

# Paternal Incarceration and Children's Food Insecurity: A Consideration of Variation and Mechanisms

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**ABSTRACT** Despite growing attention to the unintended intergenerational consequences of incarceration, little is known about whether and how paternal incarceration is related to children's food insecurity. In this article, I use data from the Fragile Families and Child Well-Being Study to examine the relationship between paternal incarceration and children's food insecurity. Propensity score matching models indicate that recent paternal incarceration, defined as incarceration in the past 2 years, is associated with an increased likelihood of food insecurity among 5-year-old children, but only among children living with their biological fathers prior to his incarceration. These associations cannot be explained by the mechanisms considered, including post-incarceration changes in economic well-being, parental relationships, maternal parenting, and maternal health. Taken together, the findings highlight the salience of the father's residential status in linking paternal incarceration to children's food insecurity, and they have a number of implications for policy and practice.

## **INTRODUCTION**

The rise in incarceration rates since the mid-1970s, especially among poorly educated minority men living in disadvantaged neighborhoods, means that a historically unprecedented number of children experience paternal incarceration (Patillo, Weiman, and Western 2004; Wakefield and Uggen 2010; Carson 2014). In response, scholars across an array of disciplines have developed an acute interest in understanding the intergenerational consequences of incarceration. This rapidly burgeoning literature documents the mostly negative academic, behavioral, and health consequences for children of incarcerated fathers (for reviews, see Eddy and Poehlmann [2010], Wakefield and Uggen [2010], Wildeman and Western [2010], Johnson and Easterling [2012], Murray, Farrington, and Sekol [2012], Wildeman, Wakefield, and Turney [2013], and Travis, Western, and Redburn [2014]). Further, *Social Service Review* (June 2015). © 2015 by The University of Chicago. All rights reserved. 0037-7961/2015/8902-0004\$10.00

because paternal incarceration is concentrated among already vulnerable poor and minority children, an unintended consequence of the growing prison population may be increased inequality among children (Wakefield and Wildeman 2013).

Despite increasing attention to the consequences of paternal incarceration for child well-being across the life course, little is known about whether and how paternal incarceration is related to food insecurity among children (however, for research on this topic, see Wallace and Cox [2012]), an especially acute and severe form of deprivation that is distinct from other indicators of economic insecurity or hardship (McIntyre et al. 2003). There are good reasons to expect that paternal incarceration increases children's risk of food insecurity and that this association is particularly strong among children living with their fathers prior to their fathers' confinement. Young children are especially at risk of experiencing food insecurity, as they are exposed to fewer alternative food resources than older children (e.g., school meal programs, meals at friends' houses) and may thus experience especially deleterious consequences of food insecurity (Slack and Yoo 2005).

I use data from the Fragile Families and Child Well-Being Study (FFCWB), a longitudinal sample of urban children born to mostly unmarried parents between 1998 and 1999, many of whom experience paternal incarceration during early childhood, to answer two research questions. First, what is the relationship between paternal incarceration and food insecurity among children with residential fathers (prior to incarceration) and children with nonresidential fathers (prior to incarceration)? Second, to what extent do post-incarceration changes in economic well-being, parental relationships, maternal parenting, and maternal health explain the relationship between paternal incarceration and children's food insecurity? Overall, given the substantial number of children who experience paternal incarceration, the unequal distribution of incarceration across the population, and the importance of food insecurity for children's life course trajectories, disentangling the consequences of paternal incarceration for children's food insecurity adds a fundamental new dimension to our understanding of childhood inequality.

## **BACKGROUND**

### **FOOD INSECURITY AMONG CHILDREN**

Food insecurity, defined by the Economic Research Service (ERS) of the US Department of Agriculture (USDA) as having limited access to adequate

food due to lacking economic or other resources, is a large and growing problem in the United States (Nord 2009; Coleman-Jenson, Gregory, and Singh 2014). In 2013, nearly 18 million households in the United States were food insecure, and about 8.6 million children (11.7 percent) lived in households where at least one child was food insecure (Coleman-Jenson et al. 2014). Food insecurity among children is not evenly distributed across the population and, instead, is more common among minority children, children living in households with incomes below the poverty line, and children with single parents. About three-fifths of food-insecure households participate in at least one federal food and nutrition program, suggesting that these programs still leave some families vulnerable (Coleman-Jenson et al. 2014).

The consequences of food insecurity among children are wide-ranging. Food insecurity or hardship is associated with educational outcomes, including reduced test scores, a greater likelihood of retention, and lower school engagement (Alaimo, Olson, and Frongillo 2001; Ashiabi 2005; Jyoti Frongillo, and Jones 2005; Howard 2011; however, also see Dunifon and Kowaleski-Jones [2003], which finds that food insecurity is associated with children's health and behavior but not their test scores); behavioral outcomes including internalizing problems, externalizing problems, poor social skills, and visits to a psychologist (Kleinman et al. 1998; Murphy et al. 1998; Alaimo et al. 2001; Weinreb et al. 2002; Dunifon and Kowaleski-Jones 2003; Slack and Yoo 2005; Whitaker, Phillips, and Orzol 2006; Zaslow et al. 2009; Belsky et al. 2010; Huang, Oshima, and Kim 2010; Slopen et al. 2010; also see Fram et al. 2011); and health outcomes, including stomachaches, headaches, and poor general health (Kaiser and Townsend 2005; Cook et al. 2006; Chilton et al. 2009; Eicher-Miller et al. 2009; Gundersen and Kreider 2009). Therefore, it is possible that children's food insecurity explains some of the negative relationship between paternal incarceration and children's educational (e.g., Haskins 2014; Turney and Haskins 2014), behavioral (e.g., Geller et al. 2012; Wakefield and Wildeman 2013), and health outcomes (e.g., Roettger and Boardman 2012; Foster and Hagan 2013; Turney 2014b).

#### WHY MIGHT PATERNAL INCARCERATION INCREASE CHILDREN'S FOOD INSECURITY?

Theoretically, there are many reasons to expect that paternal incarceration would have deleterious consequences for children's food insecurity. Although incarcerated men are often thought of as solitary and isolated from

family members, the majority of incarcerated men have children (Mumola 2000). Prior to incarceration, many fathers are employed, contribute economically to family life, and are engaged in parenting their children (e.g., Geller, Garfinkel, and Western 2011; Arditti 2012; Turney and Wildeman 2013). Therefore, incarceration is a disruption that affects not only the incarcerated but also the families and children of the incarcerated. At least four possible pathways may link paternal incarceration and children's food insecurity: changes in family economic well-being, changes in parental relationships, changes in maternal parenting, and changes in maternal health.

Economic instability resulting from paternal incarceration is perhaps the most obvious pathway through which incarceration may increase children's food insecurity. Incarceration necessitates that men, most of whom contribute earnings to their families prior to incarceration, lose their jobs. This means that incarcerated men, while simultaneously accumulating legal debt (Harris, Evans, and Beckett 2010), have few opportunities to economically provide for their families (see, e.g., Western 2006). Incarceration facilitates human capital deficits, social network disruptions, and discrimination; accordingly incarcerated men have difficulty securing gainful employment after release (Hagan 1993; Pager 2003). Given the strong link between economic instability and food insecurity (e.g., Gundersen, Kreider, and Pepper 2011), it is quite likely that the economic instability (including indicators of material hardship) resulting from paternal incarceration means that families experiencing paternal incarceration have difficulty providing nutritious meals and consistent access to food for their children.

The mechanisms linking paternal incarceration to children's food insecurity may not be narrowly economic. Indeed, incarceration has a number of cascading collateral consequences for family life. It is by now well known that paternal incarceration strains family relationships, leading to marital dissolution and poor relationship quality between parents (Western 2006; Comfort 2008; Massoglia, Remster, and King 2011; Turney 2015); increases maternal neglect and harsh parenting (Turney 2014); and increases maternal mental and physical health problems (Wildeman, Schnittker, and Turney 2012; Lee, Wildeman, et al. 2014). Given that relationship instability (Bartfeld and Dunifon 2006; Manning and Brown 2006; however, for research that shows that family structure is not associated with children's food insecurity after adjusting for sociodemographic characteristics, see Miller et al. [2014]), parenting difficulties (Cook and Frank 2008), and health impairments (Whitaker et al. 2006) are all linked to food insecurity, it is likely

that these mechanisms, in addition to resultant changes in economic well-being, explain any observed relationship between paternal incarceration and children's food insecurity.

Although there are good reasons to expect paternal incarceration to increase children's risk of food insecurity, it is equally plausible that any observed differences in food insecurity by paternal incarceration are driven by selection into incarceration rather than by incarceration itself. Children of incarcerated fathers, compared to their counterparts, experience economic and social disadvantages (e.g., poverty) prior to the incarceration of their fathers, and, in many cases, these disadvantages are intimately linked to incarceration and are not observed in survey data (e.g., Turney and Wildeman 2013). Indeed, unobserved heterogeneity is considered a crucial threat to causal inference when studying the intergenerational consequences of paternal incarceration (Giordano 2010; Wakefield and Uggen 2010). Furthermore, it is also possible that increased receipt of food stamps among families with incarcerated fathers (Chung 2012; Sugie 2012) partially offsets income loss resulting from the incarceration (Kreider et al. 2012).

#### CONSIDERING VARIATION BY FATHER'S RESIDENTIAL STATUS

It is likely that the relationship between incarceration and children's food insecurity varies by fathers' residential status prior to their incarceration. Previous research suggests that there are vast differences in fathers' economic, emotional, and instrumental contributions by their residential status prior to incarceration (Turney and Wildeman 2013). Therefore, as residential fathers, on average, contribute more to family life than nonresidential fathers, it is likely that the consequences of incarceration for children's food insecurity are strongest among children with residential fathers (for a qualitative examination of heterogeneity in the consequences of paternal incarceration, see Turanovic, Rodriguez, and Pratt [2012]).

#### CONTRIBUTIONS OF THIS STUDY

Although research on the collateral consequences of paternal incarceration for child well-being has burgeoned in recent years, little research considers the consequences of paternal incarceration for *children's* food insecurity. There are two especially relevant papers. In the first, the only research on this topic to examine children's food insecurity, Sally Wallace and Robynn

Cox (2012) use data from the FFCWB and find no statistically significant relationship between parental incarceration and children's food insecurity (although they do find that parental incarceration increases food insecurity among adults and households with children). In the second paper, Cox and Wallace (forthcoming) find that parental incarceration increases the risk of food insecurity among households with children by about 4 percentage points (but they do not specifically examine children's food insecurity).

I extend this existing research in three ways. First, I consider paternal incarceration instead of parental incarceration. I focus on paternal incarceration because the cumulative risk of paternal imprisonment is much greater than the risk of maternal imprisonment (Wildeman 2009) and because recent research suggests that maternal incarceration may not be causally related to children's well-being (Wildeman and Turney 2014). Second, I extend this research by examining variation in the relationship between paternal incarceration and children's food insecurity by fathers' pre-incarceration residential status. Third, I extend this research by considering the mechanisms underlying this relationship. The resulting analysis provides a nuanced accounting of the relationship between paternal incarceration and children's food insecurity.

#### **DATA, MEASURES, AND ANALYTIC STRATEGY**

##### **DATA SOURCE: FRAGILE FAMILIES AND CHILD WELL-BEING STUDY**

I use a series of propensity score matching models, which match treatment (children with fathers incarcerated between the 3- and 5-year surveys) and control (children with fathers not incarcerated between the 3- and 5-year surveys) observations, to estimate the relationship between paternal incarceration and children's food insecurity. Data come from the Fragile Families and Child Well-Being Study (FFCWB), a longitudinal survey of nearly 5,000 new and mostly unmarried parents who gave birth in urban areas between 1998 and 2000 (Reichman et al. 2001). Mothers and fathers were first interviewed in person at the hospital or as soon as possible after the focal child's birth. Both parents were reinterviewed by telephone when the focal child was about 1, 3, 5, and 9 years old. Additionally, when children were 3, 5, and 9 years old, a subsample of families participated in an in-home interview, which included a questionnaire for caregivers (usually the children's

mothers) and an activity booklet for the children. The FFCWB response rates are comparable to or higher than response rates of other household-based surveys, such as the National Survey of Family Growth (NSFG; Sassler and McNally 2003).<sup>1</sup>

The FFCWB data have several advantages in examining the relationship between paternal incarceration and children's food insecurity. First, unlike other data sources commonly used to study the prevalence and correlates of children's food insecurity (e.g., the Early Childhood Longitudinal Study-Birth Cohort [ECLS-B], the Early Childhood Longitudinal Study-Kindergarten Cohort [ECLS-K], and the Study of Income and Program Participation [SIPP]), the FFCWB both collects information on paternal incarceration and targets a sample of relatively disadvantaged households that includes a large number of fathers who experienced incarceration. Additionally, these data include a wealth of information about mothers, fathers, and children, making it possible to adjust for preexisting differences between families that did and did not experienced paternal incarceration and to consider mechanisms underlying the relationship between paternal incarceration and children's food insecurity.

#### ANALYTIC SAMPLE

The Core Food Security Module (CFSM), the food security module established by the USDA, was included in the 3- and 5-year in-home surveys of the FFCWB and, accordingly, my analyses primarily draw on data through the 5-year survey. My analytic sample is composed of the 3,004 families who participated in the 5-year in-home survey. Although there are some observed differences between the analytic sample and the baseline sample, most of these differences are small and statistically insignificant. Mothers in the analytic sample, compared to mothers in the full sample, were more likely to be non-Hispanic black (51 percent compared to 48 percent,  $p < .01$ ). They were also less likely to be Hispanic (25 percent compared to 27 percent,  $p < .05$ ), non-Hispanic other race (3 percent compared to 4 percent,  $p < .01$ ), and foreign-born (13 percent compared to 17 percent,  $p < .001$ ). About

1. Baseline response rates were 86 percent for mothers and 78 percent for fathers. Completion rates for the 1-, 3-, 5-, and 9-year interviews were 90 percent, 88 percent, 87 percent, and 76 percent for mothers, and 74 percent, 72 percent, 70 percent, and 59 percent for fathers, respectively. The completion rate for the 5-year in-home survey, which is when the dependent variable is measured, is 78 percent.

one-third (34 percent) of observations are missing at least one covariate value, but the vast majority of variables are missing fewer than 6 percent of observations. The three exceptions include mother's neglect (missing 18 percent of observations), father's impulsivity (missing 29 percent of observations), and father's cognitive ability (missing 18 percent of observations). Missing information is preserved by generating 20 multiply-imputed data sets, using the multivariate normal method, in Stata. In the imputation model, I include all variables from the analyses, but I then drop the imputed dependent variable values (Von Hippel 2007).<sup>2</sup>

#### DEPENDENT VARIABLES

The dependent variable is measured by caregivers' responses to the CFSM during the 5-year in-home surveys. Caregivers were asked eight questions that measure children's food insecurity (e.g., "I relied on only a few kinds of low-cost food to feed child because I was running out of money to buy food"; see table 1 for details about all eight questions). The dependent variable, children's food insecurity, is measured by affirmative responses to at least two of the eight questions, consistent with methods described by others (Nord and Bickel 2002; Nord 2009).<sup>3</sup>

#### INDEPENDENT VARIABLE

The key independent variable is recent paternal incarceration, measured affirmatively if the father was in prison or jail after the 3-year survey and up to or including the 5-year survey. I consider recent paternal incarceration, instead of any paternal incarceration, because this allows for a precise estimation of the relationship between paternal incarceration and children's food insecurity (and the ability to match observations based on observed characteristics ascertained prior to the measure of incarceration). The

2. I did not impute beyond the in-home sample because the in-home sample is not a random subsample of the full baseline sample (Bendheim-Thoman Center for Research on Child Well-Being 2009); a key assumption of multiple imputation is that the data are missing at random (Allison 2001).

3. Caregivers who report two, three, or four conditions are classified as having low food security among children. Caregivers who report five or more conditions are classified as having very low food security among children. Because relatively few children (<.8 percent) experience very low food security, I consider the more general condition, food insecurity among children, which includes children who experience either very low food security or low food security.



TABLE 1. Description of Individual Questions Used to Measure Children's Food Insecurity

Question	Response Categories	Affirmative Response?
1. [I/We] relied on only a few kinds of low-cost food to feed [child/the children] because [I was/we were] running out of money to buy food.	1 = often, 2 = sometimes, 3 = never	1, 2
2. [I/We] couldn't feed [child/the children] a balanced meal because [I/we] couldn't afford that.	1 = often, 2 = sometimes, 3 = never	1, 2
3. [Child was/The children were] not eating enough because [I/we] just couldn't afford enough food.	1 = often, 2 = sometimes, 3 = never	1, 2
4. In the last 12 months, did you ever cut the size of [child's/any of the children's] meals because there wasn't enough money for food?	1 = no, 2 = yes	2
5. In the last 12 months, did [child/any of these children] ever skip a meal because there wasn't enough money for food?	1 = no, 2 = yes	2
6. How often did [child/any of these children] skip meals because there wasn't enough money for food?	1 = almost every month, 2 = some months but not every month, 3 = only 1 or 2 months	1, 2
7. In the last 12 months, [was child/were the children] ever hungry but you just couldn't afford more food?	1 = no, 2 = yes	2
8. In the last 12 months, did [child/any of the children] ever not eat for a whole day because there wasn't enough money for food?	1 = no, 2 = yes	2

measure of recent paternal incarceration relies on both mothers' and fathers' responses about fathers' incarceration, which is advantageous because individuals are likely to underreport their own incarceration (Groves 2004) and this method is consistent with other research using these data (see especially Geller et al. 2012). I consider the father to have experienced incarceration if either the mother or the father reported him as being incarcerated.

COVARIATES

The analyses match children with and without recently incarcerated fathers based on an array of characteristics, all measured prior to the measure of paternal incarceration unless otherwise noted. Demographic characteristics include the mother's race (non-Hispanic white, non-Hispanic black, Hispanic, non-Hispanic other race), foreign-born status, childhood family structure (with a dummy variable indicating the mother lived with both biological parents at age 15), co-residence with a parent, and the number of children in the household. Child demographic characteristics include the child's

gender (a dummy variable indicating if the child is male), if the child was born weighing under 2,500 grams, and the child's age (at the 5-year survey).

The analyses also match observations based on an array of socioeconomic characteristics, including the mother's education (less than high school, high school diploma or GED, postsecondary education), residence in public housing, receipt of Temporary Assistance for Needy Families (TANF) in the past year, receipt of food stamps in the past year, employment in the past week, household income below the poverty line (established by the US Census), and material hardship (measured by summing affirmative responses to 10 questions about hardship in the past 12 months [e.g., received free food or meals; did not pay the full amount of rent or mortgage payments]). Neighborhood disadvantage is measured by the following census tract characteristics (adding together the percentages and standardizing the total): percent unemployed in the civilian labor force, percent living below the poverty line, percent receiving public assistance, and percent more than 25 years old without a high school degree ( $\alpha = .90$ ).

In addition to demographic and socioeconomic characteristics, the analyses match on a range of familial characteristics. These characteristics include mother's relationship quality with the child's father, ranging from 1 (poor) to 5 (excellent); mother's engagement, measured as an average of 13 items (e.g., sing songs or nursery rhymes with child, hug or show physical affection to child; ranging from 0 [0 days per week] to 7 [7 days per week];  $\alpha = .66$ ); parenting stress, measured as an average of four items (e.g., "Being a parent is harder than I thought it would be," "I feel trapped by my responsibilities as a parent"; ranging from 1 [strongly disagree] to 4 [strongly agree];  $\alpha = .60$ ); neglect, measured as a sum of five questions about behaviors in the past year (e.g., "had to leave your child home alone even when you thought some adult should be with him/her," "were so caught up in your own problems that you were not able to show or tell your child that you loved him/her"). Dummy variables indicate the mother's overall health (1 = fair or poor, 0 = excellent, very good, or good), the mother's depression (measured with the Composite International Diagnostic Instrument-Short Form [CIDI-SF]), and the mother's substance abuse (measured affirmatively if the mother reported having five or more drinks in one sitting or using illicit drugs in the past month).

Finally, the analyses match observations on characteristics that are especially associated with paternal incarceration. These characteristics include the mother's and the father's cognitive ability, measured by the Weschler Adult Intelligence Scale (WAIS; at the 3-year survey), and the

mother's and the father's impulsivity (at the 5-year and 1-year surveys, respectively), measured as an average of six items (e.g., "I will often say whatever comes into my head without thinking first," "I often say and do things without considering the consequences"; ranging from 1 [strongly disagree] to 4 [strongly agree];  $\alpha = .83$  for fathers,  $\alpha = .86$  for mothers).<sup>4</sup> Dummy variables indicate if the mother reported that the father engaged in domestic violence, if the mother or the father reported that the father had problems (e.g., keeping a job, getting along with family and friends) because of alcohol or drug use, and if the mother or the father reported that the father was incarcerated at or prior to the 3-year survey. The analyses also include a lagged indicator of children's food insecurity (measured at the 3-year survey).

#### MECHANISMS

I consider four sets of mechanisms: changes in economic well-being (measured as poverty, material hardship, and employment at the 5-year survey and, therefore, at or after the measure of paternal incarceration), parental relationship characteristics (measured as coresidence with the father and relationship quality at the 5-year survey), maternal parenting (measured as engagement, parenting stress, and neglect at the 5-year survey), and maternal health (measured as changes in fair/poor health, depression, and substance abuse at the 5-year survey).

#### ANALYTIC STRATEGY

##### *Estimating the Relationship between Paternal Incarceration and Children's Food Insecurity*

In the first analytic stage, I use propensity score matching to estimate the relationship between recent paternal incarceration and children's food insecurity at age 5. I first estimate a logistic regression model that generates a propensity score, the probability of experiencing paternal incarceration (ranging from 0 to 1), for each observation as a function of the covariates described above (see app. table A1; tables A1–A3 available online). Note that all of these covariates are measured at or before the 3-year survey (and therefore prior to the measure of recent paternal incarceration). I then

4. Therefore, the mother's impulsivity was measured after paternal incarceration. This should not bias the results because impulsivity is considered a stable characteristic (Gottfredson and Hirschi 1990).

restrict the analyses to regions of common support, ensuring that observations in the treatment group (children with fathers incarcerated between the 3- and 5-year surveys) and control group (children with fathers not incarcerated between the 3- and 5-year surveys) have overlapping propensity scores.<sup>5</sup> I also ensure that the means of the covariates are statistically indistinguishable across the treatment and control groups (see app. table A2). Finally, I employ a logistic regression model to estimate children's food insecurity as a function of paternal incarceration, averaging the estimates across 20 imputed data sets. I estimate these relationships with kernel matching, which matches each treatment observation to all control observations by weighting control observations by their distance from treatment observations (kernel = Epanechnikov; bandwidth = 0.06).<sup>6</sup> This model simply compares the treatment and control observations. Then, because subtle postmatch differences may still exist between the treatment and control groups, I employ doubly robust matching. Doubly robust matching further adjusts for all covariates used to generate the propensity score and is therefore usually a more conservative estimate (Schafer and Kang 2008). Because fathers' residential status might lead to vast differences in family life, and because other research suggests that the consequences of paternal incarceration may be strongest when fathers are residential prior to incarceration (Turney and Wildeman 2013), I conduct all analyses separately for residential fathers (those living with mothers and children at the 3-year survey, prior to the measure of incarceration) and nonresidential fathers (those not living with mothers and children at the 3-year survey).

### *Estimating Mechanisms*

In the second analytic stage, I consider four potential mechanisms underlying the association between recent paternal incarceration and children's food insecurity: (i) changes in economic well-being, (ii) changes in the parental relationship, (iii) changes in maternal parenting, and (iv) changes in maternal health. As detailed below, the relationships are concentrated among

5. This means that a small number of observations are excluded (75 in the residential sample and 65 in the nonresidential sample). The ability to restrict the sample to comparable treatment and control observations is an advantage that propensity score matching has over traditional regression models.

6. Results are robust to alternative matching strategies, including nearest neighbor matching (which matches each treatment observation to control observations with the closest propensity scores) and radius matching (which matches each treatment observation to control observations within a specific radius), and to different bandwidths.

children with residential fathers; therefore, I restrict mediation analyses to those observations. I follow Reuben Baron and David Kenny's (1986) guidelines for estimating mediation by considering the following (for applications using propensity scores, see Kirk and Sampson [2013] and Turney and Haskins [2014]): (i) the relationship between paternal incarceration and each proposed mediator, (ii) the relationship between each proposed mediator and children's food insecurity, (iii) the relationship between incarceration and children's food insecurity without the mediator, and (iv) the relationship between incarceration and children's food insecurity with the mediator (and the difference in the relationship with and without the mediator).

Accordingly, I first estimate each mechanism as a function of the treatment (paternal incarceration), adjusting for the propensity for paternal incarceration to ensure that observed variables do not confound the relationship between the treatment and each mechanism (these analyses are discussed below but are not presented). I then use logistic regression models to estimate children's food insecurity as a function of the mechanisms, controlling for the treatment (paternal incarceration) and the propensity for the treatment. Model 1 presents the baseline estimate, model 2 adjusts for economic well-being at the 5-year survey, model 3 adjusts for parental relationships at the 5-year survey, model 4 adjusts for maternal parenting at the 5-year survey, and model 5 adjusts for changes in maternal health at the 5-year survey. Model 6 adjusts for all possible mechanisms. These models essentially consider changes in each of the mechanisms because prior indicators of each mechanism (measured at the 3-year survey) were included in the matching equation. To consider how much of the relationship between paternal incarceration and children's food insecurity is explained by each set of mechanisms, I compare the coefficient of paternal incarceration in model 1 to the coefficients in models 2–6. I also test for statistically significant differences across models.<sup>7</sup>

#### SAMPLE DESCRIPTION

Table 2 presents descriptive statistics for all variables, by father's residential status at the 3-year survey. Food insecurity was more common among children with nonresidential fathers. About 6.7 percent of children with residential fathers, and 9.4 percent of children with nonresidential fathers

7. There are problems inherent in comparing across logistic regression models (Mood 2010); however, these results are similar when instead using linear probability models.

**TABLE 2.** Descriptive Statistics of Variables Used in Analyses, by Father's Residential Status

	Residential Fathers		Nonresidential Fathers		p-Value
	Mean	SD	Mean	SD	
Children's food insecurity (ih5)	.067		.094		**
Paternal incarceration (y5)	.087		.267		***
Control variables:					
Mother race/ethnicity (b):					
Non-Hispanic white	.299		.124		***
Non-Hispanic black	.361		.662		***
Hispanic	.300		.199		***
Non-Hispanic other race	.040		.016		***
Mother foreign-born (b)	.198		.064		***
Mother age (range: 14–47; b)	26.406	6.163	23.777	5.595	***
Mother lived with both biological parents at age 15 (b)	.516		.319		***
Mother education (y3):					
Less than high school	.246		.331		***
High school diploma or GED	.230		.268		*
Postsecondary education	.524		.401		***
Mother lives in public housing (y3)	.097		.197		***
Mother receives welfare (y3)	.121		.344		***
Mother receives food stamps (y3)	.264		.576		***
Mother neighborhood disadvantage index (y3)	-.222	.985	.219	.967	***
Mother lives with parent (y3)	.076		.211		***
Mother number of children in household (range: 0–10; y3)	2.323	1.273	2.334	1.421	
Mother multipartnered fertility (y3)	.303		.565		***
Mother in poverty (y3)	.298		.599		***
Mother material hardship (range: 0–9; y3)	1.411	1.508	2.036	1.740	***
Mother employment (y3)	.554		.579		
Mother relationship quality (range: 1–5; y3)	3.974	.949	2.189	1.264	***
Mother engagement with child (range: 0–7; y3)	4.984	.891	4.979	.965	
Mother parenting stress (range: 1–4; y3)	2.213	.642	2.313	.693	***
Mother neglect (range: 0–5; ih3)	.117	.430	.184	.536	***
Mother fair or poor health (y3)	.107		.161		***
Mother depression (y3)	.161		.252		***
Mother substance abuse (y3)	.087		.107		***
Mother impulsivity (range: 1–4; y5)	1.474	.468	1.592	.496	***
Mother cognitive ability (range: 0–15; y3)	7.092	2.716	6.419	2.543	***
Father engaged in domestic violence (y3)	.019		.147		***
Father abused substances (b, y1, y3)	.097		.259		***
Father impulsivity (range: 1–4; y1)	1.946	.656	2.091	.727	*
Father cognitive ability (range: 0–15; y3)	6.576	2.806	6.434	2.649	
Father previously incarcerated (b, y1, y3)	.266		.570		***
Child is male (b)	.514		.531		
Child age, in months (range: 56–73; y5)	61.140	2.524	61.456	2.472	***
Child born low birth weight (b)	.080		.128		***
Children's food insecurity (ih3)	.064		.099		***
Mechanisms:					
Mother in poverty (y5)	.307		.583		***
Mother material hardship (range: 0–9; y5)	1.741	2.125	2.484	2.321	***
Mother employment (y5)	.598		.587		
Mother coresidential with father (y5)	.778		.074		***
Mother relationship quality (range: 1–5; y5)	3.638	1.240	2.178	1.308	***
Mother engagement with child (range: 0–7; y5)	4.598	1.168	4.647	1.198	

TABLE 2 (continued)

	Residential Fathers		Nonresidential Fathers		p-Value
	Mean	SD	Mean	SD	
Mother parenting stress (range: 1–4; y5)	2.140	.661	2.240	.708	***
Mother neglect (range: 0–5; ih5)	.119	.337	.161	.483	*
Mother fair or poor health (y5)	.131		.162		*
Mother depression (y5)	.147		.195		***
Mother substance abuse (y5)	.085		.110		*
N	1,509		1,495		

Note.—Survey symbols: b = measured at the baseline survey; y1 = measured at the 1-year telephone survey; y3 = measured at the 3-year telephone survey; y5 = measured at the 5-year telephone survey; ih3 = measured at the 3-year in-home survey; ih5 = measured at the 5-year in-home survey. City dummy variables not presented in the interest of parsimony. Asterisks indicate statistically significant differences between families with residential fathers at the 3-year survey and families with nonresidential fathers at the 3-year survey.

\*  $p < .05$ .  
 \*\*\*  $p < .001$ .

experienced food insecurity at the 5-year survey ( $p < .01$ ; see Miller et al. [2014] to see how the prevalence of children's food insecurity in the FFCWB compares to the prevalence in other samples). Additionally, there are sharp differences in incarceration by fathers' residential status; about 8.7 percent of residential fathers and 26.7 percent of nonresidential fathers were recently incarcerated ( $p < .001$ ).

Families with residential fathers differed from families with nonresidential fathers across nearly all demographic, socioeconomic, and behavioral characteristics considered. Mothers in residential father families, compared to their counterparts in nonresidential father families, were more likely to be non-Hispanic white (29.9 percent compared to 12.4 percent,  $p < .001$ ), were less likely to be non-Hispanic black (36.1 percent compared to 66.2 percent,  $p < .001$ ), and were more likely to be Hispanic (30.0 percent compared to 19.9 percent,  $p < .001$ ). Mothers in residential-father families were more likely to be foreign-born (about 19.8 percent compared to about 6.4 percent,  $p < .001$ ), were older at baseline (26.4 years compared to 23.8 years,  $p < .001$ ), and were more likely to have lived with both biological parents at age 15 (51.6 percent compared to 31.9 percent,  $p < .001$ ).

Additionally, at the 3-year survey, mothers in residential-father families had higher socioeconomic status than their counterparts in nonresidential father families. These mothers had higher educational attainment (52.4 percent had some postsecondary education compared to 40.1 percent,  $p < .001$ ),

and they were less likely to live in public housing (9.7 percent compared to 19.7 percent,  $p < .001$ ), were less likely to receive welfare (12.1 percent compared to 34.4 percent,  $p < .001$ ), and were less likely to have incomes below the poverty line (29.8 percent compared to 59.9 percent,  $p < .001$ ). They also had lower levels of material hardship (1.4 compared to 2.0,  $p < .001$ ). Mothers in residential-father families also had more favorable health outcomes than their counterparts, and they were less likely to report fair or poor health (10.7 percent compared to 16.1 percent,  $p < .001$ ), depression (16.1 percent compared to 25.2 percent,  $p < .001$ ), and substance abuse (8.7 percent compared to 10.7 percent,  $p < .001$ ).

Finally, there are important differences between residential and nonresidential fathers. Fathers living with their children were less likely to have engaged in domestic violence toward the mother (1.9 percent compared to 14.7 percent,  $p < .001$ ), were less likely to report substance abuse (9.7 percent compared to 25.9 percent,  $p < .001$ ), and were less likely to have experienced incarceration prior to the 3-year survey (26.6 percent compared to 57.0 percent,  $p < .001$ ). These fathers had fewer impulsive behaviors (1.9 compared to 2.1,  $p < .05$ ). Taken together, the descriptive statistics show that these two groups of children—children with residential fathers and children with nonresidential fathers—grew up in vastly different environments.

## RESULTS

### PATERNAL INCARCERATION AND CHILDREN'S FOOD INSECURITY

Table 3 presents results from the propensity score matching models. The analyses in panel A are restricted to children who were living with their fathers at the 3-year survey. The unmatched models, which are essentially the unadjusted association between paternal incarceration and children's food insecurity, show that children of incarcerated fathers were about three times as likely as their counterparts to experience food insecurity. Recent paternal incarceration is associated with a greater likelihood of children's food insecurity ( $b = 1.055$ ,  $OR = 2.87$ ,  $p < .001$ ). Paternal incarceration continues to be associated with children's food insecurity in the matched model ( $b = 0.894$ ,  $OR = 2.44$ ,  $p < .05$ ). This relationship persists in the most rigorous specification, the doubly robust matching model, which is expected given the success of matching ( $b = 0.896$ ,  $OR = 2.45$ ,  $p < .05$ ). Taken together, these findings provide evidence that, when fathers are living with



**TABLE 3.** Propensity Score Matching Estimates of the Relationship between Paternal Incarceration and Children's Food Insecurity, by Father's Residential Status

	Unmatched		Matched		Doubly Robust	
	<i>b</i>	OR	<i>b</i>	OR	<i>b</i>	OR
A. Residential fathers:						
Children's food insecurity	1.055 (.275)	2.87***	.894 (.369)	2.44*	.896 (.458)	2.45*
Treatment <i>N</i>	132		118		118	
Control <i>N</i>	1,377		1,316		1,316	
B. Nonresidential fathers:						
Children's food insecurity	.090 (.202)	1.09	-.057 (.240)	.94	-.137 (.257)	.87
Treatment <i>N</i>	381		379		379	
Control <i>N</i>	1,096		1,033		1,033	

Note.—Propensity scores are estimated with a logistic regression model estimating paternal incarceration (between the 3- and 5-year surveys) as a function of pre-incarceration covariates in table 2. Coefficients and odds ratios from logistic regression models are presented (with standard errors in parentheses). Matched estimates are based on kernel matching. The differences between children with residential fathers and children with nonresidential fathers are statistically significant ( $z = 2.83$  for unmatched models;  $z = 2.16$  for matched models;  $z = 1.97$  for doubly robust models).

\*  $p < .05$  (two-tailed test).

\*\*\*  $p < .001$  (two-tailed test).

their children prior to incarceration, paternal incarceration increases the likelihood children experience food insecurity at age 5.

The analyses in panel B are restricted to children who were not living with their fathers at the 3-year survey. The unmatched models show that paternal incarceration is not significantly associated with children's food insecurity ( $b = .090$ , OR = 1.09, NS). This pattern persists in the matched models ( $b = -.057$ , OR = 0.94, NS) and in the doubly robust matched models ( $b = -0.137$ , OR = 0.87, NS). Therefore, when fathers were not living with children prior to incarceration, there is no statistically significant relationship between paternal incarceration and children's food insecurity.<sup>8</sup>

8. Existing research using these data (Wallace and Cox 2012), examining the full sample of children, finds no statistically significant relationship between parental (paternal and maternal) incarceration and children's food insecurity (although they do find that parental incarceration is associated with an increased risk of food insecurity among adults and households with children [also see Cox and Wallace forthcoming]). In supplemental analyses, I pooled children with residential and nonresidential fathers and used propensity score matching models to estimate the relationship between paternal incarceration and children's food insecurity. These results, not presented, are consistent with Wallace and Cox (2012), further suggesting the importance of considering variation in this association by father's residential status.

Importantly, comparing the coefficients across father's residential status (Paternoster et al. 1998) suggests that the differences in the relationship between incarceration and children's food insecurity are statistically significant ( $z = 2.83$  in the unmatched models,  $z = 2.16$  in the matched models, and  $z = 1.97$  in the doubly robust models).<sup>9</sup>

#### SUPPLEMENTAL ANALYSES

The above analyses document a relationship between paternal incarceration and children's food insecurity among families with residential fathers prior to incarceration, but they suffer from two threats to causal inference: unobserved heterogeneity and reverse causality.

First, because the propensity score models only match on observed characteristics, it is possible that unobserved characteristics would render the relationship between paternal incarceration and children's food insecurity spurious. I address this concern by implementing Mantel-Haenszel bounds, a statistical procedure that quantifies the degree to which an omitted variable may render the results statistically insignificant (Mantel and

9. It is possible that paternal incarceration may make it more likely for children to experience an onset of food insecurity and less likely to experience an exit from food insecurity. Although the 2-year gap between reports of food insecurity (measured in these data at the 3- and 5-year surveys) makes it difficult to fully understand the dynamics of paternal incarceration and food insecurity, as children's food insecurity is highly transient (Li, Mills, et al. 2014), supplemental analyses estimate two additional dependent variables: (i) children's food insecurity onset, a dummy variable indicating no food insecurity at the 3-year survey and food insecurity at the 5-year survey, and (ii) children's food insecurity exit, a dummy variable indicating food insecurity at the 3-year survey and no food insecurity at the 5-year survey. Among children with residential fathers, about 4.6 percent experienced an onset of food insecurity between the 3-year and 5-year surveys and about 4.2 percent experienced an exit from food insecurity between the 3-year and 5-year surveys (compared to 6.6 percent and 7.0 percent of children with nonresidential fathers). Results from the most rigorous model, the doubly robust model, provide evidence that, among children with residential fathers, paternal incarceration is associated with a greater likelihood of experiencing an onset of food insecurity ( $b = 1.048$ , OR = 2.85,  $p < .05$ ) and a lower likelihood of experiencing an exit from food insecurity ( $b = -.850$ , OR = .43,  $p < .05$ ). Among children with nonresidential fathers, paternal incarceration is not statistically significantly associated with onset of food insecurity ( $b = -.273$ , OR = .76, NS) in the doubly robust model or exit from food insecurity ( $b = .012$ , OR = 1.01, NS). However, given that these findings are almost certainly missing the full dynamics of children's food insecurity, they should be interpreted cautiously.

Haenszel 1959; Becker and Caliendo 2007). This is a nonparametric test that compares the observed number of observations that experienced paternal incarceration that also experienced the dependent variable with the expected number if the relationship between paternal incarceration and children's food insecurity is zero. I present results from the Q-statistic, which estimates negative unobserved selection, in app. table A3. These results show that an omitted variable would not render the results statistically insignificant until  $\Gamma = 1.65$ .<sup>10</sup> Compare this to the correlates of paternal incarceration from app. table A1, which shows that very few characteristics would increase the likelihood of paternal incarceration by 165 percent. Therefore, it is unlikely that the analyses omit a variable, which is not correlated with the other control variables included in the model, that would render the relationship between paternal incarceration and children's food insecurity statistically insignificant.

Second, I conduct falsification tests, which consider both unobserved heterogeneity and reverse causality (e.g., fathers living in households with food insecurity might engage in criminal behavior to help their family get more resources and therefore may be more likely to experience incarceration). I use propensity score matching to estimate children's food insecurity (measured at the 3-year survey) as a function of future paternal incarceration (measured between the 3- and 5-year surveys, as in the main analyses) and all control variables. Here I expected to find no statistically significant relationship between future paternal incarceration and children's food insecurity, and the presence of one might indicate spuriousness or reverse causality. These analyses (not presented but available upon request) show no statistically significant relationship between future paternal incarceration and children's food insecurity ( $b = 0.129$ ,  $p = .537$ ), suggesting that unobserved characteristics are unlikely to be a threat to causal inference and that reverse causality is unlikely to be operating.

#### MECHANISMS LINKING PATERNAL INCARCERATION TO CHILDREN'S FOOD INSECURITY

The next set of analyses considers the mechanisms underlying the relationship between recent paternal incarceration and children's food insecurity

10. Because it is not possible to estimate Mantel-Haenszel bounds for the doubly robust matching models, these estimates are based on the matched models.

among families with residential fathers. I first estimate each of the mechanisms as a function of paternal incarceration. These results (not presented) show that paternal incarceration is associated with indicators of economic well-being (poverty and material hardship at the 5-year survey) and parental relationship characteristics (coresidential status and relationship quality at the 5-year survey) but not indicators of maternal parenting or maternal health. This suggests that the indicators of maternal parenting and maternal health considered here are not mechanisms linking recent paternal incarceration to children's food insecurity.

In table 4, logistic regression models estimate children's food insecurity as a function of recent paternal incarceration, the propensity for experiencing recent paternal incarceration, and the mechanisms. Model 1 estimates the baseline association. In model 2, which adjusts for economic well-being (measured as poverty, material hardship, and employment at the 5-year survey), the paternal incarceration coefficient increases by 3 percent. In model 3, which adjusts for parental relationship characteristics (measured as coresidential status and relationship quality at the 5-year survey), the paternal incarceration coefficient decreases by 18 percent (and to statistical insignificance). In models 4 and 5, which adjust for maternal parenting (measured as engagement, parenting stress, and neglect at the 5-year survey) and maternal health (measured as fair/poor health, depression, and substance abuse at the 5-year survey), the paternal incarceration coefficient decreases by 14 percent and 12 percent, respectively. However, across models 2–6, the paternal incarceration coefficient is not statistically different from the coefficient in model 1. Further, with the exception of material hardship and neglect, the mediators are not independently associated with children's food insecurity. Taken together, these results provide little evidence that the mediators considered link paternal incarceration to children's food insecurity.

## DISCUSSION

Food insecurity among children, even more so than food insecurity among adults, is an especially acute and severe form of deprivation that is distinct from other indicators of economic deprivation or hardship (McIntyre et al. 2003). Despite existing government programs specifically designed to curb hunger, including the Supplemental Nutrition Assistance Program (SNAP),

the National School Lunch Program (NSLP), and Women, Infants, and Children (WIC), rates of children's food insecurity in the United States have increased over the past decade (Gundersen and Ziliak 2014). Some have suggested that one reason children's food insecurity remains an intractable social problem is because the correlates of children's food insecurity, above and beyond poverty, are not well understood (Gundersen and Ziliak 2014).

Theoretically, there are many reasons to expect that paternal incarceration, an acute familial stressor that is disproportionately experienced by poor and minority children, would have deleterious consequences for children's food insecurity. There are likely both economic and noneconomic pathways linking paternal incarceration to children's food insecurity. With respect to economic pathways, it is well known that incarceration reduces employment and wages (e.g., Western 2006), and recent research suggests that incarceration increases material hardship among current and former romantic partners of the incarcerated (Schwartz-Soicher, Geller, and Garfinkel 2011). In turn, economic instability is a known correlate of children's food insecurity (Gundersen and Ziliak 2014). With respect to noneconomic pathways, it is likely that additional disruptions resulting from paternal incarceration, such as the destabilizing of romantic relationships (e.g., Western 2006), impaired parenting behaviors (e.g., Turney 2014a), and increased mental health problems (e.g., Wildeman et al. 2012), make it more difficult for mothers and other caregivers to provide adequate food for their children (Bartfeld and Dunifon 2006).

Children with residential fathers and children with nonresidential fathers are two distinct groups, and, theoretically, paternal incarceration may be more consequential for children who are living with their fathers immediately prior to their incarceration (Turney and Wildeman 2013). Indeed, the results of the current study, using data from the Fragile Families and Child Well-Being Study and estimated through a series of propensity score matching models, suggest that recent paternal incarceration is associated with an increased risk of children's food insecurity but only among children who were living with their biological fathers prior to their incarceration. The combination of negative associations (for children with residential fathers, where one would most expect to find negative associations) and null associations (for children with nonresidential fathers, where one may or may not expect to find negative associations) lends face validity to the results. These divergent findings between children with residential fathers

TABLE 4. Mechanisms of the Relationship between Paternal Incarceration and Children's Food Insecurity, Restricted to Residential Fathers

	Model 1 (Baseline)		Model 2 (+ Economic Well-Being)		Model 3 (+ Relationship Characteristics)		Model 4 (+ Parenting)		Model 5 (+ Health)		Model 6 (+ All Mechanisms)	
	<i>b</i>	OR	<i>b</i>	OR	<i>b</i>	OR	<i>b</i>	OR	<i>b</i>	OR	<i>b</i>	OR
Paternal incarceration	.892 (.383)	2.44*	.918 (.430)	2.50*	.729 (.449)	2.07	.769 (.387)	2.16*	.786 (.407)	2.19	.719 (.479)	2.05
Propensity for paternal incarceration	.844 (.924)	2.33	.619 (.979)	1.86	.827 (.951)	2.29	.988 (.928)	2.69	.530 (.935)	1.70	.621 (1.057)	1.86
Mother in poverty			.223 (.455)	1.25							.208 (.478)	1.23
Mother material hardship			.347 (.085)	1.41***							.292 (.092)	1.34**
Mother employment			.093 (.491)	1.10							.120 (.503)	1.13
Mother coresidential with father					.148 (.516)	1.16					-.091 (.541)	.91
Mother relationship quality					-.232 (.204)	.79					-.057 (.218)	.94

Mother engagement with child	-.115 (.163)	.89	-.125 (.160)	.88
Mother parenting stress	.192 (.330)	1.21	-.103 (.346)	.90
Mother neglect	.962 (.365)	2.62**	.874 (.318)	2.40**
Mother fair or poor health			.291 (.498)	1.10
Mother depression			1.186 (.419)	1.60
Mother substance abuse			.357 (.544)	.81
Constant	-3.096	-4.454	-2.421	-3.249
				-3.467

Note.— $N = 1,434$ . Logistic regression models estimate children's food insecurity as a function of the mechanisms, controlling for paternal incarceration and the propensity for paternal incarceration (from the kernel matching models presented in table 3). Coefficients and odds ratios from logistic regression models are presented (with standard errors in parentheses).

\*  $p < .05$  (two-tailed test).

\*\*  $p < .01$  (two-tailed test).

\*\*\*  $p < .001$  (two-tailed test).

and children with nonresidential fathers provide one explanation for why prior research finds no statistically significant relationship between incarceration and children's food insecurity (Wallace and Cox 2012).

Although there is no independent relationship between paternal incarceration and children's food insecurity among children of nonresidential fathers, it is precisely this group of children that suffers from the highest rates of food insecurity. The rates of food insecurity are nearly 50 percent higher among children with nonresidential fathers (with 9.4 percent of children with nonresidential fathers and 6.7 percent of children with residential fathers experiencing food insecurity at the 5-year survey). Children with nonresidential fathers are about three times as likely as children with residential fathers to experience recent paternal incarceration (26.7 percent compared to 8.7 percent). Furthermore, children of nonresidential fathers are disadvantaged across an array of demographic, socioeconomic, and behavioral indicators. Therefore, although there is no independent relationship between paternal incarceration and food insecurity among this group of children, these children likely suffer other deleterious consequences of paternal incarceration and, more generally, are an especially vulnerable group.

Indeed, more broadly, the relationship between paternal incarceration and children's food insecurity is consistent with prior research documenting the mostly negative intergenerational consequences of paternal incarceration. Children of incarcerated fathers, compared to their counterparts, experience educational (e.g., Haskins 2014; Turney and Haskins 2014), behavioral (e.g., Geller et al. 2012; Wakefield and Wildeman 2013), and health impairments (e.g., Roettger and Boardman 2012; Foster and Hagan 2013; Turney 2014*b*). These analyses show that young children with incarcerated fathers are disadvantaged across another important and distinct dimension: access to nutritionally sound and adequate food. Children's food insecurity signifies an extreme level of disadvantage and, given the relationship between children's food insecurity and children's educational, behavioral, and health outcomes (e.g., Alaimo et al. 2001; Dunifon and Kowaleski-Jones 2003; Ashiabi 2005; Howard 2011), it is quite possible that children's food insecurity explains some of the relationship between paternal incarceration and children's educational, behavioral, and health outcomes.

Despite expectations that both economic and noneconomic pathways would explain the relationship between paternal incarceration and children's food insecurity, the results provide little evidence that this was the case. Post-incarceration changes in economic well-being, parental relation-



ships, maternal parenting, and maternal health explain some, but not all and not a statistically significant amount, of the association between paternal incarceration and children's food insecurity. This is inconsistent with expectations. One possible explanation is that the relationship between paternal incarceration and children's food insecurity is direct; the direct removal of fathers from households makes it difficult for mothers or other caregivers to monitor and provide food to children. Another possible explanation is that the indicators of economic well-being, parental relationships, maternal parenting, and maternal health are not measured properly and that different measures of these constructs would yield substantively different results. For example, the measure of poverty may not be nuanced enough to capture changes in economic well-being following paternal incarceration, especially given that so many families were living in poverty prior to the father's incarceration.<sup>11</sup> A final possible explanation is that additional mechanisms exist. Two especially plausible possibilities include residential mobility (and changes in neighborhood composition resulting from mobility) and a decrease in social support (Turney, Schnittker, and Wildeman 2012). Future research should adjudicate between these and other explanations. Moreover, although these mechanisms may not significantly mediate the relationship between paternal incarceration and children's food insecurity, some of the mechanisms may be distinct outcomes associated with paternal incarceration. Material hardship is one such example (e.g., Schwartz-Soicher et al. 2011). Material hardship does not significantly mediate the association between paternal incarceration and children's food insecurity, but the results of this analysis show it is correlated with both paternal incarceration and children's food insecurity.

#### LIMITATIONS

These analyses should be interpreted cautiously, as several limitations, many of them common to studying either paternal incarceration or children's food insecurity, exist. First, the relatively small number of children who experience both incarceration and food insecurity, especially within the residential father subsample, precludes some additional analyses that might be instructive. For example, it is not possible to consider sources of heterogeneity

11. Although supplemental analyses that instead consider a more nuanced measure of poverty—*income-to-poverty ratio*—come to substantively similar conclusions.

among children with residential fathers (e.g., variation by poverty status, variation by SNAP receipt), despite the fact that these analyses may yield useful findings. Similarly, too few mothers experience incarceration between the 3- and 5-year surveys, making it impossible to consider the independent relationship between maternal incarceration and children's food insecurity. Very low food security among children, an even more severe marker of disadvantage, is extremely rare in the sample, making it impossible to precisely estimate the relationship between paternal incarceration and very low food security among children. Given these data limitations, researchers collecting information on children's food insecurity should also consider collecting information on parental incarceration, and vice versa.

Another limitation involves unobserved heterogeneity. It is possible that there are unmeasured characteristics that might render the relationship between paternal incarceration and children's food insecurity spurious. For example, the data do not include indicators of criminal activity (though measures of domestic violence and characteristics correlated with criminal activity [e.g., prior incarceration, substance abuse] are included in the estimate of the propensity score), and it is possible that children of fathers engaging in criminal activity are likely to experience both paternal incarceration and food insecurity. Although I cannot rule out the possibility of a spurious relationship, several aspects of the analyses, including results from the Mantel-Haenszel bounds and the placebo regression, suggest that unobserved heterogeneity may not bias the results. The concentration of statistically significant relationships among children with residential fathers further strengthens the case for causal inference because it is among this group (compared to the group with nonresidential fathers) that one would most expect to see negative associations. Future research should exploit exogenous variation—perhaps in sentencing decisions, which is not possible with these data—to more explicitly consider causal relationships.

Finally, as with all broadly representative data that ascertain information about paternal incarceration, the measure of paternal incarceration is quite crude. For example, it is not possible to distinguish between prison and jail spells, even though it is plausible to assume that prison incarceration and jail incarceration differentially influence family life (because prison spells are usually longer than jail spells and because prisons, compared to jails, are often located farther from inmates' homes). Relatedly, although the data include some information about incarceration duration and incarceration offense type, the large amount of missing data on these measures makes

it impossible to consider their potential contributions to children's food insecurity among the relatively small subsamples of residential and non-residential fathers.

#### POLICY IMPLICATIONS AND CONCLUSIONS

Taken together, these findings suggest that the consequences of paternal incarceration extend beyond the offender and spill over to children of offenders, consistent with a growing body of literature documenting the cascading consequences of incarceration for family life (e.g., Turney and Wilde-*man* 2013; Turney 2014*a*). These findings have a number of implications for policy. Given the link between paternal incarceration and children's food insecurity, these findings suggest that families that experience paternal incarceration, especially those families that include residential fathers prior to incarceration, could benefit from being monitored for food insecurity. The findings also suggest, however, that children of nonresident fathers are an especially vulnerable population. These children are at heightened risk of food insecurity regardless of whether they experience paternal incarceration. The findings of this study thus suggest that, if we are to end hunger among children, policy makers would be wise to develop strategies that mitigate the collateral consequences of paternal incarceration for children's well-being and ensure that vulnerable children—those in households with incarcerated fathers and those in households with nonresident fathers—have access to sufficient food.

#### NOTE

**Kristin Turney** is an assistant professor of sociology at the University of California, Irvine. Her research investigates the complex, dynamic role of families in creating and exacerbating social inequalities. Currently, she is examining the collateral consequences of incarceration for family life, the effects of depression on individuals and children, and the causes and consequences of childhood health inequalities. These substantive interests are accompanied with a methodological interest in causal inference. This project was supported with a grant from the University of Kentucky Center for Poverty Research (UKCPR) through funding by the US Department of Agriculture, Food and Nutrition Service, contract no. AG-3198-B-10-0028. The opinions and conclusions expressed herein are solely those of the author(s) and should not be construed as representing the opinions or policies of the UKCPR or any agency of the federal government. Funding for the Fragile Families and Child Well-Being Study was provided by the Eunice Kennedy Shriver National Institute of Child Health and Human Development (NICHD) through grants R01HD36916, R01HD39135, and R01HD40421, as well as a consortium of pri-

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