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ORIGINAL RESEARCH

Family Structure and Child Food Insecurity: Evidence from the Current Population Survey

Kelly Stamper Balistreri[1]

Abstract Food insecurity—the lack of consistent access to adequate amounts of food—remains a reality for many American families. Although children are usually protected from reductions in food intake even in households with low food security, about 8 percent of all households with children also experienced reduced food intake and disrupted eating patterns. The research on child food insecurity and family structure is limited and the findings are mixed. Given the increasing complexity of families in the U.S., combined with sustained high levels of food insecurity during the last decade, a closer examination of this relationship is warranted. Using data from multiple years of the Current Population Survey Food Security Supplement (N = 39,619 households) this study finds that children growing up in complex family households are more vulnerable to food insecurity, on average, than children growing up in two biological married-parent households. The results also show higher odds of child food insecurity among single mother households than among married biological or married stepfamilies suggesting a protective effect of marriage beyond economic resources.

Keywords Food insecurity · Family structure · Poverty

1 Introduction

Food insecurity—the lack of consistent access to adequate amounts of food—remains a reality for many low-income American families. Children exposed to food insecurity are of particular concern given the consequences that food scarcity may have on child health and well-being. The USDA classifies the food insecurity of households with children by whether it affects only adults or whether it also affects the children. In 2015, there were

✉ Kelly Stamper Balistreri
  kellyba@bgsu.edu

[1] Bowling Green State University, Center for Family and Demographic Research, Bowling Green, OH, USA

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roughly 39 million households with children in the US. Nearly 8% (3 million) of these households had children who experienced food insecurity (Coleman-Jensen et al. 2016). Much on the research on possible causes of food insecurity among children has focused on economic correlates (e.g., job loss, unstable income), with many studies focusing on the ameliorative effects of food programs (e.g., SNAP, school breakfast and lunch programs, food pantries). It is well established that inadequate financial resources are tied to food insecurity (e.g., Bickel et al. 2000; Nord et al. 2009) but food insecurity is not solely about economic resources. The current study moves beyond a singular focus on income and considers how family context may protect or generate risk for children.

American family life has become more complex. Children increasingly experience single parenthood, divorce, cohabitation, and re-partnering (Cherlin 2010). Indeed, roughly 40% of U.S. children are expected to reside in a cohabiting family by age 12 (Kennedy and Bumpass 2008). It is important to consider the relationship between more complex family structures (i.e., stepfamilies, cohabiting families) and patterns of child food insecurity because there is some evidence that household resources are allocated to children differently based on family type (e.g., Case et al. 1999; Evenhouse and Reilly 2004; Anderson et al. 2001). For example, research by Case et al. (1999) found that children in stepfamilies are at greater risk by receiving fewer food allocations than are children in biological families. Also, cohabiting families have been found to spend less on children and are less likely to share their income or invest in joint households goods than are married couple families (Deleire and Kalil 2002; Waldfogel et al. 2010). As such, children in cohabiting step households may face "double-institutional" jeopardy because of the lack of both marital and biological ties (Manning et al. 2006).

A large body of literature documents the association between living in increasingly non-traditional households (those not composed of two married, biological parents) and children's health and behavioral outcomes. However, the extant research on child food insecurity and family structure is limited, and the findings are mixed. Some studies find that non-intact families are linked to a higher incidence of food insecurity at the household level (i.e., Manning and Brown 2006; Acs and Nelson 2002), while others find no clear patterns of association between child food insecurity and family structure once socioeconomic and demographic characteristics are accounted for (Miller et al. 2014). Given the increasing complexity of families in the U.S., combined with sustained high levels of food insecurity during the last decade, a closer examination of this relationship is warranted. The current study uses recent (2010–2015) waves of U.S. population-based data to examine the association between complex family structure and child food insecurity. Unlike prior work, this study accounts for both union status (single, married, cohabiting) and the biological relationship of the child to the adult (biological/adopted and step).

2 Background and Literature Review

2.1 Family Structure and Child Food Insecurity

Although children are usually protected from reductions in food intake even in households with low food security (McIntyre et al. 2003), almost 10 percent of all households with children also experienced reduced food intake and disrupted eating patterns (Coleman-Jensen et al. 2014). Research has linked food insecurity and other measures of food hardship among children to lower levels of general physical health (e.g., Ryu and Bartfeld

2012; Kirkpatrick et al. 2010; Frank et al. 2010) and health-related quality of life (Casey et al. 2005) as well as a variety of poor health outcomes including anemia (Eicher-Miller et al. 2009; Skalicky et al. 2006) and asthma (Kirkpatrick et al. 2010). Food insecurity among children has also been associated with delayed academic and cognitive development (Winicki and Jemison 2003; Alaimo et al. 2001; Howard 2011; Cook and Frank 2008; Jyoti et al. 2005: Rose-Jacobs et al. 2008), higher probabilities of anxiety and aggression (Whitaker et al. 2006; Slopen et al. 2010), as well as increased behavioral problems (Slack and Yoo 2005; Huang et al. 2010; Slopen et al. 2010). Given the well-established connection between household food insecurity and poor health, it is not surprising that a key goal of Healthy People 2020, the US Department of Health and Human Services program of national health objectives, is to reduce household food security to under 6% and eliminate very low food security among children.

The USDA reports rates of food insecurity among households with children noting that food insecurity is highest in single-parent families, followed by cohabiting-parent families with married-parent families having the lowest risk of food insecurity. In these reports, family structure is derived from the union status of the household head. And yet, relying on simple household rosters misses many complex families, such as cohabiting stepfamilies (Kennedy and Fitch 2012). Relatively few studies on food insecurity have distinguished between biological and stepfamilies. Manning et al. (2006) and Acs and Nelson (2002), used the National Survey of American Families (NSAF), to explore the biological and union status of parents finding that families with two biological parents (cohabiting or married) had more protection from household food insecurity than stepfamilies (one biological parent and one non-biological parent). However, these studies use a broad and less established measure of household food insecurity that did not focus on the experiences of children. A recent study (Miller et al. 2014) addressed this gap in the literature by focusing on child food insecurity (CFI) utilizing items from the well-validated USDA Core Food Security Module (CFSM) to examine the relationship between child food insecurity and family structure among multiple national surveys. Their study found mixed results and no clear pattern of association once key economic and demographic factors were controlled. While providing valuable insight on the relationship between CFI and family complexity, this study failed to distinguish between married and cohabiting stepfamilies. This is a shortcoming because rates of remarriage, re-partnering, and multiple partner fertility are high (e.g., Kennedy and Bumpass 2008; Kreider and Fields 2002; Stewart 2007) and children are increasingly likely to live in two-parent families in which they are not the biological children of the mother's new partner (Coleman et al. 2000; Hogan and Goldscheider 2003).

Although these studies provide a useful starting point, they may have failed to adequately capture the relationship between family structure and child food insecurity for several reasons. First, in prior studies, family structure has either been defined based on the union status of the household head or from the perspective of one focal-child. However, one person's lens on family relationships excludes the experience of the entire household. Indeed, recent research has demonstrated that family-type categorization depends on the unit of analysis (Brown and Manning 2009). For example, one child in the family may be living with both biological parents while another is living with a biological mother and a stepfather or cohabiting partner. By limiting the definition of family structure to the perspective of just one child in the household, the full relationship between more complex family structures and child food security may be understated. By capturing all children, regardless of their relationship to the household head, this study improves on prior research and provides a more accurate portrait of child food insecurity across family structure.

Also, prior studies on family structure and food insecurity are based on data that was collected before the start of the Great Recession, when the prevalence of food insecurity among households with children was much lower. This is important to consider given that the prevalence of household food insecurity has remained high and relatively unchanged since 2008 despite improvements in the economy. Research on trends in food insecurity suggests that rates of household food insecurity remained high even while unemployment declined after the recession primarily because of rising inflation and the increased price of food (Nord et al. 2014). Households facing food insecurity may have been unable to spend a greater share of their income on food when food prices increased, particularly if inflation had risen as well, thus sustaining high levels of food insecurity. Given that the current high rate of food insecurity has not returned to pre-recession levels, it may be that the relationship between complex family structure and child food insecurity has shifted under the economic constraints experienced by U.S. households during the last decade.

Of particular interest to this study are the patterns of child food insecurity in stepfamily households. Differentiating between cohabiting two biological parent households and stepparent households is important because prior research finds that children in stepfamilies experience more instability (Stewart 2007) and receive less economic support than children in biological families (e.g., Case et al. 1999; Case and Paxton 2001). Also, distinguishing between cohabiting and married couple families is important because prior studies find that weaker ties and less stable qualities of cohabiting unions may lead to fewer joint investments by cohabiting than married couples (Brines and Joyner 1999; Kalmijn et al. 2007). As a result, children in cohabiting stepfamilies may not receive as much protection from food insecurity as children living in married stepfamilies. On the other hand, children living in cohabiting stepparent households may fare better than children living with cohabiting biological parents. Indeed, prior research has found that single mothers with children often choose new cohabiting partners who have more economic and social resources than their former partners, and thus may be better able to prevent food insecurity among their children (Bzostek et al. 2012).

3 Data and Methods

3.1 Data and Sample

Data come from multiple years of the Current Population Survey, Food Security Supplement (FSS). The FSS includes a broad range of questions on food-related problems, perceived dietary inadequacy, reductions in food intake and frequency of hunger. This dataset is particularly well-suited for studying food security in children because it is the only large, recently collected, national-level dataset that allows for the exploration of an important but relatively uncommon phenomenon. To maximize the sample size of children experiencing food insecurity, six consecutive years (2010–2015) of the FSS were pooled. The CPS design involves sampling each household once a month for four months in one year, and then again for the same number of months a year later. This longitudinal component means that roughly half of the households are surveyed in adjacent years. To avoid counting households twice, separate year files are combined such that all households surveyed in 2015 are included, along with households surveyed in their second year for 2010 through 2014. The data are weighted using household-level replicate weights

provided by the CPS to generate nationally representative estimates and adjusted standard errors.

The analytic sample is composed of households with children ages 0–17 with child food insecurity information and household composition attached. To compare the results with patterns found in prior studies, households are included if there is one mother with a biological child ($N = 40, 346$). Households were excluded if the mother reported her marital status as "married, spouse absent" ($N = 531$) since there was no information available on the father (i.e., biological or step). An additional $N = 196$ households were excluded because they were missing information on child food security status resulting in a final analytic sample size of 39,619 households. The excluded households were more likely to be low-income, and less likely to include mothers who were non-Hispanic white, or to have mothers with more than a high school education than the analytic sample. Nonetheless, the excluded households comprise fewer than 2% of households with biological mothers and children.

3.2 Measurement

3.2.1 Child Food Insecurity Status

The USDA differentiates food-secure households by the severity of food insecurity they have experienced in the last 12 months. Food insecurity among households with children is further differentiated by whether it affects only adults or also affects children and by the severity of food insecurity among the children (Coleman-Jensen et al. 2014). The following questions constitute the eight items from the USDA's 18-item Core Food Security Module that are used to identify food insecurity among children: (1) We relied on only a few kinds of low-cost food to feed our children because we were running out of money to buy food; (2) We couldn't feed our children a balanced meal, because we couldn't afford that; (3)The children were not eating enough because we just couldn't afford enough food; (4) In the last 12 months, did you ever cut the size of any of the children's meals because there wasn't enough money for food? (5) In the last 12 months, were the children ever hungry but you just couldn't afford more food? (6) In the last 12 months, did any of the children ever skip a meal because there wasn't enough money for food?; (7) How often did this happen—almost every month, some months but not every month, or in only 1 or 2 months? And (8) In the last 12 months, did any of the children ever not eat for a whole day because there wasn't enough money for food? Responses to questions 1–3 ranged from often, sometimes, or never true. The questions were coded as affirmative if the response was 'often' or 'sometimes'. Question 7 responses ranged from almost every month, some months but not every month, or in only the last 2 months. This question was coded as affirmative if the response was 'almost every month' or 'some months but not every month.' The remaining questions were Yes/No and coded as affirmative if the response was 'Yes'. Households responding affirmatively to two or more child-focused questions indicate that the children in the household were *child food insecure* (CFI).

3.2.2 Independent Variable

Five family structure categories were established. When each child in the household shares the same two biological parents that are married to each other the household is termed a *married biological parent household*; comparable households in which the biological parents are unmarried are termed *cohabiting biological parent households*. A household is

considered a *married stepfamily household* when at least one child in the household has an identified married stepparent; when the identified stepparent is not married to the other parent, the household is considered a *cohabiting stepfamily household*. Following Manning and Brown (2006), households are also considered *cohabiting stepfamily households* when children have an unmarried mother who reports residing with a cohabiting partner, but that partner is not reported as the father of any children in the household. The final category of family structure includes *single mother households*. This includes households in which the children have a mother who does not have a cohabiting partner nor a spouse listed on the household roster.

3.2.3 Control Variables

The multivariate models control for a series of sociodemographic variables used in recent research on the association between family structure and child food insecurity. These include the race/ethnicity of the mother defined as non-Hispanic white, non-Hispanic black, other non-Hispanic and Hispanic, mother's educational attainment (defined as less than high school, high school, and more than high school), and mother's age. Also included are household characteristics that have been found to influence the level of household food insecurity: the number of children and the number of adults in the household as well as household income. Recent research shows that households with teenagers have higher rates of CFI than households with only younger children (Schanzenbach et al. 2016), therefore the number of children in the household by age categories '0–5', '6–12' and '13–17' is included. Given that the FSS includes a 16 categorical response variable for household income, the midpoint dollar amount for each of the income categories was assigned as in prior studies (e.g., Wadsworth 2014; Zilanawala 2016). For the top category, which includes no upper bound (e.g., $200,000 and over) the values are imputed using a formula based on the Pareto curve which takes into account the frequencies of both the highest and next-to-highest categories as well as the next-to- highest income category's midpoint (Hout 2004).

3.3 Analysis

The goal of this study is to clarify the findings on the relationship between family structure and child food insecurity and to understand whether different types of family structure confer varying levels of risk for children's food insecurity, net of socio- and demographic factors. The first step was to provide a descriptive portrait of food security among households by variation in family structure. To assess the relationship between family structure and children's food security status, both unadjusted and adjusted logistic regression models were specified. The first set of models focuses on the biological status of parents by examining the differences between step, biological and single mother households; the second set focuses on the union status of the parents by examining the differences between married, cohabiting, and single mother households; and finally the last set of models considers biological status and union status together to examine the full five-category family structure of biological married, biological cohabiting, step married, step cohabiting, and single mother households. Each model includes a set of year fixed effects. In all of the models single mother families are the omitted category. Post-hoc tests were conducted to identify significant differences between key groups of interest (i.e., biological versus step, married versus cohabiting) and are indicated in the tables by superscripts. In

order to account for the increased probability of a Type I error when making multiple comparisons, all p-values are adjusted using a Bonferroni correction (DeMaris 2004).

4 Results

4.1 Descriptive Findings

Table 1 shows the descriptive characteristics and 95% confidence levels for all variables used in the analysis across five family structure types. Although descriptive, these numbers highlight some of the complexities surrounding attempts to uncover the relationship between family structure and child food insecurity. Among households with children, roughly 63% are composed of married biological families, while over one in five (22.5%) are composed of single mother families. Results show that children's food security as well as household characteristics vary by family structure. Married biological family households show the lowest prevalence of food insecurity among children (4.8%) followed by married stepfamily households (10.2%) and biological cohabiting households (10.8%). Among cohabiting family households, those headed by biological parent households have slightly lower rates of CFI than those headed including stepparents—10.8% compared to 13.6%. Roughly 17% of single mother households experience CFI.

4.2 Multivariate Logistic Regression Models

Results of the logistic regression analyses are displayed in Table 2. The odds ratios for just the family structure categories are presented. The first set of models includes a specification of family structure that only considers the biological relationship of the mother and her spouse (or partner) to the children in the household by contrasting biological families and stepfamilies with single mother families, the reference category. Post-hoc comparisons are also presented which examine the difference between two-biological parent families and stepfamilies. Model 1 shows that single mother families have higher unadjusted odds of CFI than both two biological parent families and stepfamilies, and stepfamilies have higher odds of CFI than two biological parent families (indicated by superscript a in Table 1). Once the full set of maternal and household characteristics are included (Model 2), a notable pattern emerges—the adjusted odds of CFI between single mother households and stepfamily households is no longer statistically significant. However, the difference between stepfamily and biological families remains. Children residing in stepfamily households have 74% higher odds of experiencing CFI than biological family households (OR = 83/0.48 = 1.74, $p < 0.001$).

The next set of models (3 and 4) focus on the impact of marital status, rather than biological status of the parents by specifying family structure as married couple families, cohabiting couple families and single mother families. Here again single mother families are the reference category, but post hoc comparisons between married families and cohabiting families are presented (indicated by superscript b in the table). Model 3 shows that children living in single mother families have higher unadjusted odds of CFI compared to children in cohabiting or married families, while children in living with married couple families have lower unadjusted odds of CFI than children living in cohabiting couple families. After introducing the full set of controls (model 4), the patterns change. No differences in the predicted odds of CFI between cohabiting family households and single

Table 1 Descriptive statistics of the study population, by family structure

	Family structure				
	Married biological (63.3%)	Cohabiting biological (3.4%)	Married stepfamily (6.7%)	Cohabiting stepfamily (4.1%)	Single mother (22.5%)
Children's food insecurity	4.8 (4.4–5.0)	10.8 (8.85–12.7)	10.2 (8.88–11.4)	13.6 (11.7–15.4)	16.8 (15.8–17.7)
Mother's race/ethnicity					
Non-hispanic white	65.3 (64.6–65.9)	43.4 (43.1–49.0)	64.4 (62.4–66.3)	58.8 (56.0–61.4)	42.4 (41.3–43.4)
Non-hispanic black	6.4 (6.04–6.75)	16.5 (11.6–16.9)	11.4 (10.0–12.7)	13.1 (11.1–15.1)	29.9 (28.8–31.0)
Non-hispanic other	10.0 (9.56–10.4)	6.2 (4.60–7.34)	5.2 (4.27–6.19)	5.8 (4.38–7.28)	5.1 (4.5–5.6)
Hispanic	18.3 (17.8–18.8)	33.9 (30.4–36.8)	19.0 (17.2–20.6)	22.3 (19.8–24.7)	22.6 (21.6–23.6)
Mother's age (in years)	39.2 (39.0–39.2)	30.1 (29.6–30.5)	36.9 (36.6–37.2)	33.9 (33.4–34.3)	36.6 (36.4–36.8)
Mother's educational attainment					
Less than high school	8.2 (7.82–8.62)	21.0 (18.2–23.7)	10.4 (9.13–11.7)	14.4 (12.3–16.4)	13.9 (13.1–14.7)
High school	19.7 (19.1–20.3)	33.6 (30.6–36.4)	29.4 (27.6–31.1)	34.4 (31.7–37.1)	30.6 (29.4–31.8)
More than high school	72.0 (71.4–72.6)	45.4 (42.0–48.7)	60.2 (58.1–62.2)	51.2 (48.0–54.2)	55.5 (54.2–56.7)
Household income (ln)	11.2 (11.1–11.1)	10.3 (10.2–10.3)	10.8 (10.7–10.8)	10.4 (10.3–10.4)	10.1 (10.1–10.1)
Total number of adults in HH	2.30 (2.2–2.3)	2.29 (2.2–2.3)	2.31 (2.2–2.3)	2.28 (2.2–2.3)	1.59 (1.5–1.6)
Number of children by age					
Ages 0–5	0.61 (0.60–0.62)	1.01 (0.96–1.0)	0.60 (0.56–0.63)	0.71 (0.66–0.75)	0.49 (0.47–0.50)
Ages 6–12	0.76 (0.75–0.77)	0.44 (0.39–0.48)	0.96 (0.91–1.0)	0.81 (0.76–0.85)	0.71 (0.69–0.73)
Ages 13–17	0.50 (0.49–0.51)	0.14 (0.11–0.16)	0.77 (0.74–0.80)	0.46 (0.42–0.49)	0.51 (0.49–0.52)
Unweighted N	25,517	1227	2761	1636	8478

Current population survey, food security supplement, 2010–2015. Estimates are weighted using household replicate weights

Table 2 Odds Ratios of Children's Food Insecurity by Family Structure Specifications

	Model 1		Model 2		Model 3		Model 4		Model 5		Model 6	
	OR	95% CI	OR	95% CI	OR	95% CI	OR	95% CI	OR	95% CI	OR	95% CI
Family structure												
Biological family	0.27 ***a	(0.23 –0.29)	0.48 ***a	(0.41 –0.55)								
Step family	0.64***	(0.55 –0.74)	0.83	(0.71 –1.0)								
Single mother (reference)												
Married couple family					0.28***b	(0.24–0.30)	0.49***b	(0.41–0.56)				
Cohabiting couple family					0.70***	(0.59–0.83)	0.86	(0.71–1.0)				
Single mother (reference)												
Married biological									0.25***	(0.22–0.28)	0.45***	(0.37–0.53)
Cohabiting biological									0.60***c	(0.44–0.82)	.77c	(0.55–1.0)
Married step									0.56*c	(0.44–0.70)	0.75*c	(0.56–0.99)
Cohabiting step									.78*c	(0.62–0.99)	.94c	(0.72–1.2)
Single mother (reference)												
Wald Chi Square(df)	990.14(7)		2969.63(18)		889.83(7)		2969.63(18)		1088.49(9)		2757.15(20)	
Includes year fixed effects	Yes		Yes		Yes		Yes		Yes		Yes	
Includes controls	No		Yes		No		Yes		No		Yes	

Data are weighted with using household replicate weights. $N = 39,349$. All models include year fixed effects. Models 2, 4, and 6 also include mother's education, mother's age, mother's race/ethnicity, and household income (logged), number of children (by age category) and number of adults. p values and 95% CI for family structure categories are adjusted using the Bonferroni correction

[a] Significantly different from *step family* at $p < 0.05$

[b] Significantly different from *cohabiting couple family* at $p < 0.05$

[c] Significantly different from *married biological family* at $p < 0.05$

* Indicates the coefficient is statistically significant at $p < 0.05$, ** $p < 0.01$, *** $p < 0.001$

mother households remain once controls are added. However, the adjusted odds of CFI for children living in cohabiting families are 78% higher than the odds for children living with married couple families ($0.86/0.49 = 1.78$, $p < 0.001$).

The final set of models (Models 5 and 6) present the unadjusted and adjusted odds ratios for CFI regressed on the five category family structure measure that incorporates both parental marital status and parental biological status. Model 5 shows that without controls for income, maternal and household characteristics all family structure types have significantly lower odds of CFI than children in single mother families and higher odds of CFI than married biological families (indicated by the subscript c). After adding the full set of controls (Model 6), several patterns emerge.[1] First, the inclusion of demographic and socioeconomic controls reduces the relationship between family structure and child food security but not to insignificance as found in prior research. Children in married couple families—either married biological parent families or married stepfamilies—have lower odds of experiencing food insecurity than children in single mother families. Second, all households display significantly higher adjusted odds of CFI than married two biological parent households (as indicated by the superscript c). For example, among biological parent households, those whose parents are cohabiting rather than married face 1.72 higher odds of CFI. And finally, once the controls are added, any statistical differences in the odds of CFI between single mother households and cohabiting families of any kind (i.e., cohabiting stepfamily or cohabiting biological family) fades. No differences in the adjusted odds of CFI between cohabiting step, cohabiting biological or married stepfamilies were found.

The absence of significant differences in the likelihood of CFI between cohabiting biological parent families and the two types of stepfamilies is consistent with prior research on child wellbeing (Brown 2004; Artis 2007). In addition, while stepfamilies overall do have a higher likelihood of experiencing child food insecurity compared to biological families no statistical difference was found in the odds of CFI among stepfamilies (i.e., between married stepfamilies and cohabiting stepfamilies). A notable result presented here demonstrates that children in households headed by single mothers have higher adjusted odds of experiencing CFI than comparable children living in either type of married couple family (i.e., biological or step), but similar odds compared to children living in either type of stepfamily. These findings suggest that regardless of whether the mother remains unpartnered or forms a cohabiting stepfamily, the likelihood of children experiencing food insecurity is the same once income, maternal and household characteristics are accounted for. In short, family structure is associated with the presence of child food insecurity, and for the most part, socioeconomic and demographic factors do not completely account for this relationship.

5 Discussion and Future Research

Prior studies that have explored the linkages between complex family type and food insecurity are dated, focus on a limited age range of children, are unable to distinguish between married and cohabiting stepfamilies, or do not utilize a child-specific measure of

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[1] Control variables are associated with child food insecurity as expected based on prior research. Maternal education (more than a high school degree) and having higher logged income was significantly associated with reduced odds of food insecurity, while being Hispanic and having older children in the household was associated with an increase in the odds of food insecurity.

food insecurity. In addition, this study considers the family type from the perspective of all children in the households, not just one focal child. This is an important consideration since prior research has found that over one-third (36%) of children live with siblings who do not share the same biological parents (Kreider and Ellis 2011) and thus may not share the same family type.

This study fills a gap in the literature by using recent nationally representative data and a USDA measure of child food insecurity to understand how children are differentially protected from food insecurity across complex family structures. Results show that rates of CFI in families headed by a single mother are higher than households headed by either a married biological parent family or a married stepfamily net of income, maternal and household characteristics. In addition, all family types studied here were at higher risk of CFI than married biological parent households. This aligns with prior research which shows that children raised by their married biological parents enjoy a range of better cognitive, economic and emotional outcomes compared to their peers in other family types (Ribar 2015). In addition, among cohabiting families, there was no protective advantage for children living with two biological parents. It may be that the observed differences in CFI between cohabiting and marital families are the result of characteristics correlated with selection into marriage. Indeed, cohabitation is often a marker of family instability, a characteristic that often leads to worse outcomes for children (Manning 2015).

These results support published USDA reports on CFI which finds the highest rates of CFI among households headed by a single mother, and the lowest rates among married couple households (Coleman-Jensen 2010). The results also show that cohabiting step-families—which are less stable and could represent single mother families in transition—are no different in the likelihood of experiencing CFI once the set of controls are introduced. In other words, for children living with a single mother, there may be no protective advantage against CFI with the presence of an unmarried partner in the household. The absence of significant differences in CFI between cohabiting biological parent families and the two types of stepfamilies is consistent with prior research on child wellbeing (Brown 2004; Artis 2007). However, some of the results here contrast with those of an earlier study which found little consistent evidence of a relationship between CFI and family structure (Miller et al. 2014).

There are several possible reasons these differences. First, the present study utilizes recent nationally representative data from 2010 to 2015, a period of time in which the level of household food insecurity remained high even though the economy was in recovery after the end of the Great Recession. While valuable, the Miller et al. (2014) study utilized data sources that were collected during time periods prior to the steep increase in household food insecurity which occurred after the onset of the Great Recession. From 1998 to 2007 (prior to the recession) an average of 15.7% of household with children experienced some level of food insecurity, increasing to an average from 2008 to 2014 of roughly 20% (Schanzenbach et al. 2016). As the recession ended, the level of inflation increased as did the price of food relative to the price of all other goods and services (Coleman-Jensen et al. 2014). This may have placed more of a burden on families to pay for the food needed to protect their children from food insecurity even as the economy was recovering. In addition, research has shown that the recession reduced the asset ownership for low-income mothers who were single or cohabiting more than low-income mothers who were in a marital union (Sariscany 2015). Household assets such as vehicle ownership and savings, have been found to have an additional protective effect against food insecurity beyond income in the post-recession period (Guo 2011). In addition, the gaps in recovery between the married and unmarried were large—single parents had much higher odds of

being unemployed in the years after the recession, than before and have seen much smaller income gains than married couple families (Mattingly et al. 2011). These reasons support the results of the current study which finds that married biological couple families retain an advantage net of income, maternal and household characteristics, and for the most part, single mother families retain a disadvantage. And finally, the results here may contrast with earlier studies because of the variation in age composition of the samples. The current study uses a nationally representative sample of households with children ages 0–17, whereas the Miller et al. (2014) study was primarily limited to samples composed of younger children. It may be that in those studies, mothers with young children who had already repartnered were negatively selected on characteristics associated with family instability, and thus may be more disadvantaged than those in the current study.

This study has some limitations. First, despite its clear advantages the USDA Food Security Module measures food security among all children in the household, not individual children. This limits the ability to measure variation in food security by relationship to the parents for children living in the same household. Also, the data are cross-sectional and do not allow a consideration of transitions in family structure or the duration of child food insecurity. Little is known about the long-term effects of household structure on patterns of child food insecurity. In one of the few studies to examine shifts in family structure and food security, Hernandez and Pressler (2013) find that transitioning into a union (from unpartnered to either cohabiting or marital) is associated with an improvement in household level food security for young children. The results presented here support the increased risk of child food insecurity among children living with single mothers. Another limitation concerns the availability of other characteristics that may explain the relationship between family structure and children's food insecurity. More specifically, the CPS does not allow for the inclusion of a rich set of covariates (i.e., family functioning, food preparation strategies, parental physical or mental health, etc.) that may capture unobserved characteristics of families that would help explain the patterns found here. And finally, there are concerns on the sample restrictions. The current study is limited to households with children in which there is one identified biological mother. Single-father households are excluded, as are more complex families that have no mother present and are headed by grandparents, family types which often have high rates of food insecurity (Balistreri 2012). While this limitation was necessary to focus the aims of the study and attempt to match prior research which focuses on the relationship between one child and one mother, future research should explore the relationship between other types of complex families and child food insecurity.

The results demonstrate that children growing up in complex family households are more vulnerable to food insecurity than children growing up in two married biological parent households. If the goals of Healthy People 2020 are to reduce household food insecurity and eliminate severe food insecurity among children, special attention must be paid to variation in family household composition and its links to child food insecurity. The key public assistance program geared toward reducing food insecurity and eliminating hunger, the Supplemental Nutrition Assistance Program (SNAP) has a wide definition of eligibility, encompassing all household members that prepare and eat meals together. Even though SNAP has a broad definition that may include family members who are connected in a variety of ways, some individuals are still prohibited from receiving benefits (Meyer and Carlson 2014). For example, households in which the parents have children who reside in other households part of the time (i.e., shared custody) or a cohabiting partner who resides in the household part-time—those individuals would only be eligible for SNAP benefits if they eat at least half their meals with the household (Carlson and Meyer 2014).

Indeed, as families have become more complex they have also become more fluid with children and adults moving across household boundaries for varying levels of time (Seltzer 2000). Further research needs to determine not only the length of time that family members in complex households live together, but also the movement into and out of food insecurity. Given that stable two-married-parent families are in decline, it is imperative that food assistance programs continue to test and develop systems that reduce the risks of child food insecurity associated with increasing family complexity.

Compliance with Ethical Standards

Conflict of interest The author declares no conflict of interest.

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