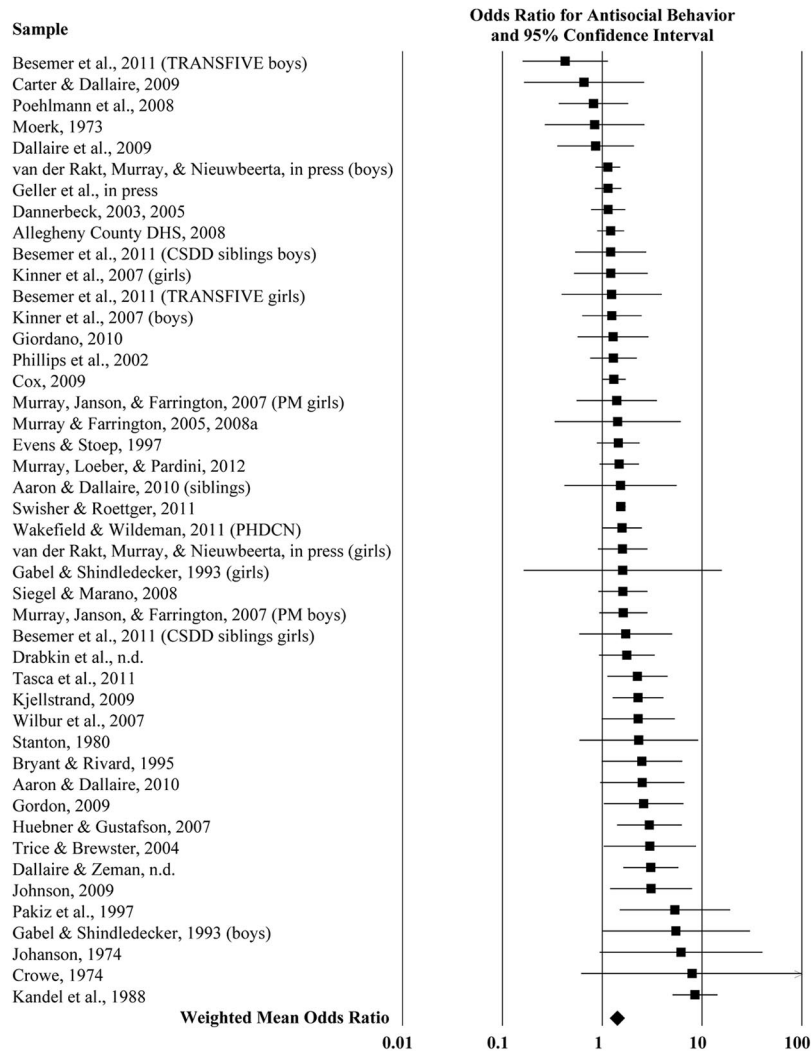


Figure 3. Distribution of effect sizes for antisocial behavior. Multiple samples analyzed by the same authors are identified by study names, sibling samples, and children's sex (boys or girls). For the study by Geller, we combined results for boys and girls so that we could analyze children's outcomes in relation to both maternal and paternal incarceration. Results were also available for boys and girls separately, but for paternal incarceration only—and we used these results only in moderator analyses. TRANSFIVE = NSCR (Netherlands Institute for the Study of Crime and Law Enforcement) Transfive Study; CSDD = Cambridge Study in Delinquent Development; PM = Project Metropolitan; PHDCN = Project on Human Development in Chicago Neighborhoods; DHS = Department of Human Services; NSCR = Netherlands Institute for the Study of Crime and Law Enforcement.

Possible Moderators of the Association Between Parental Incarceration and Children's Antisocial Behavior

We investigated whether six possible moderators explained variation in the results for antisocial behavior. We chose to conduct these analyses for antisocial behavior because this outcome was examined most often ($k = 45$), had the largest mean effect size ($OR = 1.6$), and had the greatest heterogeneity in study results ($Q = 123.3$).⁴ Figure 3 shows the distribution of individual effect sizes for all 45 samples in which antisocial behavior was measured. Forty effect sizes (89%) show a positive association between parental incarceration and children's antisocial behavior.

Although not many individual effect sizes were statistically significant, as noted above, pooled effect sizes were significant for all samples, for community samples, and for clinic and court samples (as reported in Table 2).

Table 3 shows the results of the moderator analyses. Slightly larger pooled odds ratios were found for boys (compared with girls), parental incarceration during adolescence, parental incarceration "ever" (compared with parental incarceration during child-

⁴ If we had conducted these six tests for all four outcomes, the probability of a Type I error (finding a significant result by chance) would have increased considerably.

Table 3
Possible Moderators of the Association Between Parental Incarceration and Antisocial Behavior

Variable	Category	OR	[95% CI]	k	QB
Child sex	Girls	1.4	[0.9, 2.4]	7	0.5
	Boys	1.8**	[1.3, 2.6]	13	
Mother/father imprisoned	Mother	1.6*	[1.0, 2.6]	8	0.0
	Father	1.7**	[1.2, 2.5]	11	
Child age at parental imprisonment	Childhood (0–10 years)	1.5*	[1.1, 2.3]	9	2.4
	Adolescence (11–17 years)	2.0*	[1.2, 3.5]	5	
	Parent ever incarcerated	2.4**	[1.6, 3.6]	9	
Child age at outcome	Juvenile (0–17 years)	1.6**	[1.3, 1.9]	26	1.1
	Adult (18+ years)	1.9**	[1.4, 2.6]	15	
Type of outcome	Antisocial	1.6**	[1.2, 2.1]	17	0.0
	Crime	1.6**	[1.3, 2.0]	28	
In the United States	United States	1.6**	[1.3, 1.9]	31	0.0
	Not United States	1.7**	[1.2, 2.2]	14	

Note. Results from mixed effects models. OR = odds ratio; CI = confidence interval; k = number of samples; QB = QB statistic for test of heterogeneity between categories, distributed as chi-square with $c - 1$ degrees of freedom, where c is the number of categories in the moderator variable.

* $p < .05$. ** $p < .01$.

hood), and outcomes in adulthood (compared with outcomes in juvenile years). However, no moderator variable was statistically significant, and pooled effect sizes were almost identical for maternal compared with paternal incarceration, type of outcome measured (antisocial or crime), and whether or not studies were conducted in the United States.

We also examined whether effect sizes for U.S. studies varied according to the year in which parental incarceration took place, in a meta-regression analysis (which can examine variation in effect sizes by continuous-level predictors). We did this because the U.S. incarceration rate grew rapidly over several decades, and some researchers hypothesize that as the event became more common, stigma associated with incarceration might have diminished, and harmful effects on children might have reduced. Figure 4 shows the distribution of the (logged) odds ratios by year of parental incarceration in U.S. samples. Although a very slight downward slope is observed in this graph, the regression analysis showed that the effects of parental incarceration on children's antisocial behavior were not significantly smaller among samples of children for whom parental incarceration occurred more recently ($B = -0.01$, $p = .52$).

Variation in Results by Study Methodology

We investigated whether study methodology explained variation in effect sizes for antisocial behavior. Table 4 shows average effect sizes for different study designs and whether studies controlled for covariates. Prospective studies had the largest average effect size, followed by retrospective and then cross-sectional studies, but these differences were not quite significant ($QB = 4.7$, $p = .10$). There existed a clear and significant difference between studies that controlled for covariates ($OR = 1.4$) and studies that did not ($OR = 3.0$; $QB = 13.9$, $p < .01$). Given the importance of covariates for these results on antisocial behavior, we also examined whether effect sizes for educational performance (which were also positive and significant on average for all samples; see Table 2) differed according to whether studies controlled for covariates. Again, there was a significant difference. Studies that controlled

for covariates had, on average, a significantly ($QB = 3.8$, $p < .05$) smaller association between parental incarceration and poor educational performance ($OR = 1.1$, CI [1.0, 1.3], $k = 8$) than did studies that did not control for covariates ($OR = 1.5$, CI [1.2, 1.9], $k = 5$). In fact, the average effect size for educational performance when covariates were controlled ($OR = 1.1$) shows almost zero association with parental incarceration.

We expected that the type of covariates controlled might also make a difference to study results. We expected that studies that controlled for parental criminality or children's antisocial behavior before parental incarceration would have smaller effect sizes than would other studies. In 13 samples, the association between parental incarceration and children's antisocial behavior was estimated while controlling for parental criminality, using three different methods: (a) by comparing children who experienced parental incarceration during childhood with children whose parents were incarcerated only before the child was born; (b) by comparing children whose parents were incarcerated with children whose parents were convicted but received noncustodial sentences; and (c) by comparing children whose parents were incarcerated with other children while statistically controlling for a measure of parental criminality (e.g., controlling for the number of parental convictions in regression analyses). In these 13 samples, the pooled association between parental incarceration and children's antisocial behavior was $OR = 1.4$ (CI [1.2, 1.7], $k = 13$).

In three samples, the association between parental incarceration and children's later antisocial behavior was estimated while controlling for children's antisocial behavior before parental incarceration.⁵ The pooled effect size in these samples was $OR = 1.3$ (CI [1.0, 1.7], $k = 3$). Combining all 14 studies that controlled either for parental

⁵ Note that four samples included results controlling for children's antisocial behavior before parental incarceration. However, two samples (boys and girls in the study by Geller, Cooper, Garfinkel, Schwartz-Soicher, & Mincy, in press) were analyzed together here because, otherwise, only results for paternal incarceration (rather than both maternal and paternal incarceration) could be included.

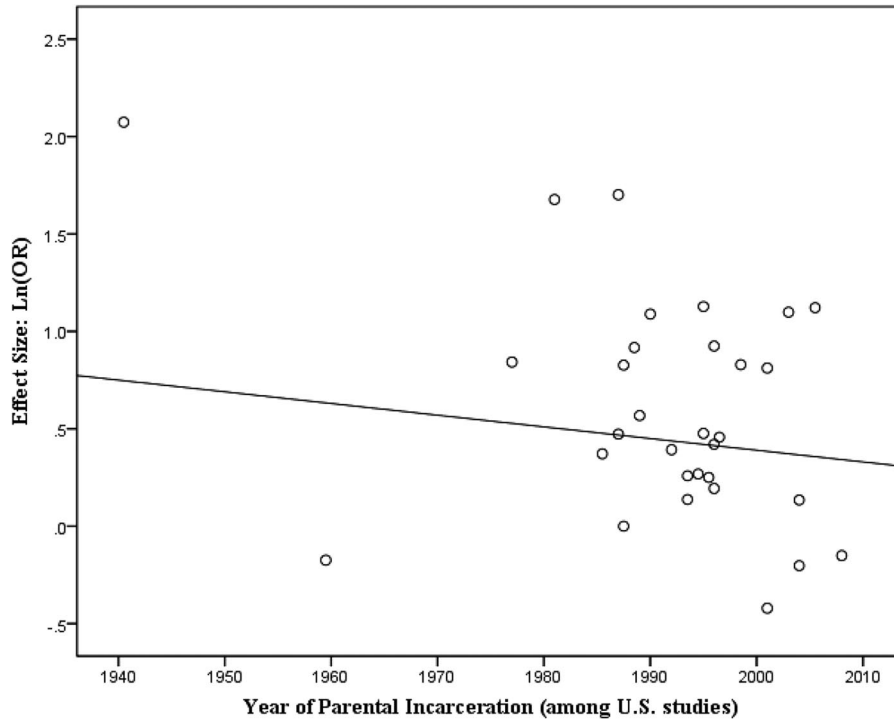


Figure 4. The association between parental incarceration and antisocial behavior through time in the United States. *OR* = odds ratio.

criminality or for children's antisocial behavior before parental incarceration, the pooled odds ratio was 1.4 (CI [1.1, 1.6], $k = 14$). This association was similar to that among other studies that controlled for some covariates but not for these two particular covariates ($OR = 1.4$, CI [1.2, 1.6], $k = 22$; $QB = .02$, $p = .89$). Thus, the two covariates that we thought would be most important to take into account (parental criminality and previous child antisocial behavior) did not significantly influence the meta-analytic results.

We also considered whether effect sizes for antisocial behavior might have been biased by the omission of additional covariates. To do this, we examined the association between study results and the total number of covariates controlled in each study, both graphically and in metaregression. Figure 5 shows the distribution of effect sizes according to the number of covariates controlled (excluding one outlier, which controlled for 32 covariates). As can be seen, there is greater variability in the results for samples in which fewer covariates were controlled (toward the left hand side of the graph). However, the regression line is almost flat, and metaregression showed that as the number of covariates controlled increased, effect sizes did not significantly decrease ($B = -0.01$, $p = .46$). Similar results were obtained when including the outlier ($B = -0.01$, $p = .24$). Therefore, there is no evidence that if studies had controlled for more covariates, the average association between parental incarceration and child antisocial behavior would have been smaller.

Finally, we examined whether the five methodological quality characteristics of the studies, as coded on the Cambridge Quality Checklists, were related to effect size. None of the items examined (sampling methods, response rates, sample size, measure of paren-

tal incarceration, measure of outcome) was significantly associated with study results on antisocial behavior.

Investigating Possible Publication Bias

We investigated whether our meta-analytic results on antisocial behavior might be affected by publication bias: bias caused by unpublished studies having smaller effect sizes and being under-represented in the review. The weighted mean odds ratio for antisocial behavior among published studies was 1.8, and among unpublished studies it was 1.4, but the difference was not significant ($QB = 2.1$, $p = .14$). A funnel plot showed a roughly symmetrical dispersion of effect sizes by standard error that indicated a lack of publication bias. To consider possible effects of publication bias further, missing studies were imputed using the trim and fill method. When imputed missing studies were included in the analysis, the weighted mean odds ratio for the association between parental incarceration and children's antisocial behavior changed only slightly from 1.6 (CI [1.4, 1.9]) to 1.5 (CI [1.2, 1.7]), suggesting that the results of this meta-analysis are quite robust to possible missing studies.

Discussion

Incarceration can cause many difficulties for families and children of prisoners, including traumatic separation, confusing explanations given to children, unstable child care arrangements, strained parenting, reduced family income, stigma, and home, school, and neighborhood moves. As such, it has been hypothe-

Table 4
Variation in Effect Sizes for Antisocial Behavior by Study Design and Control for Covariates

Variable	Category	OR	[95% CI]	k	QB
Study design	Prospective	1.9**	[1.5, 2.4]	21	4.7
	Retrospective	1.4*	[1.1, 1.9]	13	
	Cross-sectional	1.3	[1.0, 1.8]	11	
Covariates controlled	Zero covariates controlled	3.0**	[2.1, 4.2]	9	13.9**
	Any covariates controlled	1.4**	[1.2, 1.6]	36	

Note. Results from mixed effects models. OR = odds ratio; CI = confidence interval; k = number of samples; QB = QB statistic for test of heterogeneity between categories, distributed as chi square with $c - 1$ degrees of freedom, where c is the number of categories in the moderator variable.
* $p < .05$. ** $p < .01$.

sized that parental incarceration might cause increases in children’s problem behaviors. A meta-analysis of the most rigorous empirical evidence showed that parental incarceration predicts increased risk for children’s antisocial behavior, but not mental health problems, drug use, or poor educational performance. Based on 50 samples in 40 published and unpublished studies, we are confident that this is the most comprehensive synthesis of the empirical evidence to date.

No previous meta-analysis had been conducted on children’s drug use or educational performance after parental incarceration. In the current meta-analysis, there was no association between parental incarceration and children’s drug use. Among studies that controlled for covariates, there was also no association between parental incarceration and children’s educational performance. One previous meta-analysis of eight samples demonstrated a large *bivariate* association between parental incarceration and children’s mental health problems and a smaller covariate-adjusted association (Murray, Farrington, Sekol, & Olsen, 2009). However, in the

current meta-analysis, we found no association between parental incarceration and poor mental health when synthesizing across the most controlled results in 23 samples. This difference may be because the current meta-analysis of mental health is based on a larger number of primary studies than the previous meta-analysis, and it only includes studies that clearly measured mental health (e.g., results on “self-concept” were excluded from the current review, but they were included in the previous review). The different results might also be explained by the fact that the earlier review excluded certain types of studies that were included in the current review, for example studies that sampled children in clinics or courts. However, when we restricted the current meta-analysis to community samples only, the association between parental incarceration and poor mental health was only just significant, and the effect size was small ($OR = 1.2$). Thus, on the basis of the current review, summarizing the most rigorous evidence to date, we must conclude that there are zero or only weak associations

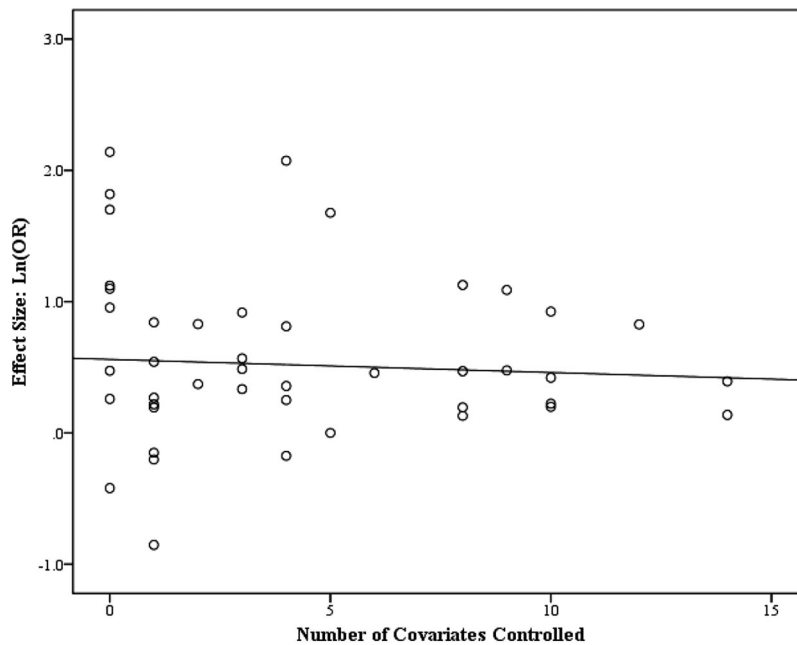


Figure 5. The association between parental incarceration and antisocial behavior by number of covariates controlled. OR = odds ratio.

between parental incarceration and children's poor mental health, drug use, and educational performance.

The results from 45 samples confirm that on average, children with incarcerated parents are at significantly higher risk for antisocial behavior compared with their peers (overall $OR = 1.6$). The specificity of this effect (given the null results for mental health problems, drug use, and educational performance) could indicate potentially important explanatory mechanisms linking parental incarceration and children's antisocial behavior. Note that although antisocial behavior is commonly associated with other kinds of youth problems (such as drug use and mood disorders) explanatory factors are not necessarily the same (Loeber, Farrington, Stouthamer-Loeber, & van Kammen, 1998). There are three main possible explanations for the specific association of parental incarceration with children's antisocial behavior.

A first possible explanation for the specific association with children's antisocial behavior is an interaction between preexisting antisocial propensity and the stressful experiences caused by parental incarceration. Social modeling processes might be implicated here. If children grow up seeing their parents respond to stressful life events with antisocial behavior, they may be socialized into having antisocial reactions to disruptive events, such as parental incarceration. This "double whammy" of prior exposure to parental antisocial behavior and strains caused by parental incarceration might interact to increase the probability of children developing antisocial behavior without necessarily affecting other outcomes. Another potentially important interaction is between the genetic risk transmitted by antisocial parents and the social impacts of parental incarceration. Thus, a gene \times environment interaction or correlation may be implicated in the increased risk for antisocial behavior among children of incarcerated parents.

A second possible explanation for the specific association between parental incarceration and children's antisocial behavior is that the stigma of parental incarceration has particular effects on this outcome. Stigma can manifest itself in social bias toward children with incarcerated parents: peers, teachers, and other community members believing that "the apple doesn't fall far from the tree" (Phillips & Gates, 2011) or viewing children with incarcerated parents as destined toward a life of crime (Braman, 2004, pp. 173–174). Although criminological research clearly shows that intergenerational criminal behavior is only a probabilistic phenomenon, according to criminological labeling theory, social expectations can produce self-fulfilling prophecies by cutting children off from conventional others, fostering a delinquent self-image, and increasing the probability of antisocial and criminal behavior (Becker, 1963; Farrington & Murray, in press; Lemert, 1967). These hypothetical mechanisms linking parental incarceration and children's later antisocial behavior would need to be carefully tested in new empirical studies.

A third possible explanation for the specific effects on antisocial behavior is that unmeasured confounding variables have particular effects on this outcome: the observed association with antisocial behavior might be spurious. For example, preexisting genetic and social influences that predispose children toward antisocial behavior might have been inadequately controlled in existing studies. If this were true, the association between parental incarceration and children's antisocial behavior would reflect the intergenerational transmission of antisocial behavior (via other mechanisms) rather than an impact of parental incarceration itself (Murray & Far-

ington, 2008a). To test this hypothesis, it would be highly desirable to employ genetically sensitive research designs, such as longitudinal twin studies, to tease apart the relevant environmental and genetic mechanisms involved (Moffitt & Caspi, 2006).

We conclude that although some individual studies and prior reviews have suggested that there are multiple types of adverse effects of parental incarceration on children, taking all evidence into account, the only outcome that remains associated with parental incarceration after adjustment for covariates is children's antisocial behavior. Among the most rigorous studies to date, the average effect size for antisocial behavior was $OR = 1.4$. This can be transformed into a percentage difference in antisocial behavior between children with incarcerated parents and children without incarcerated parents (Lipsey & Wilson, 2001, pp. 151–154). When this is done, the difference in antisocial behavior between children of incarcerated parents and comparison children is approximately 10%.

It must be emphasized that although existing studies point toward the possibility that parental incarceration increases the risk for children's antisocial behavior, firm causal conclusions cannot be drawn. No randomized experiment has been conducted on this topic, and the nonexperimental studies that have been conducted to date might be systematically biased. There was some evidence that even if studies included more covariates, effect sizes would not reduce much further: Metaregression showed no reduction in effect sizes with more covariates controlled. Nonetheless, it is very hard to rule out all alternative explanations for associations in nonexperimental studies.

Several commentators have drawn connections between parental incarceration and other forms of parent–child separation, such as parental divorce (e.g., S. Gabel, 2003; Poehlmann, 2010; Richards, 1992). It is important to remember that many children with incarcerated parents were not living with their parent before the incarceration. Our meta-analysis of studies comparing children of incarcerated parents with children separated from parents for other reasons showed significantly higher risk for antisocial behavior among the parental incarceration group. Therefore, it is clear that parent–child separation *per se* is not the main influence explaining children's outcomes after parental incarceration.

Given considerable variation in the study results, we investigated possible moderators of the association between parental incarceration and children's antisocial behavior. Although several possible moderators have been suggested in the literature, we found no significant differences in study results according to the following variables: the child's sex, which parent was incarcerated, the child's age at the time of parental incarceration, the child's age at the time of outcome, the "crime" outcomes versus outcomes of "general antisocial behavior," and whether studies were conducted in the United States. Also, there was no evidence that the effects of parental incarceration have diminished through time in the United States, as some researchers have speculated.

Why did the current meta-analysis reveal no significant moderator effects for the association between parental incarceration and children's antisocial behavior? First, it is possible that the effects of parental incarceration are similar across a range of different circumstances. The reasons why it has been speculated that maternal incarceration has stronger effects on children than paternal incarceration, for example, have to do with mechanisms of separation, changes in childcare, and difficulties staying in contact.

However, if other mechanisms are more important and have relatively uniform effects, this could explain the lack of significant moderator variables. For example, levels of stigma resulting from maternal and paternal incarceration might be quite similar and have similar consequences for children.

A second possible explanation for the lack of significant moderator effects relates to confounding. Expected moderator effects assume a causal relationship between parental incarceration and children's outcomes. For example, the hypothesis that maternal incarceration is more harmful for children than paternal incarceration assumes that parental incarceration itself has a causal impact. If the association is in fact spurious rather than caused by the incarceration experience then the rationale for the expected moderator effects will not apply.

A third possible reason for the lack of moderator effects is that the range of moderator variables that we investigated was limited, and perhaps there are other, untested moderator variables that do have significant effects. For example, it is possible that significant moderators would have been found if we had tested other variables such as whether parents and children were living together before the incarceration, the quality of prior and ongoing family relationships, what children are told about the event, the offence for which parents are incarcerated, the length of parental incarceration, types of incarceration (jail or prison, and types of prison), levels of social support, family income, and neighborhood context. We could not test these variables as moderators because not enough primary studies reported the relevant information. Finally, it should be remembered that the tests of possible moderators in the current analysis compared results across a diverse group of studies that also varied in sample characteristics, measures used, and methodologies. Therefore, it is possible that real moderator effects were obscured because of these differences.

Limitations and Directions for Future Research

The conclusions that we are able to draw from this systematic review and meta-analysis are necessarily limited by the available primary evidence. Although we retrieved a reasonably large number of studies, few had rigorous research designs. Only three studies (including four samples) examined changes in children's behavior from before to after parental incarceration. Many studies did not control for parental criminality in comparing children with incarcerated parents and other children. No study used a randomized experimental design, limiting inferences about causal effects. Most studies only included children of incarcerated fathers or children of incarcerated parents, most of whom are likely to be fathers. Therefore, less is known about impacts of maternal incarceration on children, compared with paternal incarceration.

Many primary studies controlled for covariates with little regard to when those covariates were measured. Covariates that were measured after parental incarceration might indicate preexisting family situations, or they might represent consequences of parental incarceration itself. If such covariates are controlled for in statistical analyses, this could bias estimates of the effects of parental incarceration downward. Future studies should pay careful attention to the time ordering of variables used in analyses (see, e.g., Murray, Loeber, & Pardini, in press).

Hagan and Dinovitzer (1999, p. 152) rightly argued that "the implication of not having better and more systematic research on

the collateral effects of incarceration is that we are making penal policy in a less than fully, indeed poorly, informed fashion." New studies are needed that are specifically designed to investigate the effects of incarceration on families and children. Some key questions that still need answering are as follows: How do the effects of parental incarceration develop over time, from the point of arrest, through trial, during incarceration, and after release? What are the effects of repeated parental incarcerations, compared with the first incident? Do the effects of parental incarceration on children increase linearly the longer parents are held in prison? Which mechanisms (e.g., attachment, strain, learning, and stigma) link parental incarceration and undesirable child outcomes? Can replicable moderating factors be identified that explain variation in its effects? Does parental incarceration represent a protective factor for some children, and under what circumstances? Which child, parent, family, and wider intervention programs could support families of prisoners and prevent undesirable effects of parental incarceration on children?

We recommend two types of research design for new studies. The first is a randomized experiment in which convicted parents who would normally be incarcerated are randomly assigned either to incarceration (as usual) or to alternative sentences (e.g., community service). Randomization (with large enough samples) ensures that children with incarcerated parents and comparison children are similar on observed and unobserved factors before incarceration, making any difference afterward attributable to the incarceration itself. A few randomized experiments have been conducted on the effects of incarceration on ex-prisoner outcomes (Barton & Butts, 1990; Bergman, 1976; Killias, Aebi, & Ribeaud, 2000; Schneider, 1986). For example, Killias et al. (2000) invited people sentenced to prison for up to 2 weeks in Switzerland to participate in a study in which they were randomly assigned either to serve their sentence in prison as usual or to serve a community sentence. Among the 123 randomly assigned participants, those who received prison sentences had higher rates of rearrest 2 years later and more unfavorable attitudes toward the criminal justice system than did control participants. However, no differences were observed with respect to employment or social and private life, and effects seemed to dissipate in the long term (Killias, Gilliéron, Villard, & Poggia, 2010).

If similar experiments were conducted focusing on convicted parents and including interviews with families and children, the causal effects of parental incarceration (of a short duration) could be estimated with greater confidence than has been possible to date. Randomized studies would have to focus on short-term incarceration so that the alternative punishment condition was of comparable severity. The combination of circumstances that made the experiment by Killias and colleagues feasible (despite various forms of opposition to its implementation) was a Swiss legal provision for introducing (and thereby evaluating) new forms of punishment for limited periods of time (for instance, alternatives to incarceration) and the commitment to evidence-based policy by the director of the local corrections services and the Minister of Justice (Killias et al., 2010). One can imagine many practical, political, and ethical obstacles to conducting randomized studies of incarceration. However, these difficulties may not be as absolute as they first seem (Killias & Villettaz, 2008). A few studies now show that they can be overcome, and the benefits of randomized

experiments imply that opportunities to conduct them should be taken wherever possible (Killias & Villettaz, 2008).

The second research design that could be used to investigate the effects of parental incarceration (of various lengths) on children is a prospective longitudinal design, starting before parental incarceration takes place. To analyze development and change over time, and moderators and mediators of change (Hinshaw, 2002), new studies should include large samples and a wide range of repeated assessments, starting before parental incarceration. Nearly all studies to date have started after parental incarceration first occurred, and this makes it nearly impossible to disentangle the effects of parental incarceration from preexisting influences. Data need to be collected from both before and after parental incarceration to investigate within-individual change and isolate incarceration effects. In new studies, it would be necessary to involve enough high risk families such that parental incarceration occurs frequently during the course of the study and can be analyzed quantitatively. This might be done by recruiting a cohort of arrested or convicted parents with noncustodial sentences (who are at risk for future offending and incarceration) or including a large number of families with known correlates of incarceration, perhaps living in high risk neighborhoods.

A new prospective study might be combined with an experimental intervention aimed at reducing the risk of future parental incarceration (Loeber & Farrington, 2008). For example, a cohort of convicted parents receiving noncustodial sentences could be randomly assigned to receive additional employment programs, drug rehabilitation programs, cognitive behavioral therapy (aimed at reducing the chances of future offending and incarceration), or services as usual. Combining such experimental interventions with a longitudinal study would provide the opportunity to study effects of incarceration as it naturally occurs (in quasiexperimental analyses) while also gaining direct knowledge about the effects of prevention programs aimed at reducing incarceration.

From the start of a new prospective study, detailed assessment of multiple influences on child development should be conducted, including careful examination of children's individual characteristics, relationships with their parents and significant others, parental antisocial behavior and mental health, parenting behaviors, caretaker arrangements, and children's wider social environment. Children with incarcerated parents and comparison children should be matched (for example, using propensity scores, Rosenbaum & Rubin, 1983) on a wide range of confounding variables that are measured before incarceration. In quasiexperimental analyses, changes in outcomes should be compared between children who experience parental incarceration and carefully matched controls (Shadish, Cook, & Campbell, 2002). It is essential that confounding variables and moderating variables are measured before incarceration and that mediating variables are measured after parental incarceration so that their distinct effects can be estimated appropriately (Kraemer, Lowe, & Kupfer, 2005).

Policy and Practice Considerations

If evidence continues to point toward possible adverse effects of parental incarceration on children's antisocial behavior, intervention programs should be considered to prevent these effects. Intervention programs should be designed based on evidence about the key mediating mechanisms linking parental incarceration and

youth problem behavior (Murray & Farrington, 2006). Currently, the evidence base is too weak to draw strong conclusions about the kinds of interventions that might be most effective for children with incarcerated parents. The provision of parenting programs in U.S. prisons is sporadic, and those used tend to have little scientific basis. However, there are ongoing efforts to develop and rigorously test prison parenting programs that address the unique needs of incarcerated parents and their families (Eddy et al., 2008). Mentoring programs for children of incarcerated parents have been given considerable support from the U.S. Congress but have not been evaluated in randomized experiments (Zwiebach, Rhodes, & Dun Rappaport, 2010). Several policy initiatives have been suggested as possible ways to reduce the stigma experienced by children with incarcerated parents, as well as by prisoners themselves (Murray & Farrington, 2006). These include prohibition of the public identification of offenders, not only before conviction but also afterward (Petersilia, 2003, pp. 215–216; Walker, 1980), diversion of offenders away from courts to restorative justice conferences (Braithwaite, 1999; Sherman et al., 2005), and increased use of community services that emphasize the positive contributions that ex-offenders can make to the community (Clear, Rose, & Ryder, 2001; Maruna & LeBel, 2002, p. 167). However, little or no research has been conducted on how such policies might actually change outcomes for children.

Conclusion

The number of children experiencing parental incarceration in countries like the United States is unprecedented. Identifying and understanding the possible effects on children is of great importance. It is clear that children with incarcerated parents are at increased risk for antisocial behavior compared with their peers. However, relatively little is known about the causal effects of parental incarceration on children. This topic warrants large-scale investment to understand why children develop undesirable outcomes after parental incarceration and identify how harmful effects can be prevented.

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Appendix
Table of Studies Included in the Review

Study	Location	Sample (age, in years, of children at start of study)	Children with incarcerated parents (CIP)	Comparison children (CC)	Covariates controlled for in statistical analyses	Child outcome (age, in years, at outcome)	Effect size (OR)
Aaron & Dallaire (2010); Children at Risk (see also, Peniston, 2006)	Austin, TX; Bridgeport, CT; Memphis, TN; Seattle, WA; Savannah, GA	Boys/girls with personal/family risk factors, randomly assigned to 3 interventions or no treatment (10–14)	15 with parent incarcerated in 2 years between baseline & follow up	355 in the same study. No significant differences from CIP in child sex, age, parent gender, 8 risk indicators, sibling delinquency, and family environment scales. CIP more likely than CC to have parent drug problem, family financial problems, and family criminal victimization	Child age, sex, and intervention-control status; caretaker sex; prior parental incarceration; family conflict and family victimization; risk score (summarizing child ethnic minority; parental absence, unemployment, and drug use; family financial problems; large family)	Delinquency (12–16)	2.5
Aaron & Dallaire (2010); Children at Risk: Sibling sample	Austin, TX; Bridgeport, CT; Memphis, TN; Seattle, WA; Savannah, GA	Older siblings of main study participants, as described above (10+)	8 with parent incarcerated in 2 years between baseline and follow up	236 older siblings in same study	Main subject child age, sex, and intervention-control status; caretaker sex; prior parental incarceration; family conflict and family victimization; risk score (summarizing main child ethnic minority; parental absence, unemployment, and drug use; family financial problems; large family)	Delinquency (10+)	1.5
Allegheny County Department of Human Services (2008; see also, Brazzell, 2008)	Allegheny County, PA	Boys/girls entering foster care for first time (0–18)	699 with mother incarcerated at unknown age	3,401 with first foster care placement at the same time as CIP (2001–2004). No significant differences in sex or race, but CC are younger than CIP, and mothers are less likely to have used drugs/alcohol and mental health services	None	Juvenile justice involvement (12–17) Mental health service use (0–18) Drug/alcohol treatment use (5–17)	1.2 0.7 ^a 0.7 ^a

(Appendix continues)

Appendix (continued)

Study	Location	Sample (age, in years, of children at start of study)	Children with incarcerated parents (CIP)	Comparison children (CC)	Covariates controlled for in statistical analyses	Child outcome (age, in years, at outcome)	Effect size (OR)
Besemer et al. (2011): Cambridge Study in Delinquent Development: Sibling sample	London, England	Brothers and sisters of main study boys. Born between 1946 and 1962 and living in south London in 1962 (0–16)	103 with father/mother incarcerated between birth and age 18 years	111 with father/mother convicted between birth and age 18 but not incarcerated	Boys only: risk score (summarizing family socioeconomic class, low family income, large family size, teen mother at birth of first child, parental conflict, parents' interest in education, and poor job record of father)	Convicted (19–40)	1.2 boys 1.7 girls
Besemer et al. (2011): Transfive	National, the Netherlands	Boys/girls born between 1946 and 1962 and descendants of boys born in 1899 and sent to a reform school (0–16)	82 with father/mother incarcerated between birth and age 18 years	87 with father/mother convicted between birth and age 18 but not incarcerated	None	Convicted (19–40)	0.4 boys 1.2 girls
Bryant & Rivard (1995)	South Carolina	Boys/girls in social and mental health services (5–17)	66 with father/mother incarcerated at unknown age	114 in same clinics as CIP	Child age, clinic treatment service level, sibling incarceration, and child ran away from home	Juvenile justice contact (5–17)	2.5
Carter & Dallaire (2009)	Williamsburg, VA	Boys/girls in a juvenile detention center (13–17)	9 with father/mother ever incarcerated	23 in same juvenile detention center as CIP. Similar to CIP on 4 mother-child relationship variables and father-child alienation. CIP significantly higher scores on father-child relationship quality, trust and communication, and family pride. CC higher scores on emotional distance	None	Delinquency (13–17)	0.7
Cox (2009): Longitudinal Study of Child Abuse and Neglect	Baltimore, MD; Chicago, IL; Seattle, WA; San Diego, CA; North Carolina	Boys/girls born 1986–1994; in child protection services, foster care, or other clinics; plus not high risk control group (4)	305 with father/mother incarcerated between ages 4–9	305 in same cohort matched on child sex, race, and high risk for neglect	None	Externalizing (6–9) Internalizing (6–9) Academic problems (6–9) Juvenile incarceration/ Adult conviction (15–46) Clinical depression (15–46) Drug dependence (15–46)	1.3 1.0 1.0
Crowe (1972, 1974; 1975)	Iowa	Adopted boys/girls followed up in adulthood (15–46)	46 with mother incarcerated soon after birth	46 matched to CIP on age, sex, race, and approximate age at time of adoption. Very similar to CIP on parental psychopathology in the adoptive families, socioeconomic status, and broken homes	None		8.0 1.4 0.3

(Appendix continues)

Appendix (continued)

Study	Location	Sample (age, in years, of children at start of study)	Children with incarcerated parents (CIP)	Comparison children (CC)	Covariates controlled for in statistical analyses	Child outcome (age, in years, at outcome)	Effect size (OR)
Dallaire & Zeman (n.d.): Main CC comparison	Mid-Atlantic city in the United States	Boys/girls in elementary schools (7–11)	80 with father/mother currently or previously incarcerated	54 in same schools who had never experienced a separation from a parent	None	Aggressive behavior (7–11)	3.1 ^a
Dallaire & Zeman (n.d.): CC separated for other reasons	Mid-Atlantic city in the United States	Boys/girls in elementary schools (7–11)	80 with father/mother currently or previously incarcerated	69 in same schools separated from parents for other reasons—commonly marital separation/divorce and parental work/family commitments	None	Aggressive behavior (7–11)	1.7
Dallaire et al. (2009)	Southern city in the United States	Boys/girls recruited via incarcerated parents and faith based support groups ($M = 10$, $SD = 3.7$)	32 with father/mother currently incarcerated and in substance abuse rehabilitation program	32 separated from parents because of parental divorce/separation, child abandonment, or substance abuse/rehabilitation. Recruited from faith-based support groups in same areas as CIP. Similar to CIP in age, sex, ethnicity, and relation to absent parent; negative life events; 8 family environment variables; caregiver stress, depression, warmth, and hostility	None	Rule breaking/aggressive ($M = 10$) Anxious/withdrawn/depressed ($M = 10$)	1.0 0.9
Dannerbeck (2003, 2005) ^b	Missouri	Boys/girls in juvenile court (<21)	346 with parent incarcerated at unknown age	766 in same juvenile courts as CIP. CC parents less likely to have mental disorder, substance abuse history, and effective parenting; CC more likely to have abuse, placement history, young first court referral, and assault referral	For delinquency outcome only: child sex, race, mental health, academic performance, school attendance, substance abuse, interpersonal skills, age at first court referral, referral for assault, prior out of home placement, and child abuse/neglect; parental mental health, substance abuse, ineffective parenting; and peer influence	Prior delinquency referrals (<21) Mental disorder (<21) Substance abuse (<21) Poor academic performance (<21)	1.1 1.3 1.5 ^a 1.3 ^a

(Appendix continues)

Appendix (continued)

Study	Location	Sample (age, in years, of children at start of study)	Children with incarcerated parents (CIP)	Comparison children (CC)	Covariates controlled for in statistical analyses	Child outcome (age, in years, at outcome)	Effect size (OR)
Drabkin et al. (n.d.): Great Smoky Mountains Study: Main CC comparison	North Carolina	Boys/girls in public schools; oversample of children with high behavior problem scores (9, 11, & 13)	313 with parent figure ever incarcerated up to age 16 years	1,012 in same cohorts excluding children whose parents had died. No significant differences between CC and CIP on child sex or race, but CIP more likely to have low socioeconomic status, parental mental health difficulties, and physical or sexual abuse	Child sex, race, low socioeconomic status, parental mental health difficulties, and physical or sexual abuse	Crime (16–21) Emotional disorder (9–16 & 19–21) Substance use disorder (9–16 & 19–21)	1.8 1.4 0.9
Drabkin et al. (n.d.): Great Smoky Mountains Study: CC separated for other reasons	North Carolina	Boys/girls in public schools; oversample of children with high behavior problem scores (9, 11, & 13)	313 with any parent figure ever incarcerated up to age 16 years	95 in same cohorts as CIP whose parents had died. CC and CIP similar in child race, but CIP more likely to be female, have low socioeconomic status, parental mental health difficulties, and physical or sexual abuse	Child sex, race, low socioeconomic status, parental mental health difficulties, and physical or sexual abuse	Crime (16–21) Emotional disorder (9–16 & 19–21) Substance use disorder (9–16 & 19–21)	2.7 2.7 1.8
Evens & Stoep (1997)	King County, WA	Boys/girls entering mental health services (10–17)	124 with father/mother or adoptive/foster parents incarcerated at unknown age	236 in the same age range and entering same mental health services as CIP	History of physical abuse, drug and alcohol use	Police referrals (10–17)	1.5
Gabel & Shindedecker (1992, 1993)	New York, NY	Boys/girls treated at a day hospital (5–12)	11 with father incarcerated at unknown age	20 in same age range and treated at same day hospital as CIP. CC not significantly different in race or child abuse but less likely than CIP to have parents with substance abuse	None	Delinquency (5–12) Internalizing (5–12)	5.5 boys 1.6 girls 0.6 boys 0.6 girls

(Appendix continues)

Appendix (continued)

Study	Location	Sample (age, in years, of children at start of study)	Children with incarcerated parents (CIP)	Comparison children (CC)	Covariates controlled for in statistical analyses	Child outcome (age, in years, at outcome)	Effect size (OR)
Geller et al. (in press) ^b : Fragile Families and Child Wellbeing Study: Main CC comparison (see also Craigie, 2009; Dyer, 2009; Garfinkel et al., 2008; Geller et al., 2008, 2009; Wakefield & Wildeman, 2011; Wildeman, 2008, 2010)	20 cities in the United States	Boys/girls born to mostly unmarried mothers in 1998–2000 (0)	577 with father incarcerated between ages 3 years and 5 years (143 with mother incarcerated analyzed separately)	2,132 in same cohort as CIP	Child sex, birthweight, birth order, and outcome scores at age 3 years; prior parental incarceration; concurrent maternal incarceration; parents cohabiting at birth; father and mother: race, immigrant status, impulsivity, cognitive score, age at child's birth, education, employed, hard drug use, and alcohol use; father/mother lived with both their parents at 15 years; maternal poverty, health, domestic violence, and smoked in pregnancy; father's income; maternal/paternal grandmother depression	Aggressive behavior (5) Internalizing (5) Verbal ability test (5)	1.9 ^a boys 1.4 ^a girls 1.1 boys 0.9 girls 1.1 boys 1.0 girls
Geller et al. (in press) ^b : Fragile Families and Child Well-being Study: CC separated for other reasons	20 cities in the United States	Boys/girls born to mostly unmarried mothers in 1998–2000 (0)	577 with father incarcerated between ages 3 years and 5 years	1,339 in same cohort as CIP with fathers absent for reasons other than incarceration	Child sex, birth weight, birth order, and outcome scores at age 3 years; prior parental incarceration; concurrent maternal incarceration; parents cohabiting at birth; father and mother: race, immigrant status, impulsivity, cognitive score, age at child's birth, education, employed, hard drug use, and alcohol use; father/mother lived with both their parents at 15 years; maternal poverty, health, domestic violence, and smoked in pregnancy; father's income; maternal/paternal grandmother depression	Aggressive behavior (5) Internalizing (5) Verbal ability test (5)	1.4 ^a 1.0 1.2 ^a

(Appendix continues)

Appendix (continued)

Study	Location	Sample (age, in years, of children at start of study)	Children with incarcerated parents (CIP)	Comparison children (CC)	Covariates controlled for in statistical analyses	Child outcome (age, in years, at outcome)	Effect size (OR)
Giordano (2010) ^b : Ohio Life-Course Study	Ohio	Sons/daughters of men/women institutionalized as adolescents in 1982 (8–22)	114 with father/mother incarcerated at unknown age	44 in same study as CIP	Child sex, age, and ethnicity; parent substance abuse, parent–child attachment, and parental monitoring	Delinquency (8–22)	1.3
Gordon (2009) Christchurch Health and Development Study	Christchurch, New Zealand	Boys/girls born in Christchurch in 1977 (0)	33 with parent ever incarcerated up to age 15 years	953 in same cohort as CIP	None	Arrested/convicted (21–25) Depression/ anxiety disorder (21–25) Drug dependence (21–25) No educational qualifications (25)	2.6 ^a 1.6 2.6 ^a 4.3 ^a
Hagan & Foster (2009) National Longitudinal Study of Adolescent Health (see also, Foster & Hagan, 2007, 2009)	National, United States	Boys/girls in Grades 7–12 during 1994–1995 school year (12–18)	828 with father incarcerated between ages 0–12 years	12,977 in same study	Child sex, race, age, and delinquency; father education, alcoholism, and smoking; closeness with father; single parent family; school rate of paternal incarceration, single parent families, household income, crime, and student attendance; school size, urbanicity, number of teachers, education level of teachers, and public school status	Lower school grades (cumulative to 2001–2002 school year)	1.5 ^a
Hayatbakhsh et al. (2007): Mater University Study of Pregnancy: Main CC comparison	Brisbane, Australia	Boys/girls born to mothers pregnant in Brisbane between 1981–1983 (0)	123 with father (mother's partner) incarcerated up to age 14 years	1,854 in the same cohort as CIP whose mothers had partners without arrests at age 14 years	Child sex; child internalizing, externalizing, smoking, and alcohol use during adolescence; maternal age, education, depression, anxiety, smoking, alcohol use, and marital circumstances; mother–child communication; family income	Cannabis use (21)	1.1
Hayatbakhsh et al. (2007): Mater University Study of Pregnancy: CC separated for other reasons	Brisbane, Australia	Boys/girls born to mothers pregnant in Brisbane between 1981–1983 (0)	123 with father (mother's partner) incarcerated up to age 14	248 in the same cohort as CIP with single mothers at age 14	None	Cannabis use (21)	0.9

(Appendix continues)

Appendix (continued)

Study	Location	Sample (age, in years, of children at start of study)	Children with incarcerated parents (CIP)	Comparison children (CC)	Covariates controlled for in statistical analyses	Child outcome (age, in years, at outcome)	Effect size (OR)
Huebner & Gustafson (2007): National Longitudinal Survey of Youth (see also, Wintfield, 2008)	National, United States	Sons/daughters of nationally representative sample of women aged 14–22 years in 1978 (0)	31 with mother ever incarcerated up to ages 18–24 years	1,666 in the same cohort as CIP. CC not significantly different from CIP in sex, race, home environment, parental supervision, peer pressure, and maternal years of education. CIP more likely than CC to have mother: non-White, adolescent, smoked in pregnancy, absent, and delinquent	Child age, sex, race, delinquency, education, maternal age, education, delinquency, absence, smoking during pregnancy; parental supervision, home environment, and peer pressure	Convicted (up to 18–24 years)	3.0 ^a
Johanson (1974)	National, Sweden	Imprisoned and nonimprisoned men born in the same parish in Sweden (19–23)	35 with father incarcerated (and 4 with mother incarcerated) at unknown age	189 in same study as CIP	None	Incarceration (19–23)	6.2
Johnson (2009): Panel Study of Income Dynamics	National, United States	Boys/girls aged 0–12 years in 1997 in nationally representative sample of families recruited in 1968 (0–12)	~584 with father/mother incarcerated in one of three age periods: 0–5 years, 6–11 years, 11–16 years	~3,750 in same cohort as CIP	Child sex, age, and race; parental incarceration at other ages, family member alcohol problems, religiosity, parental education, mother married, neighborhood quality, and neighborhood policing for drugs	Antisocial behavior (3–17) Internalizing (3–17)	3.1 ^a 3.2
Kandel et al. (1988): Danish Cohort Study (see also, Mednick & Kandel, 1988)	Copenhagen, Denmark	Boys born between 1936–1938 in Copenhagen (0)	92 with father incarcerated at unknown age	513 in the same cohort as CIP. Excluded boys with minor offenses, boys whose fathers had only minor offenses, and serious offenders with no jail sentence	None	Incarceration (up to 34–36)	8.5 ^a
Kinner et al. (2007): Mater University Study of Pregnancy (see also, Bor et al., 2004)	Brisbane, Australia	Boys/girls born to mothers pregnant in Brisbane between 1981–1983 (0)	137 with father (mother's partner) ever incarcerated up to age 14 years	2,262 in the same cohort as CIP	Maternal age, education, anxiety/depression, and alcohol/tobacco use; family income, dyadic adjustment, domestic violence, and parenting style	Antisocial behavior (14) Internalizing (14)	1.3 boys 1.2 girls 1.1 boys 1.9 girls

(Appendix continues)

Appendix (continued)

Study	Location	Sample (age, in years, of children at start of study)	Children with incarcerated parents (CIP)	Comparison children (CC)	Covariates controlled for in statistical analyses	Child outcome (age, in years, at outcome)	Effect size (OR)
Kjellstrand (2009) Linking Interests of Families and Teachers study (see also, Kjellstrand & Eddy, 2011a, 2011b)	Eugene–Springfield, Oregon	Boys/girls in 1st and 5th grades in 1991 and in experimental evaluation of a school-based preventive intervention program (5–10)	69 with father/mother incarcerated between birth and age 10 years	602 in same cohort as CIP. CC parents less likely than CIP parents to be lower socioeconomic status and have depression/health problems and less likely to use inconsistent/inappropriate discipline; CC more likely to be White	Parent health and depression; family income, socioeconomic status and hours of work; parent–child praise, monitoring involvement, relationship quality, and inappropriate and inconsistent discipline; experimental intervention assignment	Antisocial behavior (15–16)	2.3 ^a
Moerk (1973)	Unknown location in the United States	Boys of low socioeconomic class (11–20)	24 with father incarcerated from birth to age 15	24 with fathers absent because of parental divorce, matched to CIP on socioeconomic status, parental education, ethnicity, and age at separation from father	None	Behavior problems (11–20)	0.8
Murray & Farrington (2005, 2008a, 2008b) ^b ; Cambridge Study in Delinquent Development: Main CC comparison (see also, Murray, 2006; Osborn & West, 1979)	London, England	Boys born about 1953 and living in south London in 1962–1963 (8)	23 with father/mother incarcerated from birth to age 10 years	17 boys in the same cohort as CIP but with parental incarceration before the boy's birth and not afterward. CC not significantly different from CIP on 9 individual and family risk factors. CIP more likely to have low socioeconomic status and low family income	Boy's IQ, daring, family size, and number parental convictions Boy's junior attainment, family income, and number parental convictions Poor marital relations and number parental convictions Boy's IQ, harsh maternal attitude, family size, and number parental convictions	Conviction (10–18 & 19–50) Internalizing (48) Drug use (18 & 48) Poor educational performance (14) Conviction (10–18 & 19–50)	1.4 2.9 3.9 22.8 ^a
Murray & Farrington (2005, 2008a, 2008b) ^b ; Cambridge Study in Delinquent Development: CC separated for other reasons (see also, Murray, 2006)	London, England	Boys born about 1953 and living in south London in 1962–1963 (8)	23 with father/mother incarcerated from birth to age 10 years	138 boys in same cohort as CIP separated from parents for other reasons for at least 1 month between birth and age 10 years: 77 because of hospitalization or parental death and 61 principally because of parental discord. CC and CIP not significantly different on 5 individual and family risk factors. CIP more likely than CC to have low IQ, poor attitude father, large family, low socioeconomic status, and low family income	Boy's IQ, daring, number of parental convictions, and family size Boy's junior attainment, family income, and number parental convictions Poor marital relations and number parental convictions Boy's IQ, harsh maternal attitude, family size, and number parental convictions	Internalizing (48) Drug use (18 & 48) Poor educational performance (14) Conviction (10–18 & 19–50)	2.2 1.5 1.4 6.9 ^a

(Appendix continues)

Appendix (continued)

Study	Location	Sample (age, in years, of children at start of study)	Children with incarcerated parents (CIP)	Comparison children (CC)	Covariates controlled for in statistical analyses	Child outcome (age, in years, at outcome)	Effect size (OR)
Murray, Janson, & Farrington (2007) ^b ; Project Metropolitan	Stockholm, Sweden	Boys/girls born in 1953 and living in Stockholm in 1963 (10)	283 with father/mother incarcerated between ages 0 years and 6 years or 7 years and 19 years	245 in same cohort as CIP with parental incarceration before birth but not afterward	Number parental convictions and family social class	Conviction (19–30)	1.6 boys 1.4 girls
Murray, Loeber, & Pardini (in press); Pittsburgh Youth Study	Pittsburgh, PA	Boys randomly selected from Pittsburgh public schools, with oversample of boys with higher behavior problem scores (7 years and 13 years)	52 with any parent incarcerated between start of study and age 18 years	156 in same study, individually matched to CIP children in the same cohort on propensity scores (covariates used to calculate propensity scores listed on the right)	Child theft, marijuana use, depression, and academic achievement in year before parental incarceration; parental incarceration before start of study; parent lifetime antisocial behavior, substance use, and arrests/convictions until year before incarceration; caretaker stress, parent-child communication, parental supervision, boy involved with family, peer relations, and peer delinquency in year before parental incarceration	Theft (1–7 years after parent incarcerated) Marijuana use (1–4 years after parent incarcerated) Depression (1–4 years after parent incarcerated) Poor educational performance (1–4 years after parent incarcerated)	1.5 1.3 1.1 1.1
Neal (2009)	Tennessee	Boys/girls in mentoring programs for children with incarcerated parents and children in single-parent households (6–16)	66 with parent incarcerated any time since birth	39 in mentoring programs for children in single-parent households. CC had fewer caregiver changes and higher caregiver education than CIP	None	Lower school test scores (6–16)	1.4
Pakiz et al. (1997); Simmons Longitudinal Study	Northeast United States	Boys in public school kindergarten in 1977 (5)	Parent ever incarcerated up to age 18 years. CIP + CC = 188	Children in the same cohort as CIP	Childhood behavior problems, physical abuse in family, family disadvantage, school grades, and marijuana use	Antisocial behavior (21)	5.4 ^a

(Appendix continues)

Appendix (continued)

Study	Location	Sample (age, in years, of children at start of study)	Children with incarcerated parents (CIP)	Comparison children (CC)	Covariates controlled for in statistical analyses	Child outcome (age, in years, at outcome)	Effect size (OR)
Phillips et al. (2002)	Arkansas	Boys/girls using mental health services (11–18)	100 with father/mother incarcerated at unknown age	137 in the same age range and in the same mental health services as CIP	None	Conduct disorder/oppositional defiant disorder (6 months later) Depression/anxiety disorder (6 months later) Drug abuse/dependency (6 months later) Externalizing Internalizing	1.3 0.9 1.9 0.8 0.8
Poehlmann et al. (2008) ^b	Midwest United States	Boys/girls separated from mothers, living with grandparents (3–7)	36 with mother currently incarcerated	40 with custodial grandparents and in same age range as CIP, separated from mothers because of maternal substance abuse/mental health problems, abandonment, or other problems. CC not significantly different from CIP in child sex, ethnicity, age, number of family sociodemographic risks, and grandparent's age. CC separated from mothers longer than CIP	None		
Roettger et al. (2010) National Longitudinal Study of Adolescent Health (see also, Roettger, 2009)	National, United States	Boys/girls in Grades 7–12 during the 1994–95 school year (12–18)	2,134 with father ever incarcerated	12,976 in same study. CC less likely than CIP to have mothers with history of binge drinking, arrests as juveniles, substance using friends, low family and neighborhood socioeconomic status, and low father involvement	Child age, race, low self-control, and juvenile arrest; parental supervision, physical abuse, mother drinking, father closeness, father involvement, two biological parents, socioeconomic status, friend marijuana use, school attachment, and neighborhood poverty	Hard drug use (12–27)	1.6 ^a boys 1.3 ^a girls
Sarri et al. (2011)	Michigan	Males/females being released from juvenile and adult prisons (juvenile sample median = 18; adult sample median = 24)	62 with father/mother ever incarcerated	33 in same institutions as CIP. CC and CIP not significantly different on child sex, grew up with both parents, low supervision, many moves, stigma, understanding legal rights, and perceived court fairness. CC more likely than CIP to be White, and to be in adult prisons and less likely to have negative life events, have drunk parents, be in foster care, and experience material disadvantage	None	Depression (median 18 & 24) Drug abuse (median 18 & 24) Poor school grades (median 18 & 24)	1.1 0.6 0.8

(Appendix continues)

Appendix (continued)

Study	Location	Sample (age, in years, of children at start of study)	Children with incarcerated parents (CIP)	Comparison children (CC)	Covariates controlled for in statistical analyses	Child outcome (age, in years, at outcome)	Effect size (OR)
Siegel & Marano (2008) Developmental Victimization Survey	National, United States	Boys/girls sampled through random telephone digit dialing (10–17)	92 with father/mother incarcerated between birth and ages 10–17 years	924 children in the same study. CC less likely than CIP to be Hispanic, low socioeconomic class, subject to maltreatment, or living with single parent	Child age, Hispanic race, witness/indirect victimization, maltreatment, child sent/taken away, number of parents, parental substance abuse, parental warmth, socioeconomic status, school attachment, and neighborhood violence	Delinquency (10–17)	1.6
Stanton (1980)	California	Boys/girls with mothers incarcerated (CIP) or on probation (CC). (4–18)	24 with mother currently incarcerated	18 in same age range as CIP but with mothers on probation. CC and CIP not significantly different in sex, age, number of siblings, and financial support before mother's sentence; mother's age, race, marital status, CC more likely than CIP to be White and be of a higher social class. CC mothers less likely than CIP mothers to have been unemployed or have prior criminal justice involvement	None	Antisocial behavior (4–18) Poor academic performance (4–18)	2.3 11.4 ^a
Stroble (1997): Main CC comparison	Richmond, VA	Boys/girls in public high school (14–18)	15 with parent ever incarcerated up to ages 14–18 years	15 students in the same school as CIP, with both parents at home. CC and CIP similar in sex, but CC slightly older than CIP	None	Depression (14–18) Low school test scores	3.3 1.1
Stroble (1997): CC separated for other reasons	Richmond, VA	Boys/girls in public high school (14–18)	15 with parent incarcerated up to age 14–18	15 students in same school as CIP, living in single parent families. CC and CIP similar in sex and age	None	Depression (14–18) Low school test scores	0.9 0.6
Swisher & Roettger (2011) ^b : National Longitudinal Study of Adolescent Health (see also, Roettger, 2008, 2009, n.d.; Roettger & Swisher, 2008)	National, United States	Boys/girls in Grades 7–12 during the 1994–1995 school year (12–18)	1,224 with father incarcerated between birth and 12–18 years	12,962 in same study. CC less likely than CIP to have mothers with a history of binge drinking, arrests as juveniles, substance using friends, low family and neighborhood socioeconomic status, and low father involvement	Child age, race, sex, and temperament; physical abuse, family structure, father not known, and socioeconomic status	Delinquency (12–27) Depression (12–27)	1.5 ^a 1.2 ^a

Appendix (continued)

Study	Location	Sample (age, in years, of children at start of study)	Children with incarcerated parents (CIP)	Comparison children (CC)	Covariates controlled for in statistical analyses	Child outcome (age, in years, at outcome)	Effect size (OR)
Tasca et al. (2011)	Maricopa, AZ	Boys/girls referred to a juvenile court and followed up 1 year after court disposal ($M = 16$, $SD = 1.2$)	55 with father/mother ever incarcerated	301 from same courts as CIP	Child age, sex, race, type of offense, prior referral, and mother/father drug use history	Rearrest (1 year after court disposal)	2.3 ^a
Trice & Brewster (2004)	Virginia	Boys/girls (13–19)	47 with mother currently incarcerated	41 same sex best friends of CIP	None	Arrest (previous year) Failing classes	3.0 ^a 3.3 ^a
van der Rakt, Murray, & Nieuwbeerta (in press) ^b ; Criminal Careers and Life Course Study (see also, van der Rakt, 2010)	National, the Netherlands	Boys/girls born up to 2003 whose fathers had a criminal conviction in 1977 (18+)	1,254 with father incarcerated between ages 0 and 12 years and 18 years	569 in same cohort as CIP, but father incarcerated only before birth	Child sex, age, number of offenses of father, criminal trajectory group father, father born abroad, alcohol/drug abuse by father, teen-pregnancy mother, parental separation, and family size	Conviction (18–30)	1.1 boys 1.6 girls
Wakefield & Wildeman (2011); Project on Human Development in Chicago Neighborhoods (see also, Wakefield, 2007, n.d.)	Chicago, IL	Boys/girls in four cohorts recruited between 1994–1997 (6–15)	69 with father incarcerated between start of study and 3 years later	2,313 in same study as CIP	Child age, sex, and race; prior child outcome scores, parental education and employment, household income, parental criminal history, and relationship to primary caregiver	Antisocial behavior (9–18) Internalizing (9–18)	1.6 2.2 ^a
Wilbur et al. (2007)	Boston, MA	Boys/girls in a study of the effects of cocaine exposure in utero (0)	31 with father incarcerated between ages 6–11	71 in the same cohort as CIP. CC and CIP not significantly different in maternal education, ethnicity, mental health, use of alcohol, cigarettes, and marijuana in pregnancy; father drug/alcohol problem and child birth weight. CC had a higher proportion (50%) exposed to cocaine in utero than CIP (32%)	Child age, sex, and exposure to cocaine in utero	Antisocial behavior (6–11) Internalizing (6–11)	2.3 1.1

Note. Results are shown separately for boys and girls where possible. Results are shown separately for comparisons made with children separated from parents for other reasons. Results are averaged across similar outcomes measured in childhood and adulthood and across different types of parental incarceration (e.g., maternal and paternal incarceration): Results used in the meta-analyses may be slightly different.

^a Confidence interval for odds ratio does not include 1.0. ^b Additional, unpublished information provided by the author(s) was used to calculate the results.

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