



From Poverty to Food Insecurity and Child Overweight: A Family Stress Approach

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ABSTRACT—*Food insecurity and child overweight represent major public health problems in the United States, especially for children living in poverty. Recent research has greatly expanded our knowledge regarding the antecedents of these health concerns, yet the causal mechanisms connecting poverty to food insecurity and to child overweight remain unclear. This article reviews the research through the perspective of family stress theory and proposes a developmental model to explain how poverty and its related economic stress affect specific parental resources and behaviors that, in turn, may account for food insecurity and overweight in young children. It proposes maternal depression and family food behaviors—such as the acquisition, provision, and distribution of food in the household—as key mediators linking poverty to food insecurity and child overweight.*

KEYWORDS—*poverty; family stress theory; child overweight; food insecurity; maternal depression*

Poverty puts children at risk for a host of negative outcomes. Children in impoverished households are more likely than their peers in households with adequate resources to struggle academically, to display social and emotional problems, and to experience poor health (Brooks-Gunn & Duncan, 1997; McLeod & Shanahan, 1993). Although we do not yet fully know what mechanisms link poverty to poor child outcomes, family stress theory helps to explain how poverty, parenting, and child outcomes may be related (Conger & Elder, 1994; Conger et al., 2002). According to this theory, parents struggling to make ends meet because of lack of income, underemployment, and low-

wage jobs experience heightened stress that leads to changes in emotions and behaviors that hurt their parenting and affect their children adversely (Conger, 2005; Conger et al., 2002). We argue that the family stress model, typically used to explain negative psychosocial and cognitive outcomes among poor children, has clear implications for understanding two prevalent child health issues: food insecurity and child overweight.

Rates of food insecurity are disproportionately high among low-income families (Nord, Andrews, & Carlson, 2008). Food insecurity, defined as limited or uncertain access to sufficient and nutritious food, results from financial or social constraints that prevent the acquisition of adequate food in socially acceptable ways (Nord & Hopwood, 2007). Whereas about 11% of U.S. households report household food insecurity, 40% of poor households with young children (under age 6) had experienced food insecurity during the previous 12-month period (Nord et al., 2008).

At the same time, childhood overweight and obesity have reached epidemic proportions in the United States (Tudor-Locke, Kronenfeld, Kim, Benin, & Kuby, 2007). Childhood obesity, defined as sex- and age-specific body mass index (BMI) equal to or above the 95th percentile for children (American Academy of Pediatrics, 2003; Krebs et al., 2007), and child overweight (sex- and age-specific BMI in the 85th to 95th percentiles) now substantially affect very young children. Just over 12% of all U.S. children ages 2–5 are obese (Ogden, Carroll, & Flegal, 2008). This trend is especially worrisome for low-income children, whose obesity rates have risen faster than those of the general child population (Anderson & Butcher, 2006). Studies report that between 31% and 33% of low-income preschool-aged children are overweight or obese, with sex-specific BMI-for-age at or above the 85th percentile (Edmunds et al., 2006; Kimbro, Brooks-Gunn, & McLanahan, 2007; Polhamus et al., 2009; Williams, Strobino, Bollella, & Brotanek, 2007), as compared to 24% of U.S. preschoolers in the general population (Ogden et al., 2008). In the remainder of this article, we use the term *overweight* to refer to both child overweight and obesity.

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The recent phenomenon of elevated rates of food insecurity and overweight among low-income U.S. children presents an interesting paradox to researchers, as many would expect food insecurity to lead to child underweight despite limited research examining this association (Isanaka, Mora-Plazas, Lopez-Arana, Baylin, & Villamor, 2007). Studies on the causal relationship between food security and overweight remain equivocal; however, a number of similar antecedents argue for their joint consideration. In this article, we review this research through the lens of family stress theory and propose a developmental model to explain how poverty and its related economic stress affect parental resources and behaviors that, in turn, may account for these adverse outcomes in young children. We discuss maternal depression as a key product of economic stress that may help explain the development of overweight and food insecurity in some families, through its impact on food behaviors, including the acquisition, provision, and distribution of food in the household. Although maternal depression is unlikely to be the only link between economic insecurity and poor nutrition in children, it is critical to examine it because of its high prevalence in low-income families (Malik et al., 2007).

DEVELOPMENTAL CONTEXT

Studies reporting that the antecedents of food insecurity and overweight vary by child age argue for a developmental approach when considering these outcomes. For example, younger children are less likely to experience reduced food intake as a consequence of household food insecurity than older children (Nord & Hopwood, 2007). Further, parenting behaviors that potentially affect a child's eating habits and weight (Lin, Huang, & French, 2004) may exert greater influence over young children than older children and adolescents who have more independent access to food both within and outside of the home (Kumanyika, 2008). Gundersen and colleagues' finding that maternal stressors corresponded to overweight among 3- to 10-year-olds, but not among 11- to 17-year-olds, supports the hypothesis that parental behavior may produce stronger effects on younger children (Gundersen, Lohman, Garasky, Stewart, & Eisenmann, 2008). Finally, evidence that BMI-for-age at age 3 is highly predictive of adolescent overweight (Nader et al., 2006) suggests that early exposure to poor nutrition may produce lasting effects. We are using the following model to explain adverse outcomes among young children (under age 8), and it may not apply to older children.

FAMILY STRESS MODEL

Bronfenbrenner (1979) proposed that a child's development is influenced by the child's biologic and psychologic characteristics, by the immediate context in which the child lives, and by the "adjacent or encompassing systems which may in fact determine what can or cannot occur in the more immediate context" (p. 4). Family stress theory fleshes out Bronfenbrenner's model

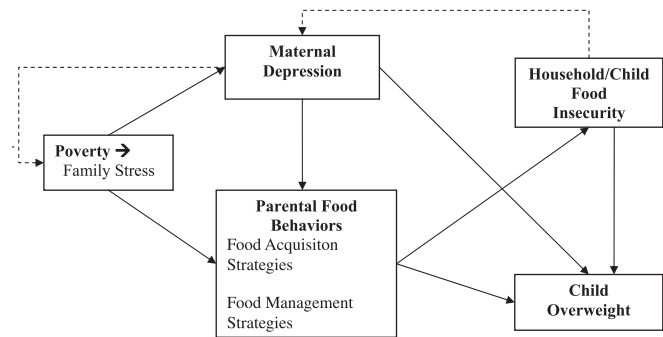


Figure 1. A family stress model linking poverty to food insecurity and child overweight.

by providing an explanation of how one encompassing system—poverty—leads to poor child outcomes (Conger & Elder, 1994; Conger et al., 2002). Family stress theory presumes that poverty produces high economic stress on some families as parents struggle to provide adequate food and resources for themselves and their children, although factors such as maternal education and neighborhood resources may make this task easier. This economic pressure harms parental mental health and increases emotional problems for parents, especially depression (Wu & Schimmele, 2006). Family stress theory then provides a link between depression and parenting behavior by positing that reduced parental mental health leads to less competent and responsive relationships with the child. In the final step, the theory proposes that this disrupted parenting increases the likelihood of poor child outcomes (Conger & Elder, 1994; Conger et al., 2002).

Although researchers have primarily used family stress theory to explain the effects of poverty on child psychosocial and cognitive outcomes (Conger, 2005), we believe that it can help to explain the mechanisms linking poverty to food insecurity and child overweight (see Figure 1). First, we posit that the economic stress of poverty is associated with increased rates of maternal depression. At the same time, we presume that poverty affects the resources and strategies parents use to acquire and manage limited food resources. Our model posits that depression among poor mothers of young children affects family food behavior by inhibiting the use of active and responsive food acquisition strategies (such as buying in bulk) and management strategies (such as eating as a family). In line with family stress theory, we hypothesize that these maternal behaviors result in food insecurity or overweight among children. Lastly, we discuss the direct link between food insecurity and child overweight.

IMPACTS OF POVERTY

Although it may seem counterintuitive that poor children are at increased risk for both food insecurity and overweight, inadequate nutrition is likely a key link between limited economic resources and these adverse outcomes. Those living in

low-income neighborhoods have significantly fewer low-cost grocery options than those living in high-income neighborhoods (Morland, Wing, Diez Rouz, & Poole, 2001). Larson, Russ, Crall, and Halfon (2008) linked fewer neighborhood supermarkets to reduced consumption of fruits and vegetables, and to unhealthy weights and diets. Further, fast food restaurants tend to be concentrated in low-income and minority communities (Reidpath, Burns, Garrard, Mahoney, & Townsend, 2002), which may affect diet and weight gain because of the poor nutritional content of this food (Larson et al., 2008). These obstacles increase the likelihood that low-income families will experience stress as they struggle to provide an adequate diet for their children.

Research suggests that low-income households use various strategies to acquire and manage their limited food resources (Kempson, Keenan, Sadani, & Adler, 2003) and that these strategies may influence the development of food insecurity and/or overweight. For example, food acquisition and management strategies related to having restricted resources, including limited access to highly nutritious foods, purchase of poor quality (high calorie, high fat, low nutrient) but low-cost food (Drewnoski & Damon, 2005), and overeating when food is available after experiencing prolonged and repeated shortages of food, are among the mechanisms that researchers have proposed to explain how food insecurity may increase overweight prevalence among household members (Frongillo, Olson, Rauschenbach, & Kendall, 1997; Kempson et al., 2003; Radimer, Olson, Greene, Campbell, & Habicht, 1992; Smith & Richards, 2008). Further, low-income parents facing food shortages may use proactive strategies, such as borrowing money from friends or family members, buying food in bulk, using discount stores, and/or using governmental and community resources, to prevent or mitigate inadequate food intake (Hoisington, Shultz, & Butkus, 2002; Kempson et al., 2003; Leibtag & Kaufman, 2003; Maxwell, 1996). In addition, mothers often sacrifice their own nutritional needs to provide more food for their children (McIntyre et al., 2003; Piaseu, Belza, & Shell-Duncan, 2004; Tarasuk & Beaton, 1999). If such sacrifices reduce the mother's intake of essential nutrients, such as folate, these mothers may be at increased risk for depression (Bottiglieri et al., 2000).

Family stress theory proposes that the stress of managing these limited resources is associated with poor parental mental health, such as elevated rates of maternal depression. Indeed, poverty reduces material resources, increases conflict in social relationships, and decreases self-efficacy, factors that increase the likelihood of a parent experiencing depression (Belle & Doucet, 2003). As expected, studies demonstrate a strong connection between poverty and depression. Depression rates are significantly higher for low-income individuals (Horowitz, Briggs-Gowan, Storfer-Isser, & Carter, 2007), women (Kessler et al., 2005), and young mothers (Volker & Ng, 2006). Studies of low-income mothers with young children reveal high levels of depressive symptoms, with one third to one half meeting the threshold for clinical depression on standardized depression measures

(Casey et al., 2004; Chung, McCollum, Elo, Lee, & Culhane, 2004; Malik et al., 2007) as compared to 17% in a national sample of U.S. mothers of 3-year-olds (McLennan, Kotelchuck, & Cho, 2001). Of course, depression may lead to poverty by reducing one's ability to seek and/or maintain employment. A recent meta-analysis, however, finds mixed evidence for this direction of effects (Lorant et al., 2003).

MATERNAL DEPRESSION, PARENTING, AND FOOD INSECURITY

Studies have demonstrated that maternal depression is associated with food insecurity. Casey et al. (2004) note substantially higher rates of depression among mothers classified as food insecure than among food-secure mothers. Significant positive correlations between depression and household food insecurity exist for pregnant women (Laraia, Seiga-Riz, Gundersen, & Dole, 2006), for a representative sample of U.S. families (Dunifon & Kowaleski-Jones, 2003), for a national sample of mothers of toddlers (Bronte-Tinkew, Zaslow, Capps, Horowitz, & McNamara, 2007), and for urban U.S. families (Whitaker, Phillips, & Orzol, 2006). Food insufficiency, when families report that they sometimes or often do not have enough to eat, is associated with depression as well (Wu & Schimmele, 2006). The cross-sectional nature of the above studies, however, prohibits establishing either a causal or temporal link between maternal depression and food insecurity.

Two longitudinal studies have explored this subject, with conflicting conclusions. London and Scott (2005) followed more than 3,000 low-income mothers in four urban areas over a 3-year period. Food-secure women reported better health and less depression than food-insecure women. Further, women with high or increasing depression, and women with poor or worsening health, were significantly more likely to become food insecure over the course of the study (London & Scott, 2005). Importantly, interviews with 36 of these women showed that maternal depression corresponded to the use of coping strategies that increased the likelihood that both mother and child would need to skip meals or reduce their food intake. In contrast, Heflin, Siefert, and Williams (2005) conclude that food insecurity increases depression for parents on the basis of their finding that changes in food sufficiency corresponded to changes in maternal depression for welfare recipients.

We believe that the overall evidence supports a complex relationship between maternal depression and food insecurity. In line with family stress theory (see Figure 1), we posit that maternal depression indirectly increases the risk of food insecurity through its impact on parental behaviors related to the acquisition and consumption of food. We discuss this pathway below. The dashed arrow in the figure between food insecurity and maternal depression acknowledges that food insecurity may act as a potential stressor that can contribute to maternal depression (Ashiabi & O'Neal, 2008).

Depression is known to foster lower self-efficacy and lead to poorer performance of tasks among the general public (Bandura, 1989; Pratt & Brody, 2008). For low-income mothers struggling to offer adequate nutrition to their children, depression may jeopardize their ability to utilize effective food acquisition and consumption strategies to respond to dietary deficits. For example, depressed parents are less likely to ask for or receive help from their support network than nondepressed parents (Seto, Cornelius, Goldschmidt, Morimoto, & Day, 2005), which may shut off critical avenues for obtaining food for low-income families. Our hypothesis that maternal depression may reduce the use of active food acquisition strategies required to gather adequate food supplies for poor families (such as shopping at discount stores) is supported by evidence that depressed mothers are less likely to engage in behaviors that foster their child's physical health. Children of depressed mothers are less likely to receive well-child visits or immunizations than those of nondepressed mothers (Minkovitz et al., 2005), and, as infants, are more likely to be placed on their stomachs to sleep (Chung et al., 2004). Further, depressed mothers are less likely to engage in behaviors to protect a child from potential health hazards (e.g., using a car seat or covering electrical outlets) than their nondepressed counterparts (Leiferman, 2002; McLennan & Kotelchuck, 2000).

MATERNAL DEPRESSION, PARENTING, AND CHILD OVERWEIGHT

Although maternal depression has been associated with a wide range of negative outcomes for children (Parke et al., 2004; Petterson & Albers, 2001), few researchers have investigated whether maternal depression has similar negative impacts on child overweight, and the results from those studies have been mixed.¹ One large national survey found that maternal mental health significantly explained child overweight, even after controlling for parental income and ethnicity (Larson, Russ, Crall, & Haflon, 2008). Similarly, another study found that maternal stressors, including maternal depression, predict overweight in young, low-income U.S. children (Gundersen et al., 2008) and in a sample of low-income Brazilian families (Surkan, Kawachi, & Peterson, 2008). In contrast, two other studies detected no direct relationship between maternal depression and child overweight (Bronte-Tinkew et al., 2007; Davis, Young, Davis, & Moll, 2008), although both studies found evidence that maternal depression appears to work through parenting behaviors to influence child overweight, as family stress theory would predict.

Other evidence supports the family stress hypothesis that maternal depression may lead to parenting behaviors that increase a child's risk for overweight. Depression is known to lead to less competent parenting behaviors (Pachter, Auinger,

Palmer, & Weitzman, 2006), such as neglect (Kotch, Brown, Dufort, Winsor, & Catellier, 1999) and disengaged or permissive feeding styles (Hurley, Black, Papas, & Caufield, 2008), which have been found to increase the incidence of overweight observed in low-income children. Lissau and Sorenson (1994) connected parental neglect of Swedish third graders with a high likelihood of overweight 10 years later, after controlling for initial child BMI, gender, and family structure. A recent study of 872 U.S. mothers and their children found that 4-year-old children of mothers with neglectful parenting styles were almost twice as likely as children of authoritative mothers to be classified as overweight upon entering first grade (Rhee, Lumeng, Appugliese, Kaciroti, & Bradley, 2006). Using the Fragile Families Study, which includes a large sample from 20 U.S. urban areas, Whitaker, Phillips, Orzol, and Burdette (2007) found that neglect corresponded to a 50% increase in overweight for preschool children. In addition to neglect, a cross-sectional study of close to 5,000 Australian preschoolers found that permissive or disengaged parenting by the father, although not by the mother, was linked to higher child BMIs (Wake, Nicholson, Hardy, & Smith, 2007).

Recent studies note that depressed mothers were significantly less likely to use healthy feeding strategies, such as breastfeeding, than nondepressed mothers (Paulson, Dauber, & Leiferman, 2006). Breastfeeding is known to prevent child overweight (Owen, Martin, Whincup, Smith, & Cook, 2005). Another parenting behavior frequently associated with depression, fewer interactions with the child (Lehrer, Crittenden, & Norr, 2002; Teti & Gelfand, 1991), may lead to reduced monitoring of child consumption. Among low-income families, depressed parents allow greater television viewing than nondepressed parents (Conners, Tripathi, Clubb, & Bradley, 2006) and may be more likely to permit children to eat while watching TV (Wachs, 2008), a practice associated with child overweight (Rao, 2008).

Depression also produces physical effects on individuals, such as lethargy and reduced energy (American Psychiatric Association, 2000) that may influence food acquisition and management behaviors. Depression has been found to reduce a parent's use of proactive strategies in the home, such as reading, which correspond to positive child outcomes (McLennan & Kotelchuck, 2000), and is likely to produce similar effects on depressed, low-income mothers' use of proactive strategies that may be necessary to ensure that their children receive a nutritious meal (Wachs, 2008). Such mothers may be more likely to purchase fast food as a quick alternative to home-cooked meals, a practice linked to higher rates of childhood overweight (Duerksen et al., 2007).

FOOD INSECURITY AND CHILD OVERWEIGHT

The simultaneous rise in rates of food insecurity and child overweight have prompted some observers to posit that food insecurity fosters child overweight, possibly because food-insecure

¹Maternal depression may be associated with faltering growth in children (O'Brien, Heycock, Hanna, Jones, & Cox, 2004), although little is known about the mechanisms underlying this association.

families emphasize cheap but energy-dense foods that increase the likelihood of weight gain (Dietz, 1995; Drewnoski & Specter, 2004). Studies investigating this connection among children report conflicting results. Of recent studies examining this association in young children, two report no direct associations (Kaiser et al., 2002; Winicki & Jemison, 2003), and a third found a negative association between child food insecurity and overweight for very young children (birth to 24 months) but a positive association for 2- to 5-year-old girls (Metallinos-Katsaras, Sherry, & Kallio, 2009). In contrast, two studies found positive associations for certain groups of children, such as 3- to 5-year-olds (Casey et al., 2006) and preschoolers born with high or low, but not normal, birth weights (Dubois, Farmer, Girard, & Porchere, 2006).

Three studies using the Early Childhood Longitudinal Study data report conflicting findings. Rose and Bodor (2006) followed kindergarteners into first grade and reported that food-insecure children were at lower risk for overweight. In contrast, Jyoti, Frongillo, and Jones (2005) followed kindergarteners to third grade and found that kindergarten food insecurity was predictive of greater weight gain and higher BMIs for third-grade girls, whereas becoming food insecure during this time period (as compared to becoming food secure) was associated with greater weight and BMI gains for third-grade boys. A third study found that food insecurity at 9 months indirectly increased the risk of overweight at 24 months as a result of infant feeding and parenting practices (Bronte-Tinkew et al., 2007). The studies noting a positive correlation followed children for a longer time period (Bronte-Tinkew et al., 2007; Jyoti et al., 2005) and may reflect that persistent food insecurity leads to child overweight in young children. However, the three studies also varied in their use of covariates, mediators (Bronte-Tinkew et al., 2007), and interaction terms (Rose & Bodor, 2006), making it challenging to identify the key mechanism leading to these different findings.

Overall, methodological differences across studies assessing the food insecurity–child overweight link make comparisons difficult and provide limited guidance to explaining this relationship. Clearly, we need greater consistency in research paradigms to fully understand the underlying factors that contribute to differences in weight status for children who are food insecure themselves and/or live in households with food insecurity.

OTHER CONSIDERATIONS

Given the complexities surrounding the rise in childhood overweight and food insecurity, other factors likely contribute to these conditions and explain why studies do not consistently demonstrate expected connections, such as food insecurity leading to overweight. For example, maternal education typically covaries with income and might also account for variation in parental food behaviors (Hurley et al., 2008) and rates of depression (Seto et al., 2005). Similarly, sociodemographic variables, such as child gender (Casey et al., 2006; Edmunds et al., 2006;

Nader et al., 2006), child ethnicity (Anderson & Butcher, 2006; Rose & Bodor, 2006), and family structure (Gundersen et al., 2008) may mediate or moderate the multiple pathways that link poverty to overweight and/or food insecurity, and future studies must consistently examine these factors. Finally, the biologic underpinnings of excessive weight gain stem from an imbalance between energy intake (i.e., diet) and energy output (i.e., growth, activity), and are likely influenced by genetics and the interplay between genetics and environmental factors.

IMPLICATIONS

Food insecurity (Cook et al., 2004; Rose-Jacobs et al., 2008; Skalicky et al., 2006) and overweight (Krishnamoorthy, Hart, & Jelalian, 2006; Lumeng, Gannon, Cabral, Frank, & Zuckerman, 2003) substantially threaten the health and well-being of young children. Although research has resulted in a burgeoning knowledge base linking individual variables to food insecurity and/or child overweight, identifying causal mechanisms to guide intervention efforts requires explicit modeling that is grounded in sound theory. Family stress theory, with its elaboration of how poverty affects parental mental health and functioning, which, in turn, affects low-income children's socioemotional and cognitive development (Conger, 2005; Conger & Elder, 1994), provides such a grounded framework to empirically explore the critical antecedents of child overweight and food insecurity.

Reducing rates of food insecurity and child overweight will require policies and programs built on rigorous theoretic models. For example, if the stress associated with poverty is what starts the cascading effects that lead to a child's unhealthy weight gain or insufficient food intake, then reducing poverty and/or its related stressors emerges as a key policy goal to address these epidemics. A seminal study by Costello, Compton, Keeler, and Angold (2003) supports this policy direction: Poor children's mental health significantly improved when their families received enough income to move out of poverty, in contrast to the mental health of children in neighboring families who remained poor during the same period. Public health programs to combat food insecurity and overweight need to expend greater efforts to expand programs that increase economic resources for poor families, such as food assistance programs, housing vouchers, or cash subsidies.

Under the family stress paradigm, depression among low-income mothers, with its high prevalence, scarce treatment resources (Coiro, 2001), and potential detrimental effects on children's nutrition, needs stronger consideration in antipoverty and public health programs, particularly those aimed at increasing food security and preventing child overweight (Casey et al., 2004). Collaborative approaches, such as establishing partnerships that integrate nutrition and food assistance programs with mental health services, could result in better targeting of outreach and education efforts designed to alleviate these outcomes.

Offering access to nutrition education at community mental health centers may help improve family nutrition among depressed and stressed parents seeking mental health services. Training providers of federal food assistance and nutrition programs to identify and assist depressed individuals, and establishing aggressive food assistance outreach efforts at hospitals, clinics, and day care centers, might help reach parents who would not otherwise seek out such assistance, thereby increasing access to nutritious food for their children. Overall, successful public health programs to prevent child overweight and food insecurity will require integrated efforts that take into account the context of the family and its surrounding environment on a child's access to nutritious and adequate food.

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