

Table 1. Descriptive statistics: Food insecurity, ACEs, and other covariates, by age group

Variables	(1) Respondents aged 18–44			(2) Respondents aged 45–64			(3) Respondents aged ≥65		
	N	Mean or %	SD or 95% CI	N	Mean or %	SD or 95% CI	N	Mean or %	SD or 95% CI
Outcome									
Food insecurity	3324	30.0	[28.5-31.6]	4230	25.0**	[24.3-26.9]	3493	13.2**	[12.1-14.4]
Adverse Childhood Experiences (ACE)									
Continuous ACE score	3055	1.9	2.3	3864	1.6***	2.0	3212	0.8**	1.4
Any household dysfunction	3199	55.8	[53.8-57.2]	4059	46.4**	[44.7-47.7]	3380	28.3**	[26.8-29.8]
Any physical and emotional abuse	3170	41.4	[40.2-43.6]	4006	38.0**	[36.4-39.4]	3300	22.6**	[21.2-24.0]
Any sexual abuse	3202	12.6	[11.5-13.8]	4072	12.0	[11.9-14.0]	3377	6.4**	[5.6-7.3]
Covariates									
<i>Demographics</i>									
Age (reported age in years)	3661	32.5	7.5	4424	54.3**	5.6	3685	74.2**	7.2
Men	3661	43.0	[41.4-44.6]	4424	39.6**	[38.2-41.1]	3685	34.8**	[33.3-36.4]
White non-Hispanic	3661	56.7	[55.1-58.3]	4424	69.0**	[67.6-70.4]	3685	79.4**	[78.1-80.7]
Black non-Hispanic	3661	19.9	[18.7-21.3]	4424	19.5	[18.4-20.7]	3685	13.3**	[12.2-14.4]
Any race Hispanic	3661	13.4	[12.4-14.6]	4424	3.3**	[2.82-3.88]	3685	1.05**	[0.7-1.4]
Other/Multiple race non-Hispanic	3661	9.3	[8.4-10.3]	4424	7.6**	[6.8-8.4]	3685	5.0**	[4.3-5.8]
Married or partnered	3649	52.9	[51.3-54.6]	4412	58.2**	[56.8-59.7]	3677	46.0**	[44.4-47.6]
Veteran	3661	7.4	[6.6-8.3]	4424	11.9**	[10.9-12.8]	3685	20.0**	[18.7-21.3]
<i>Education</i>									
Less than HS	3661	11.1	[10.2-12.2]	4424	10.1	[9.2-10.9]	3685	17.4**	[16.2-18.6]
High school degree or equivalent	3661	26.6	[25.2-28.1]	4424	28.9*	[27.6-30.3]	3685	31.6**	[30.2-33.2]
Some college	3661	29.2	[27.8-30.7]	4424	27.4	[26.0-28.7]	3685	24.3**	[22.9-25.7]
College degree or higher	3661	32.8	[31.3-34.3]	4424	33.4	[32.0-34.8]	3685	26.2**	[24.8-27.6]

Missing education	3661	0.001	[0.000-0.002]	4424	0.002*	[0.001-0.004]	3685	0.004*	[0.002-0.006]
<i>Economic factors</i>									
Currently employed	3641	68.7	[67.2-70.3]	4410	56.4**	[54.9-57.9]	3681	11.6**	[10.5-12.6]
Annual household income <\$15,000	3661	12.3	[11.3-13.4]	4424	12.4	[11.4-13.4]	3685	12.0	[10.9-13.1]
Annual household income \$15,000–24,999	3661	18.8	[17.5-20.0]	4424	14.4**	[13.3-15.4]	3685	0.19	[18.3-20.8]
Annual household income \$25,000–49,999	3661	22.5	[21.2-23.9]	4424	22.9	[21.7-24.2]	3685	23.3	[21.9-24.7]
Annual household income \$50,000–74,999	3661	12.6	[11.6-13.7]	4424	13.3	[12.2-14.3]	3685	9.0**	[8.1-9.9]
Annual household income ≥\$75,000	3661	20.2	[18.9-21.5]	4424	23.7**	[22.5-25.0]	3685	10.7**	[9.7-11.7]
<i>Household characteristics</i>									
Any children in household	3649	57.5	[55.9-59.1]	4419	19.9**	[18.7-21.1]	3681	2.6**	[2.1-3.1]
Own home	3661	49.7	[48.1-51.3]	4424	77.0**	[75.7-78.2]	3685	83.2**	[82.1-84.5]
Rent	3661	40.3	[38.7-41.9]	4424	18.4**	[17.3-19.6]	3685	12.2**	[11.2-13.3]
<i>Regional characteristics</i>									
Live in an Appalachian County	3661	15.9	[14.8-17.2]	4424	19.1**	[17.9-20.2]	3685	22.1**	[20.8-23.5]

*Notes: N denotes the number of observations. SD denotes standard deviation. 95%CI denotes 95% confidence interval. All analyses are weighted by BRFSS survey weights. The ACE score is a sum of 11 categories of ACEs. The ACE subscale of household dysfunction represents whether, as a child, the respondent lived with divorced/separated parent, or with someone who used illegal drugs, had drinking problems, or was incarcerated. The ACE subscale of physical or emotional abuse represents whether the respondent was exposed to swearing, punching, or parents beating each other in childhood. The ACE subscale of sexual abuse represents whether the respondent was touched sexually by someone, or forced to touch someone sexually, or forced to have sex with an adult in childhood. Significant difference in means or percentages relative to the category aged 18–44 years denoted by * p<0.05, ** p<0.01.

Table 2. Association between food insecurity and continuous ACE score, by age group

Independent variables↓	Odds of food insecurity by age group		
	(1) Respondents aged 18–44	(2) Respondents aged 45–64	(3) Respondents aged ≥ 65
Continuous ACE score	1.158*** (0.0265)	1.206*** (0.0333)	1.134*** (0.0514)
Appalachian County	1.108 (0.153)	1.252 (0.174)	1.154 (0.201)
Female	1.157 (0.136)	1.546*** (0.196)	1.301 (0.261)
High school degree or equivalent	0.831 (0.147)	0.729* (0.130)	0.568*** (0.107)
Some college	0.947 (0.175)	0.772 (0.147)	0.637** (0.132)
College degree or higher	0.676* (0.143)	0.448*** (0.0917)	0.731 (0.179)
Black, non-Hispanic	0.733** (0.106)	0.803 (0.120)	1.484* (0.315)
Any race, Hispanic	1.243 (0.207)	1.078 (0.298)	1.382 (0.891)
Other/Multiple race, non-Hispanic	0.731 (0.160)	1.529* (0.348)	1.733* (0.533)
Age in years	1.182** (0.0858)	1.292 (0.279)	0.952 (0.221)
Squared age	0.998* (0.00112)	0.997 (0.00196)	1.000 (0.00153)
Married or partnered	1.030 (0.134)	0.912 (0.114)	1.073 (0.190)

Currently employed	0.793*		0.603***		1.433
	(0.0957)		(0.0721)		(0.350)
Any children in household	0.982		1.706***		2.111**
	(0.112)		(0.261)		(0.787)
Annual household income <\$15,000	1.641**		3.520***		3.561***
	(0.324)		(0.746)		(0.840)
Annual household income \$15,000–24,999	1.154		2.537***		2.419***
	(0.208)		(0.463)		(0.502)
Annual household income \$25,000–49,999	0.755		0.975		0.598**
	(0.139)		(0.168)		(0.134)
Annual household income \$50,000–74,999	0.345***		0.472***		0.222***
	(0.0839)		(0.104)		(0.105)
Annual household income ≥\$75,000	0.227***		0.123***		0.0625***
	(0.0658)		(0.0333)		(0.0412)
Own home	1.250		0.635*		0.849
	(0.269)		(0.151)		(0.259)
Rent	1.736***		0.921		1.823*
	(0.337)		(0.234)		(0.603)
Veteran	0.786		0.757		1.238
	(0.189)		(0.149)		(0.307)
Constant	0.0176***		0.00140		2.642
	(0.0194)		(0.00819)		(23.03)
Observations	3010		3813		3135

ACE, adverse childhood experience

*Notes: Columns (1), (2), and (3) report the estimated odds ratios of the relationship between stress related food insecurity and the principal independent variable, the continuous ACE score as well as its interaction with an Appalachian county indicator, and other covariates. Column (1) presents the odds ratios for the 18–44 years old sample. Panel II (Panel III) presents the odds ratios for the 45–64 years old (65 and older) sample. All models include the following control variables: age, squared age, male indicator, an indicator for Appalachian county, education categories, race categories, income categories, a dummy variable for being employed, an indicator for veteran, an indicator for married, an indicator for any children in the household, an indicator for home ownership, and an indicator for renting. The omitted categories are male, not living in an Appalachian county, less than high school education, non-Hispanic white, missing income, unemployed, not a veteran, not married, no children in household, and residing in mobile home or other type of housing. Robust s.e. in parentheses. All analyses weighted by BRFSS sample weights. Significance: *** $p < 0.01$, ** $p < 0.05$, * $p < 0.1$. See text for definitions of ACE measures.

Table 3. Association between food insecurity and any household dysfunction subscale, by age group

Independent variables↓	Odds of food insecurity by age group		
	(1) Respondents aged 18–44	(2) Respondents aged 45–64	(3) Respondents aged ≥65
Any household dysfunction in childhood	1.436*** (0.155)	1.544*** (0.168)	1.305* (0.193)
Appalachian County	1.141 (0.153)	1.227 (0.161)	1.159 (0.196)
Female	1.211* (0.139)	1.571*** (0.190)	1.225 (0.237)
High school degree or equivalent	0.773 (0.131)	0.717* (0.124)	0.581*** (0.106)
Some college	0.911 (0.161)	0.769 (0.141)	0.649** (0.130)
College degree or higher	0.607** (0.123)	0.433*** (0.0859)	0.727 (0.173)
Black, non-Hispanic	0.705** (0.0990)	0.744** (0.104)	1.456* (0.303)
Any race, Hispanic	1.181 (0.190)	1.181 (0.333)	1.309 (0.832)
Other/Multiple race, non-Hispanic	0.750 (0.158)	1.513** (0.315)	1.583 (0.478)
Age in years	1.197** (0.0837)	1.345 (0.277)	0.994 (0.227)

Squared age	0.998**		0.997*		1.000
	(0.00107)		(0.00187)		(0.00150)
Married or partnered	1.006		0.803*		1.037
	(0.127)		(0.0955)		(0.176)
Currently employed	0.765**		0.573***		1.365
	(0.0884)		(0.0660)		(0.326)
Any children in household	0.982		1.766***		1.967*
	(0.110)		(0.260)		(0.716)
Annual household income <\$15,000	1.780***		3.809***		3.405***
	(0.337)		(0.760)		(0.764)
Annual household income \$15,000–24,999	1.251		2.543***		2.216***
	(0.216)		(0.453)		(0.444)
Annual household income \$25,000–49,999	0.795		1.046		0.620**
	(0.140)		(0.174)		(0.131)
Annual household income \$50,000–74,999	0.364***		0.493***		0.226***
	(0.0848)		(0.106)		(0.104)
Annual household income ≥\$75,000	0.241***		0.128***		0.0632***
	(0.0673)		(0.0341)		(0.0415)
Own home	1.277		0.680*		0.835
	(0.267)		(0.155)		(0.251)
Rent	1.811***		0.987		1.861*
	(0.343)		(0.241)		(0.603)
Veteran	0.789		0.812		1.029
	(0.178)		(0.153)		(0.249)
Constant	0.0151***		0.000602		0.700
	(0.0162)		(0.00337)		(6.002)
Observations	3144		4002		3294

ACE, adverse childhood experience

*Notes: Columns (1), (2), and (3) report the estimated odds ratios of the relationship between stress related food insecurity and the principal independent variable, the indicator for any household dysfunction experienced in childhood as well as its interaction with an Appalachian county indicator, and other covariates. Column (1) presents the odds ratios for the 18–44 years old sample. Panel II (Panel III) presents the odds ratios for the 45–64 years old (≥65) sample. All models include the following control variables: age, squared age, gender, an indicator for Appalachian county, education categories, race categories, income categories, a dummy variable for being employed, an indicator for veteran, an indicator for married, an indicator for any children in the household, an indicator for home ownership, and an indicator for renting. The omitted categories are male, not living in an Appalachian county, less than high school education, non-Hispanic white, missing income, unemployed, not a veteran, not married, no children in household, and residing in mobile home or other type of housing. Robust s.e. in parentheses. All analyses weighted by BRFSS sample weights. Significance: *** $p < 0.01$, ** $p < 0.05$, * $p < 0.1$. See text for definitions of ACE measures.

Table 4. Association between food insecurity and any physical/emotional abuse subscale, by age group

Independent variables↓	Odds of food insecurity by age group		
	(1) Respondents aged 18–44	(2) Respondents aged 45–64	(3) Respondents aged ≥65
Any physical and emotional abuse in childhood	1.810*** (0.191)	1.895*** (0.211)	1.562*** (0.259)
Appalachian County	1.161 (0.156)	1.304** (0.176)	1.115 (0.188)
Female	1.224* (0.141)	1.591*** (0.196)	1.306 (0.263)
High school degree or equivalent	0.802 (0.137)	0.698** (0.126)	0.555*** (0.103)
Some college	0.934 (0.166)	0.788 (0.148)	0.620** (0.126)
College degree or higher	0.609** (0.124)	0.418*** (0.0858)	0.705 (0.170)
Black, non-Hispanic	0.723** (0.101)	0.762* (0.111)	1.519** (0.310)
Any race, Hispanic	1.094 (0.179)	1.026 (0.285)	1.372 (0.884)
Other/Multiple race, non-Hispanic	0.736 (0.153)	1.319 (0.290)	1.586 (0.478)
Age in years	1.198** (0.0846)	1.287 (0.271)	0.927 (0.212)
Squared age	0.998**	0.997	1.000

	(0.00109)	(0.00192)	(0.00151)
Married or partnered	1.000	0.854	1.012
	(0.127)	(0.105)	(0.178)
Currently employed	0.771**	0.588***	1.441
	(0.0904)	(0.0696)	(0.348)
Any children in household	1.017	1.741***	1.774
	(0.115)	(0.263)	(0.667)
Annual household income <\$15,000	1.805***	3.655***	3.301***
	(0.348)	(0.760)	(0.776)
Annual household income \$15,000– 24,999	1.256	2.435***	2.101***
	(0.221)	(0.433)	(0.437)
Annual household income \$25,000– 49,999	0.802	1.001	0.551***
	(0.143)	(0.170)	(0.122)
Annual household income \$50,000– 74,999	0.364***	0.465***	0.198***
	(0.0863)	(0.0995)	(0.0932)
Annual household income ≥\$75,000	0.238***	0.121***	0.0578***
	(0.0673)	(0.0320)	(0.0380)
Own home	1.303	0.643*	0.886
	(0.272)	(0.148)	(0.268)
Rent	1.768***	0.932	1.842*
	(0.333)	(0.227)	(0.606)
Veteran	0.723	0.767	1.218
	(0.172)	(0.148)	(0.299)
Constant	0.0147***	0.00204	9.676
	(0.0158)	(0.0116)	(83.06)
Observations	3121	3951	3218

*Notes: Columns (1), (2), and (3) report the estimated odds ratios of the relationship between stress related food insecurity and the principal independent variable, the indicator for any household dysfunction experienced in childhood as well as its interaction with an Appalachian county indicator, and other covariates. Column (1) presents the odds ratios for the 18–44 years old sample. Panel II (Panel III) presents the odds ratios for the 45–64 years old (65 and older) sample. All models include the following control variables: age, squared age, gender, an indicator for Appalachian county, education categories, race categories, income categories, a dummy variable for being employed, an indicator for veteran, an indicator for married, an indicator for any children in the household, an indicator for home ownership, and an indicator for renting. The omitted categories are male, not living in an Appalachian county, less than high school education, non-Hispanic white, missing income, unemployed, not a veteran, not married, no children in household, and residing in mobile home or other type of housing. Robust s.e. in parentheses. All analyses weighted by BRFSS sample weights. Significance: *** $p < 0.01$, ** $p < 0.05$, * $p < 0.1$. See text for definitions of ACE measures.

Table 5. Association between food insecurity and any sexual abuse subscale, by age group

Independent variables↓	Odds of food insecurity by age group		
	(1) Respondents age 18–44	(2) Respondents age 45–64	(3) Respondents ≥65
Any sexual abuse in childhood	2.076*** (0.291)	1.652*** (0.259)	1.397 (0.394)
Appalachian County	1.105 (0.148)	1.354** (0.179)	1.138 (0.192)
Female	1.110 (0.128)	1.519*** (0.185)	1.242 (0.247)
High school degree or equivalent	0.777 (0.131)	0.709** (0.124)	0.532*** (0.0944)
Some college	0.884 (0.155)	0.771 (0.142)	0.592*** (0.116)
College degree or higher	0.592*** (0.118)	0.420*** (0.0843)	0.656* (0.156)
Black, non-Hispanic	0.710** (0.0996)	0.804 (0.116)	1.516** (0.310)
Any race, Hispanic	1.089 (0.174)	1.036 (0.281)	1.257 (0.831)
Other/Multiple race, non-Hispanic	0.717 (0.149)	1.393 (0.289)	1.574 (0.479)
Age in years	1.178** (0.0805)	1.288 (0.265)	0.966 (0.213)
Squared age	0.998** (0.00105)	0.997 (0.00187)	1.000 (0.00145)
Married or partnered	0.993	0.846	0.946

	(0.124)		(0.101)		(0.160)
Currently employed	0.771**		0.581***		1.400
	(0.0893)		(0.0670)		(0.331)
Any children in household	1.050		1.814***		1.741
	(0.117)		(0.267)		(0.622)
Annual household income <\$15,000	1.657***		3.856***		3.044***
	(0.312)		(0.767)		(0.686)
Annual household income \$15,000–24,999	1.190		2.478***		1.953***
	(0.204)		(0.432)		(0.393)
Annual household income \$25,000–49,999	0.766		1.087		0.566***
	(0.133)		(0.180)		(0.119)
Annual household income \$50,000–74,999	0.340***		0.500***		0.209***
	(0.0795)		(0.107)		(0.0957)
Annual household income ≥\$75,000	0.224***		0.131***		0.0591***
	(0.0627)		(0.0349)		(0.0387)
Own home	1.300		0.639**		0.911
	(0.267)		(0.145)		(0.276)
Rent	1.850***		1.006		1.864*
	(0.343)		(0.243)		(0.607)
Veteran	0.791		0.762		1.078
	(0.181)		(0.148)		(0.259)
Constant	0.0257***		0.00208		2.569
	(0.0266)		(0.0117)		(21.31)
Observations	3149		4013		3294

*Notes: Columns (1), (2), and (3) report the estimated odds ratios of the relationship between stress related food insecurity and the principal independent variable, the indicator for any sexual abuse experienced in childhood as well as its interaction with an Appalachian county indicator, and other covariates. Column (1) presents the odds ratios for the 18–44 years old sample. Panel II (Panel III) presents the odds ratios for the 45–64 years old (65 and older) sample. All models include the following control variables: age, squared age, gender, an indicator for Appalachian county, education categories, race categories, income categories, a dummy variable for being employed, an indicator for veteran, an indicator for married, an indicator for any children in the household, an indicator for home ownership, and an indicator for renting. The omitted categories are male, not living in an Appalachian county, less than high school education, non-Hispanic white, missing income, unemployed, not a veteran, not married, no children in household, and residing in mobile home or other type of housing. Robust s.e. in parentheses. All analyses weighted by BRFSS sample weights. Statistical significance: *** $p < 0.01$, ** $p < 0.05$, * $p < 0.1$. See text for definitions of ACE measures.
