



# Food insecurity, childhood hunger and caregiver life experiences among households with children in South Carolina, USA

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## Abstract

*Objective:* We explored how positive and negative life experiences of caregivers are associated with household food insecurity.

*Design:* The Midlands Family Study (MFS) was a cross-sectional study with three levels of household food security: food secure, food insecure without child hunger and food insecure with child hunger. Ordinal logistic regression analysis was used for analyses of negative and positive life experiences (number, impact, type) associated with food insecurity.

*Setting:* An eight-county region in South Carolina, USA, in 2012–2013.

*Participants:* Caregivers ( $n$  511) in households with children.

*Results:* Caregivers who reported greater numbers of negative life experiences and greater perceived impact had increased odds of household food insecurity and reporting their children experienced hunger. Each additional negative life experience count of the caregiver was associated with a 16 % greater odds of food insecurity without child hunger and a 28 % greater odds of child hunger. Each one-unit increase in the negative impact score (e.g. a worsening) was associated with 8 % higher odds of food insecurity without child hunger and 12 % higher odds of child hunger. Negative work experiences or financial instability had the strongest association (OR = 1.8; 95 % CI 1.5, 2.2) with child hunger. Positive life experiences were generally not associated with food security status, with one exception: for each unit increase in the number of positive experiences involving family and other relationships, the odds of child hunger decreased by 22 %.

*Conclusions:* More research is needed to understand approaches to build resilience against negative life experiences and strengthen positive familial, community and social relationships.

**Keywords**  
Food security  
Child hunger  
South Carolina  
Life experiences  
Stress

The US Department of Agriculture estimated that in 2017, 11.8 % of households in the USA experienced food insecurity, or lack of access to enough food for a healthy, active life, at some point during the year. In addition, 4.5 % of households experienced very low food security, where household members reduce food intake and eating patterns are disrupted, because the household lacks resources

for food<sup>(1)</sup>. Among households with children in the USA, 15.7 % experienced food insecurity of some kind in 2017, approximately half of which (~2.9 million households) reported food insecurity among both the adults and children in the household<sup>(1)</sup>. Although household food insecurity rates in South Carolina have been slightly higher than the national average<sup>(2)</sup>, they are now very similar with an

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average of 11.7 % of households experiencing food insecurity at least once in this state in 2015–2017<sup>(3)</sup>. Healthy People 2020 has established a national objective to eliminate very low food security in children<sup>(4)</sup>.

Food insecurity in adults has been linked to increased risk of chronic disease and obesity<sup>(5–7)</sup>; however, the effects of food insecurity are particularly concerning among children, as lack of adequate food in childhood has been associated with lifelong detrimental physical and mental health effects<sup>(8–11)</sup>. In addition to poverty, a number of factors are associated with heightened risk of food insecurity among families, including deteriorating physical or mental health of the head of household, child physical health issues, change in housing, loss of employment, income instability, childhood adversity, intimate partner violence and inter-generational violence experienced by caregivers<sup>(12–20)</sup>. In other words, food insecurity is a health-related stressor that is likely to be associated with life changes that result in significant strain and result in a change of a person's circumstances<sup>(21)</sup>. Research on life experiences has led to the development of theories that posit how various life experiences may influence health-related outcomes, as well as tools to identify distinct types of experiences, including individualized ratings of impact and categorization of experiences as positive or negative<sup>(22–25)</sup>.

Stress proliferation, or the expansion of stress beyond a particular situation, creating additional stressors, results from families' positive and negative life changes<sup>(26)</sup>. The experience of accumulating negative experiences is hypothesized to be a key reason for health disparities. We hypothesize that food insecurity is a part of the stress proliferation process that leads to negative health outcomes. Few studies have assessed the influences of life events and experiences of caregivers on food security status in households with children<sup>(6,7,9,27–33)</sup>. Of the studies that have been done, several were conducted in settings outside the USA and the majority focused on the mental health of the parent<sup>(6,7,9,27,31,33)</sup>.

Previously, we reported from the Midlands Family Study (MFS), conducted in 2012–2013 in South Carolina, USA, that an overall score of negative life events of any type of the caregiver was associated with increasing severity of household food security<sup>(34)</sup>. The purpose of the present study was to use MFS data to study whether the number of life experiences of the caregiver – both positive and negative – and their perceived impact, as well as the specific types of life experiences, was associated with household food security status, including childhood hunger.

## Methods

### *Midlands Family Study*

The MFS was conducted to advance the understanding of household food insecurity from a family resilience perspective<sup>(34)</sup>. MFS surveyed caregivers of households with children,

including: (i) very low food-secure families where children experienced hunger; (ii) food-insecure families without child hunger; and (iii) food-secure families<sup>(34,35)</sup>. The study was conducted in a contiguous, eight-county region in South Carolina, USA, including both rural and urban counties, between March 2012 and May 2013. The study was reviewed and approved by the University of South Carolina Institutional Review Board.

To be eligible for participation, a caregiver had to: (i) have a child under 18 years old living in the household at least 50 % of the time; (ii) live within the target eight-county region of South Carolina; and (iii) have a total household income < \$US 100 000 per year. The goal was to recruit 600 eligible persons for the study's caregiver survey, with 200 participants in each of the three food security categories. Participant recruitment continued until a food security category was filled or the end of the study was reached. In total, 538 caregivers were recruited across the three food security categories (157 food-secure households, 202 food-insecure households without child hunger and 179 food-insecure households experiencing child hunger). A range of venues across the food system, including grocery stores, convenience stores, farmers' markets, day-care centres, food pantries and federally funded summer meal sites, were used for recruitment<sup>(35)</sup>. This allowed us to include households from varying socio-economic backgrounds and those that did and did not access food assistance programmes. The vast majority of caregivers were mothers. Once a person was found to be eligible, their contact information was collected and an in-person interview was scheduled. The interview was typically conducted in the caregiver's home or another location of the participant's choosing using web-based survey software on a laptop and typically lasted 45–90 min. Participants received a \$US 40 participation reimbursement<sup>(34)</sup>. The MFS used a resilience framework based on the Family Adjustment and Adaptation Response Theory to identify the various domains, including assistance programme participation, household coping strategies, family adjustment and adaptation, household perceptions of community resources and demographics, related to rising to the challenge of food insecurity<sup>(21,34)</sup>.

### *Defining life experiences*

To assess exposure to life experiences, the MFS used a modified version of the 1978 Life Experiences Survey (LES)<sup>(36)</sup>, including forty-three of the original survey's forty-seven life experiences, removing those on: (i) experiencing an abortion; (ii) which close family member died; (iii) which close family member had a serious illness; and (iv) whether the participant was having sexual difficulties. Caregivers were asked whether they had experienced each of the forty-three experiences in the past 3 years and to rate the impact of each experience on their lives on a scale of –3 to +3, where a score of –3 indicated the most severe negative experience with a large



impact, +3 indicated an extremely positive experience with a large positive impact and 0 indicated no impact. Examples of life experiences included in the survey include marriage, divorce, death of a spouse, gaining a new family member, starting a new job, being fired from a job, major illness (personal or close family member), change in residence, borrowing a large amount of money, foreclosure on a mortgage or loan, or detention in jail. To study the overall association of life experiences and food security, any experience given a score of  $-3$  to  $-1$  was considered a single negative experience and any experience scored  $+1$  to  $+3$  was a single positive experience. We then summed the number of negative events and the number of positive events. Additionally, the impact scores for all negative and positive experiences for each caregiver were summed separately, giving each caregiver a negative and a positive impact score<sup>(36)</sup>.

Additionally, each of the forty-three life experiences of the caregiver was placed into one of four type categories: (i) experiences regarding spouse/partner relationships (e.g. marriage, divorce, death of a spouse/partner, pregnancy, engagement, etc.); (ii) experiences related to work and/or financial stability (e.g. new job, being fired from job, foreclosure of mortgage, taking out a large loan, retirement, etc.); (iii) experiences related to family and other relationships (e.g. gaining a new family member, death of a family member, serious injury or illness, change in closeness of family, change in living conditions, offspring leaving home, etc.); and (iv) personal events and behavioural changes (e.g. major personal illness, major change in sleeping or eating habits or social activities or church, major personal achievement, minor law violation, detention in jail, etc.). To the best of our knowledge, Sarason's LES has not been categorized into experience types, but other instruments have<sup>(37)</sup>, and thus the aforementioned groups were created by author consensus.

### **Defining food security**

To assess food security status, which served as the outcome variable, MFS used the eighteen-item USDA Household Food Security Survey Module (HFSSM), which includes ten adult-focused and eight child-focused questions related to anxiety about food shortages and reduced quality and quantity of foods available<sup>(38)</sup>. Based on the number of affirmed items in the HFSSM, caregivers in MFS were classified as: food secure (affirming two or fewer items on the HFSSM); food insecure without child hunger (affirming three or more items but not five or more child items, labelled in US Department of Agriculture publications as low food security (LFS) but no child hunger); or experiencing child hunger (affirming five or more of the eight child items, labelled in US Department of Agriculture publications as very low food security in which children experienced hunger (VLFS-C))<sup>(35)</sup>.

### **Covariates**

Covariates included in the statistical modelling were the caregiver's gender (male or female), race/ethnicity (African

American or other), urbanicity (urban or non-urban, with urban being recorded if the participant lived in Columbia, the state's capital), income (continuous; see below), number of adults living in the household (continuous), number of children living in the household (continuous) and referral to the study (i.e. a caregiver who was not recruited directly by the study team but was rather referred to the study by another participant; yes/no).

The income variable included all monthly wages and assistance programme benefits for the household, including support from the Supplemental Nutrition Assistance Program (SNAP), social security disability insurance, Temporary Assistance for Needy Families (TANF), retirement, child support, workers' compensation, unemployment insurance and veteran's benefits. To create the income variable, the monthly wages and monthly assistance amounts were summed; to adjust for some extreme values, income was winsorized<sup>(39)</sup> at the 95th percentile.

### **Statistical analyses**

After eliminating caregivers with missing data on income in the interview ( $n$  27), which was considered a key variable to be included in statistical analyses, the final sample comprised 511 caregivers. Because the outcome variable (food security) was categorized into three levels (food secure, food insecure without child hunger and child hunger), multinomial logistic regression was used. The modelling strategy involved testing a sequence of adjusted models of increasing numbers of covariates, including gender, race/ethnicity, urbanicity, number of adults living in the household and number of children in the household, plus an indicator variable related to recruitment type and income. The life experience exposure variables studied included: (i) counts of positive and negative life experiences; (ii) impact scores of positive and negative life experiences; (iii) counts of positive and negative life experiences by the four categories of type of experience (spouse/partner relationships, work and/or financial stability, family and other relationships, personal events and behavioural changes); and (iv) impact scores of positive and negative experiences by category<sup>(36)</sup>. For the latter two types of exposure classification, an additional model was used that included all exposure variables simultaneously in a single model including all covariates, one for counts and one for impact scores, with the goal of determining independent type-specific effects of life experiences. All data were analysed with the statistical software package SAS version 9.3.

### **Results**

Characteristics of the study sample are listed in Table 1. Of the 511 total caregivers in MFS with information on all variables of interest, 92.6% were female and 78.5% identified as African American. The final sample included 147 caregivers from

food-secure households (28.8%), 190 from food-insecure households without child hunger (37.2%) and 174 from food-insecure households with child hunger (34.1%).

Among the 511 caregivers, a total of 5317 life experiences were reported, 1910 (35.9%) of which were rated as positive and 3407 (64.1%) of which were rated as negative (Table 2). The average number of positive life events experienced by caregivers in this sample was approximately 4 (mean 3.7, SD 2.9). The average impact score was approximately 9 (mean 8.7, SD 7.2). The average number of negative life experiences among the analytical sample was approximately 7 (mean 6.7, SD 4.2), with an average impact score of approximately 12 (mean 12.2, SD 9.7).

Caregivers from food-secure households reported the greatest number of positive life experiences (mean 4.1) and the highest overall positive impact score (mean 9.8). Conversely, caregivers from households with child hunger reported the fewest number of positive experiences (mean 3.5) and the lowest overall positive impact score (mean 8.1). Consistent with expectations, negative life experiences followed an inverse pattern. Caregivers from households with child hunger reported the greatest number of negative life experiences (mean 8.4) and the greatest-magnitude negative impact score (mean 16.1); caregivers from food-secure households had the fewest negative life experiences (mean 4.7) and smallest-magnitude negative impact score (mean 7.6).

Focusing on the four types of life experiences (spouse/partner relationships, work and/or financial stability, family and other relationships, personal events and behavioural changes), personal events and behavioural changes were the most frequently reported as both negative and positive experiences, and spouse/partner relationship experiences were reported the least frequently (Table 2).

#### ***Association of caregivers' overall life experiences counts and impact scores with food security***

As shown in Table 3, the caregiver's number of negative life experiences was significantly associated with increased odds of household food insecurity both with and without child hunger, adjusting for gender, race, urban residence, number of adults and children in the household, referral status and income, but no association was observed between positive life experiences and food security status. Each additional negative life experience count was associated with a 16% greater odds of food insecurity without child hunger and a 28% greater odds of child hunger.

Negative life experience impact scores of the caregiver were also significantly and positively associated with odds of food insecurity both with and without child hunger, but positive impact scores were not associated with food security status (Table 3). Each one-unit change in the negative impact score (e.g. moving from a cumulative score of -2 to -3, i.e. worsening) was associated with an 8% higher odds of food insecurity without child hunger and a 12% higher odds of

child hunger. Positive impact scores were not associated with food security status in the models adjusted for income.

#### ***Association of caregivers' specific life experience type counts and impact scores with food security***

Results of multiple regression models examining type-specific life experience counts and impact scores and their association with food security status are shown in Table 4. Caregivers' negative experience counts of three types (work/financial, family, personal) were positively associated with food insecurity without child hunger (OR ranging from 1.22 to 1.54) and all four types were associated with child hunger: each additional work/financial negative life experience count resulted in a 54% greater odds of food insecurity without child hunger and an 84% greater odds of child hunger. One additional negative life experience in the family and other relationships category resulted in a 22% greater odds of food insecurity without child hunger and a 47% greater odds of child hunger. An additional negative life experience in the personal events and behavioural changes category resulted in a 29% greater odds of food insecurity without child hunger and a 57% greater odds of child hunger. Negative life experiences related to spouse/partner relationships were not associated with food insecurity without child hunger. However, this category of life experiences was associated with child hunger, as each additional negative spouse/partner-related life event was associated with a 45% greater odds of child hunger.

With respect to positive experiences of the caregiver, none of the positive life experience type counts were associated with household food insecurity without child hunger, and only two types – work and/or financial stability, and family and other relationships – were inversely associated with child hunger (Table 4). Each additional positive experience in the family and other relationships category was associated with a 22% lower odds of child hunger. Generally similar results were found for the corresponding type-specific positive and negative impact scores, although the magnitudes of the associations were slightly smaller for the impact scores.

Finally, a single model that simultaneously included all categories of positive and negative life experiences of the caregiver was evaluated for (i) food insecurity without child hunger *v.* food security and (ii) child hunger *v.* food security (data not shown). Negative work and/or financial stability-related caregiver experiences were the only life experiences that independently and significantly predicted food insecurity without child hunger (OR = 1.43; 95% CI 1.18, 1.74). However, negative work and/or financial stability-related experiences (OR = 1.59; 95% CI 1.29, 1.96), negative personal events and behavioural changes (OR = 1.28; 95% CI 1.07, 1.53) and positive family and other relationship experiences (OR = 0.75, 95% CI 0.58, 0.997) were all significantly associated with child hunger, independent of each other and all other variables in the model, which included income.

**Table 1** Characteristics of caregivers in the Midlands Family Study (2012–2013), by food security status (*n* 511)

Variable	Total ( <i>n</i> 511; 100.0 %)		Food secure ( <i>n</i> 147; 28.8 %)		Food insecure without child hunger ( <i>n</i> 190; 37.2 %)		Child hunger ( <i>n</i> 174; 34.1 %)	
	<i>n</i>	%	<i>n</i>	%	<i>n</i>	%	<i>n</i>	%
Gender								
Female	473	92.6	136	92.5	178	93.7	159	91.4
Male	38	7.4	11	7.5	12	6.3	15	8.6
Race/ethnicity								
African American	401	78.5	101	68.7	147	77.4	153	87.9
Other	110	21.5	46	31.3	43	22.6	21	12.1
Urbanicity								
Urban	298	58.3	85	57.8	94	49.5	119	68.4
Non-urban	213	41.7	62	42.2	96	50.5	55	31.6
Number of children in household								
1	183	35.8	50	34.0	73	38.4	60	34.5
2	183	35.8	54	36.7	71	37.4	58	33.3
≥ 3	145	28.4	43	29.3	46	24.2	56	32.2
Number of adults in household								
1	222	43.4	54	36.7	89	46.8	79	45.4
2	211	41.3	72	49.0	67	35.3	72	41.4
≥ 3	78	15.3	21	14.3	34	17.9	23	13.2
Referred to study								
Yes	124	24.3	34	23.1	44	23.2	46	26.4
No	387	75.7	113	76.9	146	76.8	128	73.6
Monthly income (\$US)*								
Mean	–		2157		1178		762	
SD	–		2236		1324		8711	
Minimum	–		0		0		0	
Maximum	–		8167		8167		4750	

\*The income variable (wages and assistance) was winsorized at the 95 % percentile.

**Table 2** Number of positive and negative life experiences reported by caregivers in the Midlands Family Study (2012–2013), by experience type and food security status (*n* 511)

	Total ( <i>n</i> 511)		Food secure ( <i>n</i> 147)		Food insecure without child hunger ( <i>n</i> 190)		Child hunger ( <i>n</i> 174)	
Overall caregiver experiences								
Total number	5317	100 %	1290	24 %	1958	37 %	2069	39 %
Positive	1910		602		693		615	
Negative	3407		688		1265		1454	
Counts of experiences, mean and SD								
Positive	3.72	2.87	4.07	2.87	3.63	2.90	3.51	2.82
Negative	6.67	4.20	4.68	3.40	6.66	4.00	8.36	4.29
Impact score of experiences, mean and SD								
Positive	8.71	7.16	9.77	7.46	8.46	6.93	8.09	7.08
Negative	12.23	9.71	7.61	6.95	12.32	9.42	16.05	10.36
Specific categories of caregiver experiences								
Spouse/partner relationships								
Positive	343		97		121		125	
Negative	248		57		93		98	
Work and/or financial stability								
Positive	422		156		155		111	
Negative	859		152		337		370	
Family and other personal relationships								
Positive	560		183		205		172	
Negative	1050		228		379		443	
Personal events and behavioural changes								
Positive	585		166		212		207	
Negative	1250		251		456		543	

Definition of experience categories as follows: (i) spouse/partner relationships (e.g. marriage, divorce, death of a spouse/partner, pregnancy, engagement, etc.); (ii) work and/or financial stability (e.g. new job, being fired from job, foreclosure of mortgage, taking out a large loan, retirement, etc.); (iii) family and other relationships (e.g. gaining a new family member, death of a family member, serious injury or illness, change in closeness of family, change in living conditions, offspring leaving home, etc.); (iv) personal events and behavioural changes (e.g. major personal illness, major change in sleeping or eating habits or social activities or church, major personal achievement, minor law violation, detention in jail, etc.).

**Table 3** Association of caregivers' (*n* 511) overall positive and negative life experiences counts and event impact scores with food security status in the Midlands Family Study (2012–2013)

	Caregivers' life experience counts				Caregivers' life experience impact scores			
	Food insecure without child hunger v. food secure		Child hunger v. food secure		Food insecure without child hunger v. food secure		Child hunger v. food secure	
	OR	95 % CI	OR	95 % CI	OR	95 % CI	OR	95 % CI
Positive experiences	0.96	0.88, 1.04	0.95	0.87, 1.04	0.98	0.95, 1.01	0.98	0.95, 1.01
Negative experiences	<b>1.16</b>	<b>1.09, 1.24</b>	<b>1.28</b>	<b>1.20, 1.37</b>	<b>1.08</b>	<b>1.04, 1.11</b>	<b>1.12</b>	<b>1.08, 1.15</b>

OR and 95 % CI are shown for every one-unit increase in the experience count or impact score. Models are adjusted for caregiver gender, race/ethnicity, urban residence, number of adults and children in the household, an indicator variable related to recruitment type and income. Bold text indicates significant associations.

**Table 4** Association of caregivers' (*n* 511) type-specific positive and negative life experiences counts and impact scores with food security status in the Midlands Family Study (2012–2013)

	Food insecurity without child hunger v. food secure		Child hunger v. food secure	
	OR	95 % CI	OR	95 % CI
<b>Caregivers' life experience counts</b>				
Spouse/partner relationships				
Positive	1.03	0.80, 1.32	1.17	0.90, 1.52
Negative	1.23	0.89, 1.68	<b>1.45</b>	<b>1.04, 2.01</b>
Work and/or financial stability				
Positive	0.95	0.77, 1.17	0.90	0.71, 1.15
Negative	<b>1.54</b>	<b>1.28, 1.85</b>	<b>1.84</b>	<b>1.51, 2.23</b>
Family and other personal relationship				
Positive	0.86	0.70, 1.06	<b>0.78</b>	<b>0.63, 0.98</b>
Negative	<b>1.22</b>	<b>1.05, 1.42</b>	<b>1.47</b>	<b>1.25, 1.72</b>
Personal events and behavioural changes				
Positive	0.99	0.81, 1.19	1.02	0.83, 1.25
Negative	<b>1.29</b>	<b>1.12, 1.49</b>	<b>1.57</b>	<b>1.35, 1.83</b>
<b>Caregivers' life experience impact scores</b>				
Spouse/partner relationships				
Positive	0.99	0.90, 1.10	1.02	0.92, 1.14
Negative	1.15	0.99, 1.33	<b>1.20</b>	<b>1.04, 1.40</b>
Work and/or financial stability				
Positive	0.96	0.88, 1.05	0.95	0.86, 1.06
Negative	<b>1.20</b>	<b>1.12, 1.30</b>	<b>1.29</b>	<b>1.20, 1.40</b>
Family and other personal relationship				
Positive	0.95	0.87, 1.03	<b>0.91</b>	<b>0.83, 0.99</b>
Negative	<b>1.12</b>	<b>1.03, 1.21</b>	<b>1.20</b>	<b>1.11, 1.30</b>
Personal events and behavioural changes				
Positive	0.99	0.91, 1.07	1.00	0.93, 1.09
Negative	<b>1.11</b>	<b>1.03, 1.20</b>	<b>1.20</b>	<b>1.11, 1.29</b>

OR and 95 % CI are shown for every one-unit increase in the experience count or impact score. All models adjusted for caregiver gender, race/ethnicity, urban residence, number of adults and children in the household, an indicator variable related to recruitment type and income. Bold text indicates significant associations. Definition of experience categories as follows: (i) spouse/partner relationships (e.g. marriage, divorce, death of a spouse/partner, pregnancy, engagement, etc.); (ii) work and/or financial stability (e.g. new job, being fired from job, foreclosure of mortgage, taking out a large loan, retirement, etc.); (iii) family and other relationships (e.g. gaining a new family member, death of a family member, serious injury or illness, change in closeness of family, change in living conditions, offspring leaving home, etc.); (iv) personal events and behavioural changes (e.g. major personal illness, major change in sleeping or eating habits or social activities or church, major personal achievement, minor law violation, detention in jail, etc.).

## Discussion

The present study provides evidence that when considering caregiver life experiences in aggregate without differentiating by type, negative but not positive life experiences, as assessed by the modified Sarason LES<sup>(36)</sup>, are

positively and significantly associated with food insecurity in households with children, both when child hunger is present and when it is not. This was true whether we considered only the number (count) of caregiver life experiences reported or additionally incorporated the individualized ratings that reflect the perceived impact of the experiences. Each additional caregiver experience (count) of a negative life event was associated with a 16% higher odds of household food insecurity without child hunger and a 28% higher odds of child hunger, controlling for various caregiver characteristics, including household income. Differentiating further between four different types of life experiences, we found that negative experiences related to personal events and behavioural changes, family and other relationship events, and work and/or financial stability were associated with significantly higher odds of food insecurity without child hunger, as well as child hunger. Negative experiences related to spouse/partner relationships were also significantly associated with higher odds of child hunger but not food insecurity without child hunger.

In a recent analysis of the Early Childhood Longitudinal Study (ECLS) – Birth Cohort, Jackson and Vaughn<sup>(37)</sup> evaluated the association of a parental history of four specific negative life experiences that they considered disruptive life events (i.e. school suspension or expulsion, job termination, parental involvement in the criminal justice system, institutionalization of a parent for mental health reasons) with the food insecurity status of the household (defined as affirming any three of the eighteen HFSSM items). ECLS found that a positive parental history of disruptive life events was associated with a significantly higher odds of food insecurity (OR ranging from 1.4 to 2.3 depending on which specific type of life event was evaluated and in which of the three waves of the study the event took place, as households were studied when children were 9 months, 2 years and 4 years of age). Each of the four disruptive life event types had the strongest associations with persistent food insecurity, which is a more severe definition and was classified as meeting the food insecurity definition during at least two follow-up time points. This mirrored our own findings, where we found the strongest associations between life experiences and childhood hunger, which is the more severe of the food insecurity outcome categories used here.



However, the current study extends the ECLS findings by focusing on a broader range of negative life experiences and additionally considering positive life experiences.

Comparing the ECLS findings directly with ours, parental experience of job termination was prospectively associated with 44 to 76% higher odds of food insecurity (depending on the time point of the food security assessment used)<sup>(37)</sup>, which is remarkably similar to the 54% higher odds of food insecurity without child hunger and the 84% higher odds of child hunger that were associated with negative caregiver experiences related to work and/or financial stability in our study. The ECLS's negative life events that focused on institutionalization of a parent for mental health reasons are not found on Sarason's LES with that same degree of specificity but would be subsumed under major personal illness of the caregiver in our study, which we grouped into a much broader personal/behavioural change category. Thus, it is not surprising that ECLS's finding of 111–128% higher odds of food insecurity associated with institutionalization is significantly higher than the 29% higher odds of food insecurity without child hunger and 57% higher odds of child hunger observed in our study. Similar to previous research<sup>(40)</sup>, the ECLS additionally considered parental involvement in the criminal justice system, which we grouped with personal events and behavioural changes because of the small number of experiences in this category in our study sample.

There is also important literature on the caregiver's experiences of violence as a child or as an adult and the relationship of these experiences to food insecurity<sup>(17–20,41–43)</sup>. For example, Sun *et al.* have shown the importance of adverse childhood experiences in relation to food insecurity in households with children, providing evidence for the important role of caregiver depressive symptoms<sup>(17)</sup>. Similarly, Hernandez *et al.* have shown that maternal depression mediates the effect of intimate partner violence on food insecurity in caregivers<sup>(18)</sup>. These experiences in turn affect the caregiver's household food security status and that of their children<sup>(19,20)</sup>. Unfortunately, Sarason's LES does not include items that tap into these domains and we did not assess aspects of childhood adversity or experiences of violence with any other questionnaire in the present study<sup>(36)</sup>. Thus, our study cannot contribute to further delineation of the pathways that underlie the relationships between life experiences, particularly childhood experiences, and food insecurity. However, qualitative studies have shown how childhood experiences such as abuse, neglect and household dysfunction affect the educational experience of individuals and their ability to maintain employment, due in part to their effects on mental health<sup>(19,20)</sup>. It thus seems reasonable to assume that these negative early-life experiences and their emotional and physical consequences are at the root of the disproportionately higher count and impact scores of the negative life experiences in the past 1 to 3 years reported by food-insecure caregivers compared with their food-secure counterparts.

Our study does provide evidence that positive caregiver experiences related specifically to family and other relationships may be associated with benefits, as each one-unit increase in this particular type of caregiver life experience was associated with a 22% lower odds of child hunger, independent of covariates and income, and this association intensified when all types of experiences were considered simultaneously (OR = 0.78; 95% CI 0.63, 0.98). Unfortunately, we are not aware of another study related to food insecurity that has assessed positive caregiver life experiences, as, for example, the study by Jackson and Vaughn focused only on four negative (disruptive) life events<sup>(37)</sup>. However, in our aggregated analyses, overall positive experiences were not associated with household food insecurity and more research is needed to explore why this is the case when a particular type of experience (e.g. positive family and other relationships) does play a buffering role.

Resilience has been defined as the ability to rebound from stressful life experiences and positive emotions are one of the mechanisms that build resilience<sup>(44–47)</sup>. Research has shown that part of the effective coping and adaptation strategies of individuals who are able to rebound from negative life experiences is the ability to activate positive emotions while coping<sup>(45–47)</sup>. Our research suggests that positive life experiences related to family and personal relationships may have the capacity to balance out or offset the additional demands created by disruptive negative life experiences and allow families to cope more effectively. Beyond those emotional coping strategies, earlier findings of our study also point to the benefits associated with concrete benefits such as higher income, SNAP benefits and social support in that families with these supports reported less child hunger<sup>(34)</sup>. Thus, future observational research should focus more explicitly on understanding potential influences of positive life experiences and differentiating between different types, and intervention studies focusing on reducing or preventing food insecurity should specifically consider interventions that strengthen positive familial and personal relationships.

The present study has a number of strengths and limitations. MFS included a study population with a large proportion of minority households, which allowed for analysis of populations that are disproportionately affected by food insecurity. In addition, the data set contained participants from a wide range of rural, suburban and urban environments. A major strength of the present study was that using the Sarason LES allowed us to assess both the number of positive and negative experiences of caregivers as well as the perceived impact of these experiences as expressed by participants, allowing us to produce an individualized rating of a life experience. For example, a marital separation may be perceived as a highly positive experience in a marriage characterized by domestic violence, whereas it may be classified as a highly negative experience for another person in different circumstances. An analysis that



measured only the number of positive and negative experiences would lack this insight. We also grouped the caregiver's life experiences into different types, allowing us to determine whether certain categories of experiences have a stronger association with food security status than others.

However, the study did have some limitations related to the study design and population. The cross-sectional nature of the study did not allow for any assessment of causation, although the assessment of life experiences – which was framed as occurring in the past 3 years – should provide some concept of the temporal ordering of exposure and outcomes. There may have been selection bias in the study sample, as some caregivers were recruited from locations where they were already seeking assistance. Lastly, although we used a validated scale, the Sarason's LES, to measure life experiences, we removed four items from this scale which we deemed too sensitive and need to point out that this revised scale has not been tested previously in populations similar to MFS caregivers, namely mostly female, African American, Southern, low income and partially from rural environments<sup>(36,48)</sup>.

More research is needed using comprehensive life experience measures – including both positive and negative experiences – in addition to measures of caregiver mental health such as anxiety and depression and social support and measures of childhood adversity and partner violence when studying the causes of food insecurity and child hunger. Integrating these quantitative findings on life experiences with existing research on the important role of chronic mental or physical health conditions in caregivers<sup>(27,31,33)</sup> and results from qualitative research<sup>(49)</sup> could begin to lay the foundation of comprehensive future intervention research aiming to prevent food insecurity and child hunger.

## Conclusion

In conclusion, our study provides evidence that negative life experiences of parents and caregivers are significantly associated with household food insecurity, both with and without child hunger. These negative life experiences fall into all major types or domains, with those related to work and/or financial stability being the most strongly associated with food insecurity with or without child hunger, independent of all other types. An important finding of the present study is that caregivers from food-insecure households (either with or without child hunger) reported about twice as many negative than positive experiences, whereas caregivers from food-secure households reported a similar number of experiences in both categories. In addition, caregivers from food-insecure households with or without child hunger also perceived these negative events as having more of an impact on their lives, as suggested by the higher mean impact scores. Thus, given this food insecurity-related disparity in positive *v.* negative life experiences, our finding that positive life experiences related to

personal events and behavioural changes have the potential to buffer against negative life experiences is significant. More research is needed to understand approaches to build resilience against negative life experiences and strengthen positive familial, community and social relationships.

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