Family Structure and Food Insecurity by Race/Ethnicity:

Implications for Food and Nutritional Assistance Programs

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Note: Christian Vazquez, MSW declares that he has no conflict of interest.

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What do we know about the interaction between race/ethnicity and family structure on food insecurity outcomes? Food insecurity is the state of being without access to a sufficient quantity of affordable nutritious food and it affected 15.6 million households in the United States in 2016 (Bickel, Nord, Price, Hamilton, & Cook, 2000; Coleman-Jensen, Rabbitt, Gregory, & Singh, 2017). Although, the percentage of food insecure households in 2016 (12%) has dropped since 2008 (14%), 15.6 million households is an unacceptable number and food insecurity continues to be a major public health concern (Gundersen & Ziliak, 2015; Rabbitt, Coleman-Jensen, & Gregory, 2017). Food insecurity has been linked to poor health and life outcomes including obesity, depression, stress and anxiety, iron deficiency anemia, tooth decay, frequent headaches, asthma, and negative academic, social, and psychological outcomes in older children (Althoff, Ametti, & Bertmann, 2016; Bhattacharya, Currie, & Haider, 2004; Casey et al., 2005; Gundersen & Ziliak, 2015; Jyoti, Frongillo, & Jones, 2005; Leung, Epel, Willett, Rimm, & Laraia, 2015; Mangini, Hayward, Dong, & Forman, 2015; Martin & Ferris, 2007; Seligman, Laraia, & Kushel, 2010; Silverman et al., 2015; Victorino & Gauthier, 2009). Food insecurity not only affects individuals and families but also the country as a whole with one study estimating the annual cost associated with food insecurity to exceed $90 billion (Brown, 2007).

The high prevalence of poor health outcomes for children in households with non-traditional family structures has been well documented; however, the recent literature on food insecurity and family structure has shown mixed findings (Bramlett & Blumberg, 2007; Brown, 2004; Conway & Li, 2012; Krueger, Jutte, Franzini, Elo, & Hayward,

2015; Miller et al., 2014; Slade, Beller, & Powers, 2017). Coleman-Jensen et al. (2017) and Rabbitt et al. (2017) report that households with children headed by a single woman or a single man experience rates of food insecurity that are higher than the national average (12%): 31% and 21%, respectively. The strongest predictor of single-parent family food insecurity has been economic power (Anderson, Butcher, Hoynes, & Whitmore Schanzenbach, 2016). Other findings contradict this, reporting that food insecurity risk may be higher for two-biological-parent households depending on race/ethnicity (Arteaga, Potochnick, & Parsons, 2017). The prevalence of the two-biological-parent household has been in decline with the prevalence of single-parent households rising from 8% in 1960 to 26% in 2004 (Slade et al., 2017). As such, more research has focused on the risk factors associated with living in non-traditional family structures (Slade et al., 2017).

The research in this area helps identify which groups are the most at risk of food insecurity, which in turn helps policymakers and program developers target those groups. Numerous studies have examined risk factors for household food insecurity. Some of those factors include: households headed by an ethnic/minority person, households headed by a person with lower education levels, renters, and households with lower incomes (Anderson, Butcher, Hoynes, & Whitmore Schanzenbach, 2016; Bickel et al., 2000; Chang, Chatterjee, & Kim, 2014; Coleman-Jensen et al., 2017; Jung, de Bairros, Pattussi, Pauli, & Neutzling, 2016; Kalil & Chen, 2008; Manning & Brown, 2006; Martin & Lippert, 2012; McIntyre, Wu, Fleisch, & Herbert Emery, 2016; Miller, Nepomnyaschy, Ibarra, & Garasky, 2014; Rabbitt, Smith, & Coleman-Jensen, 2016; Stuff et al., 2009;). For example, in 2016, food insecurity disproportionately affected

households headed by African-Americans (22%) and Hispanics (18%) (Coleman-Jensen et al., 2017). Historically, African-Americans and Hispanics have maintained high levels of food insecurity (Kiehne & Mendoza, 2015). Food insecurity is often associated with income; however, the following example shows that this phenomenon goes beyond income. In 2011, more than half (58%) of the households whose incomes were below poverty were in fact food secure, while there were as many as 7% of American households who made more than 185 % of the poverty line but were food insecure (Coleman-Jensen, Nord, Andrews, & Carlson, 2012; Chang et al., 2014). Again, according to the literature one can see the factors associated with food insecurity are not straightforward.

Government officials in the U.S. and across the world agree that food security is a basic human right (Jones, Ngure, Pelto, & Young, 2013; Kiehne & Mendoza, 2015). As such, food and nutrition assistance programs, such as the Supplemental Nutrition Assistance Program (SNAP), have been developed to reduce the prevalence of food insecurity (Bickel et al., 2000). The U.S. first implemented food and nutrition assistance programs following the great depression to alleviate food insecurity until the economy improved (United States Department of Agriculture, 2014). Food and nutrition assistance revived in 1946 with the introduction of the National School Lunch Program and then again in 1961 with the pilot version of the original Food Stamp Program (Bickel et al., 2000; United States Department of Agriculture, 2014). Food insecurity continued to be a growing concern in the U.S. and a Task Force on Food Assistance was formed in 1984, which was followed by the enactment of the National Nutrition Monitoring and Related Research Act of 1990 (Bickel et al., 2000). By 1995 the USDA was beginning to research

and monitor food insecurity on a yearly basis and in 1996 the U.S. had joined 185 other countries in signing a declaration to reduce food insecurity (Bickel et al., 2000; Coleman-Jensen et al., 2017).

In 2016, about 59% of households that were food insecure participated in one or more of the three largest food and nutrition assistance programs (Coleman-Jensen et al., 2017). SNAP, formerly known as the Food Stamp Program, is the largest of the three programs reaching around 28 million people each month and has been associated with reducing household food insecurity (United States Department of Agriculture, 2014; Coleman-Jensen et al., 2017). In 2016, SNAP enrollment rates were highest for White able-bodied adults without dependents (ABAWD), indicating a gap and a need for more minorities and families with children to enroll (United States Department of Agriculture, 2017; Coleman-Jensen et al., 2017). The purpose of the current study is to investigate the relationship between family structure (single-parent vs. two-parent) and food insecurity among different race/ethnicities to better understand what populations to target for enrollment. The hypothesis states that among the sample, single-parent households will be more food insecure, and the relationship between family structure and food insecurity will be moderated by race/ethnicity, being stronger for single-parent minority households. Thus, the study will contribute to the literature by providing evidence for policymakers to target groups in most need of assistance. Further, in the discussion, recommendations are provided about the appropriate settings for targeting minority families at elevated risk of food insecurity to enroll in food and nutrition assistance programs.

Methods

To better understand the interaction of race/ethnicity and family structure on food

insecurity two questions are asked.

RQ 1: Is the prevalence of food insecurity higher among single-parent households compared to two-parent households?

RQ 2: How does the relationship between family structure and food insecurity differ when moderated by race/ethnicity?

Data

The National Health Interview Survey (NHIS) is an annual cross-sectional household survey conducted by the National Center for Health Statistics, and the sample comes from the civilian, non-institutionalized adult population (aged 18 and older) in the U.S. (National Center for Health Statistics, 2017). The 2016 NHIS included households selected from a multi-stage cluster sample to obtain participants' health-related information (National Center for Health Statistics, 2017). African-American and Hispanic populations were over-sampled (National Center for Health Statistics, 2017). The sample was stratified by state, and used weighting to account for unequal probability of selection as well as nonresponse (National Center for Health Statistics, 2017). The study examines families with children; thus, multiple-family households and households with no children are excluded allowing the unit of analysis to be single-family households with children (N = 8,610) (National Center for Health Statistics, 2017). From each household sampled in the NHIS, one adult is randomly selected to answer on behalf of the household (National Center for Health Statistics, 2017). Additional details about the methodology of 2016 NHIS can be found elsewhere (National Center for Health Statistics, 2017).

Dependent Variable

The NHIS measures household food insecurity using the USDA's household food security scale (HFSS), which is the primary household food insecurity measure used in the U.S. and Canada (Jones et al., 2013). The HFSS consists of 10 questions for households without children and 18 questions for households with children (Bickel et al., 2000). The NHIS uses the 10-question version, due to not every participant having children. However, using this measure for this study is appropriate as the study examines household food insecurity and not child food insecurity. The HFSS has been validated by use in other nationally representative surveys (Jones et al., 2013; Miller et al., 2014). The survey includes questions, such as, "In the last 30 days, were you ever hungry but didn't eat because there wasn't enough money for food?" and "I worried whether my food would run out before I got money to buy more." Answers for this set of questions included "yes/no" and "often true, sometimes true, or never true for your family in the last 30 days?" There are also two questions that require a numerical answer, "how many days within the last 30 days did this happen?" Each question is assigned a value of 1 or 0 based on the response so that range of the 10-item scale is 0-10 (National Center for Health Statistics, 2017).

The determination of food security has been defined by four categories: high food security (raw score 0), marginal food security (raw score 1-2), low food security (raw score 3-5), and very low food security (raw score 6-10), but for the purpose of this study food security was defined as a dichotomous variable, food secure and food insecure, which is common for research purposes (Gundersen & Ziliak, 2015; Franklin et al., 2012). The categories of marginal and high were combined to define food secure households and low and very low were combined to define food insecure households.

Food secure was the reference group. Supplemental information about the cutoff scores and the HFSS can be found in the NHIS Survey Description booklet (National Center for Health Statistics, 2017).

Independent Variable

The independent variable was family structure. This study divided family structures into two categories: single-parent households and two-parent households with children. Two-parent households included cohabitating adults with children. Single-parent households with children was the reference group.

Moderating Variable

Race/ethnicity categories for this study included non-Hispanic African-American, Hispanic, non-Hispanic White, and non-Hispanic Other based on response from household respondent. This multi-categorical variable was dummy coded to represent three dichotomous variables using White as the reference group.

Covariates

The education variable, an individual level variable for highest level of education attained by any member in the household, is a continuous variable measured by number of years completed. The age variable, also an individual level variable for the household respondent, is a continuous variable measured by years.

Analysis

For this cross-sectional study, descriptive statistics along with the percentage of food secure/insecure households across each variable are provided in Table 1. Due to the complex multi-stage cluster sampling of the NHIS dataset, all analyses in this study were based on weighted statistics using the final weights provided with the NHIS dataset

(National Center for Health Statistics, 2017). This study used the final weight given in the household file (WTFA_HH). Logistic regression was performed to examine the moderating effect of race/ethnicity on the relationship between family structure and food insecurity. As mentioned above, the race/ethnicity variable was dummy coded to represent three dichotomous group variables, resulting in a model that regressed food insecurity on African-American, Hispanic, Other, Family Structure, the interaction between African-American and Family Structure, the interaction between Hispanic and Family Structure, and the interaction between Other and Family Structure. Follow-up tests using Hayes' conditional effect equation were performed to examine relationship differences for significant interactions. All statistical analyses were performed using Mplus software (Muthén & Muthén, 2017).

Results

Participant Characteristics

As summarized in Table 1, there was a significantly larger number of food secure households (7,736) compared to food insecure households (874). Of the food secure households, only 19% were single-parent households, whereas nearly 50% of the food insecure households were single-parent households. The mean age was similar among food secure and food insecure households, 38.6 (SD = 8.9) and 37.5 (SD = 9.2), respectively. White was the largest group in the sample, with Hispanic second, African-American third, and Other being fourth, across both food secure and food insecure households. Lastly, the mean education level was 15.8 (SD = 3.1) for the food secure households and 13.7 (SD = 3.4) for the food insecure households.

Model Results

As shown in Table 2, as education increased the log odds of being food secure increased ($b = -0.11$, $SE = 0.02$, $p < 0.0001$). Logistic regression analysis showed that the relationship between family structure and food insecurity was different for the African American group compared to the White group ($B = 0.60$, $SE = 0.24$, $p = 0.01$). The follow-up tests showed that for both the African American group ($b = -0.59$, $SE = 0.22$, $p = 0.01$) and the White group ($b = -1.19$, $SE = 0.13$, $p < 0.0001$), the relationship between family structure and food insecurity was significant, but it was larger for Whites. Among African-Americans, those in two-parent households have 0.55 (CI = 0.32, 0.79) times the odds of being food insecure, compared to the odds of those in single-parent households. Among Whites, those in two-parent households have 0.30 (CI = 0.22, 0.38) times the odds of being food insecure, compared to the odds of those in single-parent households.

Discussion

The study answered the two initial questions. Table 3 shows, the proportions of single-parent food insecure families was 21% and only 7% for two-parent households, suggesting that the prevalence is higher for single-parent households. Similarly, the descriptive data for this study showed that African-Americans (20%) and Hispanics (14%) are experiencing higher rates of food insecurity compared to Whites (7%) and other races (7%). This confirmed the hypothesis and the evidence in previous literature.

Second, the findings do support the hypothesis that the relationship between family structure and food insecurity varies by race/ethnicity, specifically between African-Americans and Whites. The conditional effects suggest that single-parent household status increases the likelihood of food insecurity status for both African-American and White households. The finding that the relationship is larger for African-

American households suggests that family structure matters more for them (for predicting food insecurity), compared to Whites. Both single-parent African-American and single-parent White households are at much higher risk of food insecurity compared to their two-parent counterparts.

There are several factors that link single-parent African-American households and single-parent White households. Although, not included in this study due to a large amount of missing data, the literature would suggest that income is the biggest factor that links the two, as income has been found to be the main predictor of food insecurity across races (Anderson, Butcher, Hoynes, & Whitmore Schanzenbach, 2016; Furness, Simon, Wold, & Asarian-Anderson, 2007; Murimi, Kanyi, Mupfudze, Mbogori, & Amin, 2016; Chang, Chatterjee, & Kim, 2014). The United States Department of Agriculture (USDA) defines food insecurity as, “limited or uncertain availability of nutritionally adequate and safe foods or limited or uncertain ability to acquire acceptable foods in socially acceptable ways” (Bickel, Nord, Price, Hamilton, & Cook, 2000). Factors such as, living in a food desert, not having transportation, or simply not having enough money for nutritious foods are all reasons, related to income, for which families may fall into the definition of being food insecure (Bhattacharya, Currie, & Haider, 2004; Anderson, Butcher, Hoynes, & Whitmore Schanzenbach, 2016; Chang, Chatterjee, & Kim, 2014). It has also been documented that minority and single-parent households earn less than two-parent White households (Pew Research Center, 2016; Semega, Fontenot, & Kollar, 2017).

Given the evidence provided in the literature related to income as a predictor of food insecurity, the question now turns to what setting exists where both single-parent

minority and single-parent White families can be targeted for enrollment into food and nutrition assistance programs? The children of minority and single-parent families can be found in large quantities in Title 1 schools across the United States (United States Department of Education, 2002; Kids Count Data Center, 2016). Title 1 is a program that provides financial assistance through state educational agencies to local educational agencies and public schools with high numbers or percentages of poor children (United States Department of Education, 2015). Interventions studies across several areas have found that schools can be an effective setting for engaging children and families (Balaguru, Sharma, & Waheed, 2013; Lytle, 2012; Wang et al., 2015; Kelishadi & Azizi-Soleiman, 2014; Pappas, Ai, & Dietrick, 2015). As such, food and nutrition assistance programs should target Title 1 schools in order to reach the families who are likely to be most in need of these services.

Some strengths of this study include the large sample size, which allows for the ability to perform complex statistical analysis. As a national representative dataset, it allows for generalizability to the United States, but generalize with caution. It must be restated that this is a cross-sectional study that only captures a snapshot of the United States in 2016. Another limitation is the decisions to exclude income as a covariate. It is an important covariate and future studies should include this variable, if possible. Despite these limitations, the current study contributes to the clarification of inconsistent findings regarding racial/ethnic differences in food insecurity.

The purpose of the current study was to investigate the relationship between family structure and food insecurity among different race/ethnicities to better understand what populations to target for enrollment into food and nutrition assistance programs.

The study contributes to the literature by providing evidence that single-parent African-American and single-parent White families are more at risk of food insecurity. As stated above, recommendations are made that food and nutrition assistance programs target families whose children are enrolled in Title 1 schools due to the linkage between income and food insecurity for minority and White single-parent families. Programs, such as SNAP, have made attempts to target schools as a way to help children and families lead healthier lives. However, here the recommendation is to target Title 1 schools specifically because these schools could serve as a more reasonable population to intervene on, instead of attempting to reach all schools across the country at once. It is also noted that school-based interventions require cooperation from teachers and parents, which provides a next direction for future studies. Future studies should focus on understanding the barriers that may impede the success of targeting families through school-based initiatives for enrollment into food and nutrition assistance programs. Understanding how to engage teachers and parents in schools where resources are already limited, and where teachers and parents may be worried about other important facets of life will provide program developers and practitioners with better information for how best to engage children and families who are most in need.

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Table 1
Descriptive Characteristics of Study Sample,
2016 National Health Interview Survey (NHIS) (N= 8,610 households)

	Food Secure (n = 7,736)		Food Insecure (n = 874)	
	n (M)	% (SD)	n (M)	% (SD)
Family structure				
Single-parent	1502	19%	394	45%
Two-parents	6234	80%	480	54%
Age[a]	(38.6)	(8.9)	(37.5)	(9.2)
Race/ethnicity				
African-American	750	9%	190	21%
Hispanic	1278	16%	212	24%
Other	651	8%	47	5%
White	5043	65%	418	47%
Education[b]	(15.8)	(3.1)	(13.7)	(3.4)

Note. [a]Measured for household respondent. [b]Highest level completed in the household, measured in years of school.

Table 2
Logistic Regression for Food Insecurity,
2016 National Health Interview Survey (NHIS) (N= 8,610 households)

	B(SE)	p
Age	-0.09(0.01)	0.06
Education[a]	-0.11(0.02)	<0.0001
African-American[b]	0.43(0.17)	0.01
Hispanic[b]	0.13(0.20)	0.51
Other[b]	-0.13(0.33)	0.69
Family structure[c]	-1.19(0.13)	<0.0001
Interaction between African-American and family structure	0.60(0.24)	0.01
Interaction between Hispanic and family structure	0.28(0.23)	0.23
Interaction between Other and family structure	-0.15(0.39)	0.71

Note. [a]Highest level completed in the household, measured in years of school. [b]White is reference group. [c]Two-parent household is reference group.
B = unstandardized coefficient. SE = standard error.
* p < .05, ** p < .01, *** p < .001.

Table 3
Food Insecurity Proportions by Family Structure and Race/Ethnicity

	(food insecure / total (food insecure + food secure) = Proportion
Family Structure	
Single-parent	394 / 1896 = 21% single-parent households food insecure
Two-parent	480 / 6714 = 7% two-parent households food insecure
Race/Ethncitity	
African-American	190 / 940 = 20% African-American households food insecure
Hispanic	212 / 1490 = 14% Hispanic households food insecure
Other	47 / 698 = 7% Other households food insecure
White	418 / 5461 = 7% White households food insecure

Note. Data from the 2016 National Health Interview Survey (N = 8,610).