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USDA Economic Research Service
U.S. DEPARTMENT OF AGRICULTURE

Economic Research Service

Economic Research Report Number 331

April 2024

Comparing Food Insecurity Among the U.S. Military and Civilian Adult Populations

Matthew P. Rabbitt and Matthew R. Beymer

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Comparing Food Insecurity Among the U.S. Military and Civilian Adult Populations

Matthew P. Rabbitt and Matthew R. Beymer

Abstract

Readiness is a cornerstone of military service. Military readiness includes cognitive and physical abilities to train and execute missions. Previous studies among civilians demonstrate that food security is associated with cognitive function and body mass index. Therefore, food security is vital to maintaining military readiness. While no analyses have been conducted on the prevalence of food insecurity for a representative sample of the active duty U.S. military, studies of individual military installations have demonstrated food insecurity rates between 15 and 33 percent. The authors compared food insecurity among the U.S. military and civilian adult populations, using data from the 2018 and 2020 Status of Forces Survey of Active Duty Members and the Current Population Survey Food Security Supplement. A weighting procedure was used to ensure the military and civilian adult populations were demographically equivalent. The findings show that the prevalence of food insecurity was 25.3 percent among the military population compared with 10.1 percent among a demographically equivalent civilian adult population. A more severe form of food insecurity, very low food security, was estimated to be 10.5 percent of the military population in 2018 and 2020, compared with 3.6 percent of the comparable civilian adult population during this period. The findings demonstrate that the military population is at elevated risk for food insecurity and that food insecurity measures can be used to reliably construct measures of active duty service members' food insecurity for monitoring and research purposes.

Keywords: active duty, Coronavirus, COVID-19, civilian adults, food insecurity, military service, civilian

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About the Authors:

Matthew P. Rabbitt is an economist in the USDA, ERS, Food Economics Division, Food Assistance Branch. Matthew R. Beymer is a statistician in the Defense Centers for Public Health-Aberdeen within the U.S. Department of Defense.

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Comparing Food Insecurity Among the U.S. Military and Civilian Adult Populations

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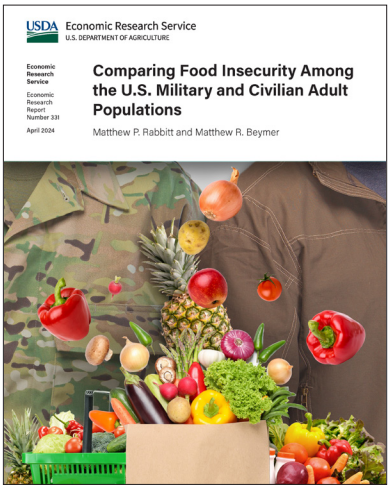
What Is the Issue?



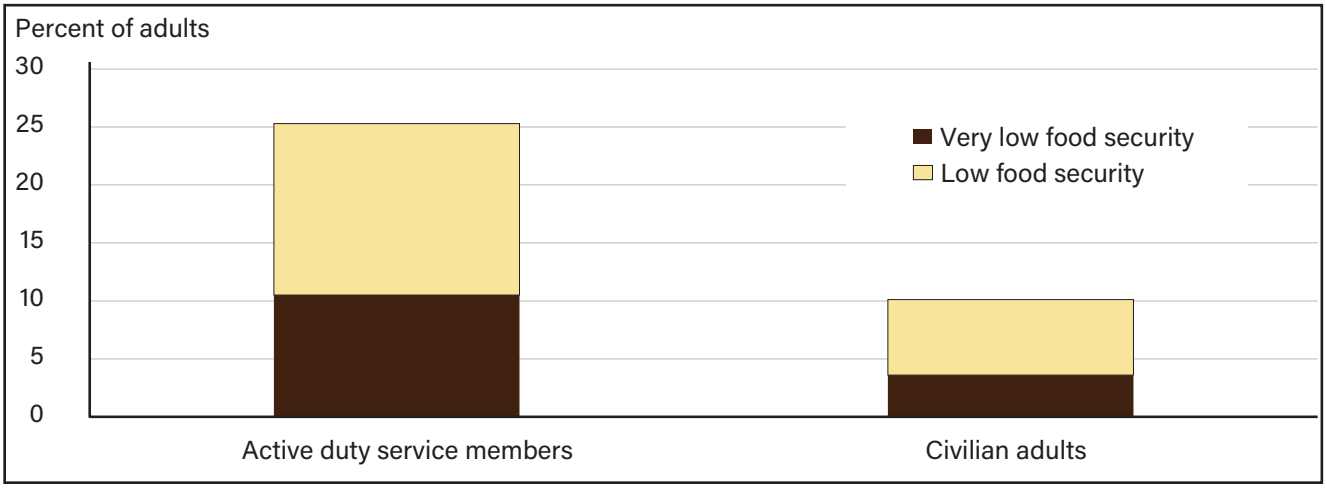
Military readiness can be defined as an individual having cognitive and physical abilities to train for and execute missions and administratively as the ability to retain trained personnel. Food security—defined as access at all times to enough food for an active, healthy life—is associated with cognitive function, body mass index, and intentions to stay in the military. Therefore, monitoring food security is paramount to maintaining military readiness. No analyses have been conducted to date on the prevalence of food insecurity for a representative sample of the active duty U.S. military. Studies of individual military installations, however, have demonstrated food insecurity rates between 15 percent and 33 percent. The primary objective of this analysis was to compare a representative sample of active duty U.S. military service members (military population) to civilian adults (civilian adult population), adjusted by demographic variables associated with food insecurity that are available in both datasets.

What Did the Study Find?

The prevalence of food insecurity was 25.3 percent in the military population and 10.1 percent in the demographically equivalent civilian adult population in 2018 and 2020. An estimated 10.5 percent of the military population had very low food security in 2018 and 2020, compared with 3.6 percent of the civilian adult population during this period.

ERS is a primary source of economic research and analysis from the U.S. Department of Agriculture, providing timely information on economic and policy issues related to agriculture, food, the environment, and rural America.

Prevalence of food insecurity was 2.5 times higher among the military population compared to the civilian adult population in 2018 and 2020



Source: USDA, Economic Research Service using data from U.S. Department of Defense, Office of People Analytics, Status of Forces-Active Duty Members and U.S. Department of Commerce, Bureau of the Census, Current Population Survey Food Security Supplement.

The prevalence of food insecurity and very low food security was generally higher among military subpopulations, when defined by demographics (e.g., gender, age, race and ethnicity, marital status, parental status (children or not), spouse's employment status, and region of residence) and compared with the corresponding demographically equivalent civilian adult subpopulations in 2018 and 2020.

In 2018 and 2020, military food insecurity was more prevalent among active duty service members who were between the ages of 17 and 25, with a high school diploma (or equivalent) or some college education, identifying as Hispanic or from other non-Hispanic races, and with an unemployed spouse.

Measurement error analyses demonstrate food insecurity among the military population is underestimated by 2.1 percentage points relative to the civilian adult population but that the prevalence of very low food security is overestimated by 1.4 percentage points in the military population compared with the civilian adult population. As a result, in 2018 and 2020, the prevalence of food insecurity among the military population may have been as high as 27.4 percent, and the prevalence of very low food security among the military population may have been as low as 9.1 percent after accounting for measurement error related to differences in the food security measurement process.

How Was the Study Conducted?

Military data were drawn from the 2018 and 2020 Status of Forces Survey of Active Duty Members. Civilian adult data were drawn from the 2018 and 2020 Current Population Survey Food Security Supplement. Because these populations are demographically different, the authors constructed a civilian comparison group of adults who are between the ages of 17 and 65, employed full time, have at least a high school education, and are not serving in the armed forces on active duty. This group is demographically equivalent to the active duty military population in terms of gender, age, race and ethnicity, marital status, parental status, educational attainment, spousal employment status if married, and geographic region of residence. The authors then constructed food security status measures based on adults' reports of the food insecurity they and their households experienced, if applicable, during the last 12 months. Measurement errors in food insecurity measures were assessed by separately estimating the Rasch model based on civilian adults' and active duty service members' responses to the food insecurity questions and estimating the bias in the military population relative to civilian adult food insecurity measures using the Nord (2012) methodology.

Comparing Food Insecurity Among the U.S. Military and Civilian Adult Populations

Introduction

A comprehensive understanding exists of the extent (Coleman-Jensen et al., 2021), causes (Gundersen et al., 2011; Smith et al., 2017), and consequences (Gregory & Coleman-Jensen, 2017) of food insecurity among the U.S. civilian population, but relatively little is known about food insecurity among active duty service members and their families, referred to as the U.S. military population in this report. The research on food insecurity among the military population to date has involved studies of individual military installations, which may not be generalizable to the entire military (Beymer et al., 2021; Government Account Ability Office, 2016; Rabbitt et al., 2022; Wax & Stankorb, 2016).

The U.S. Department of Agriculture, Economic Research Service (USDA, ERS) reported that the prevalence of food insecurity among adults was 10.5 percent in 2020 (Coleman-Jensen et al., 2021). In contrast, data from the U.S. Department of Defense (DoD) indicated that 24 percent of active duty service members experienced food insecurity at some point in the 12 months prior to the administration of the 2020 Status of Forces Survey of Active Duty Members (DoD, 2022). However, because the demographics of the military population are markedly different from the civilian adult population, particularly in ways known to be associated with the risk of food insecurity, these food insecurity prevalence estimates are not directly comparable. For example, the authors' analyses (table 1) showed that active duty service members are more likely to be males, between the ages of 17 and 28, married, have at least one child, have some college or a high school diploma (or equivalent), and live in the southern or western regions of the United States than civilian adults who are between the ages of 17 and 65, employed full time, and have at least a high school education (or equivalent).

Active duty service members and their families are also susceptible to food insecurity because of instability in their overall household income and frequent changes in where they are stationed (Rabbitt et al., 2022). Although the service members typically earn more than civilians with comparable levels of education and have more stable employment (Hosek and Wadsworth, 2013), their spouses face considerable disadvantages in the civilian labor market because of the service members' long working hours, deployment schedules, and frequent relocations (Hosek & Wadsworth, 2013). Active duty spouses are more likely to be unemployed, and if employed, they work fewer hours per week and per year and earn less than civilian spouses (Castaneda & Harrell, 2008; Harrell et al., 2004; Hosek & Wadsworth, 2013; Lim et al., 2007; Office of People Analytics, 2020; Schwartz et al.; Wood & Griffith, 1991). Therefore, the income of active duty households can, at times, be below that of demographically equivalent civilian households.

This report uses nationally representative data on food security among the U.S. military and civilian adult populations from 2018, before the onset of Coronavirus (COVID-19), and from 2020, after the pandemic started. The U.S. economy began to contract in 2020 as schools and businesses closed because of pandemic-related public health policies implemented to minimize the spread of infection. This resulted in a loss of household income through unemployment or through reduced hours for those who remained employed. This placed greater pressure on U.S. military and civilian households as they sought to meet their food needs. Reductions in the labor supply of any adult household members contribute to increases in the severity of their food insecurity (Rabbitt et al., 2022; Restrepo et al., 2021). In response, the Federal Government made significant changes and expansions to the U.S. social safety net, including nutrition assistance programs, unemployment benefits, stimulus payments, and moratoriums on housing evictions. State and local governments and the charitable sector also responded to economic needs during the pandemic (Coleman-Jensen et al., 2021).

The authors estimated the prevalence and severity of food insecurity among the U.S. military population using data from the 2018 and 2020 Status of Forces Survey of Active Duty Members (SOFS-A). Unlike prior analyses of military food insecurity conducted at individual military installations (Beymer et al., 2021; Rabbitt et al., 2022; Wax & Stankorb, 2016), the analyses use weighted data to represent the U.S. active duty military population. To better understand the extent of food insecurity among the military population, the authors constructed a civilian comparison group of adults between the ages of 17 and 65 who were employed full time, had at least a high school education (or equivalent), and were not serving in the armed forces on active duty. This civilian group is demographically similar to the active duty military population in terms of gender, age, race and ethnicity, marital status, parental status, educational attainment, employment of spouse if married, and geographic region of residence. The comparison groups were constructed using data from the 2018 and 2020 Current Population Survey Food Security Supplement (CPS-FSS). Because of the lack of information on the quality of food insecurity measures for the military population, the study also examined the psychometric properties of active duty service members' responses to the food insecurity questions. This provided key insights into the validity and reliability of food insecurity measures among the military population and allowed the authors to determine whether military and civilian food security measures were directly comparable.

Data and Methodology

The U.S. Department of Defense (DoD) began collecting information on food insecurity among active duty service members through the Status of Forces Survey of Active Duty Members (SOFS-A) in 2016 to better understand the extent, causes, and consequences of food insecurity. However, the wording of the food insecurity response options in the 2016 SOFS–A differed from the Six-Item Short Form Food Security Survey Module (SFFSSM) and thus was not directly comparable to civilian samples. The SFFSSM questions were developed by researchers at the National Center for Health Statistics (Blumberg et al., 1999; see appendix A) and were originally validated by researchers at USDA, ERS to ensure food security classifications had suitable sensitivity, specificity, and bias related to USDA's 18-question Household Food Security Survey Module (USDA, ERS, 2012). Beginning in 2018, the SOFS-A began using the SFFSSM to ensure comparability to civilian samples.

Every other year,[1] the SOFS-A is administered through web-based surveys in the fall and early winter to approximately 125,000 active duty service members.[2] By design, the SOFS-A, after correcting for oversampling and nonresponse bias through survey weighting, is representative of active duty members in all five of the military services whose pay grades are between E–1 and O–6 (i.e., excluding all general and flag officers).[3]

The analysis used data from the 2018 SOFS-A (administered between December 2018 and February 2019) and the 2020 SOFS-A (administered between October 2020 and January 2021).[4] A service members' food insecurity was measured using responses to a series of questions from the USDA's SFFSSM. The questions captured the hardships military households typically experience when they have trouble meeting their food

[1] The Status of Forces Surveys is a series of annual web-based surveys of the active duty and reserve component populations.

[2] In 2018 and 2020, 3 and 4 percent of active duty service members who responded to the SOFS-A had less than 1 year of military service, respectively.

[3] Coast Guard service members are included in all analyses in this report. Therefore, the food insecurity statistics in this report do not match those produced by the U.S. Department of Defense. For example, the recent estimate that 24 percent of active duty service members were food insecure in 2020 (U.S. Department of Defense, 2022) was based on a sample of Army, Air Force, Marine Corps, and Navy service members.

[4] 631 active duty service members completed both the 2018 and 2020 SOFS-A.

needs.[5] Each question asks whether a food hardship occurred for the service member or their household (subsequently referred to as the "service member" for simplicity) in the previous 12 months. Each question specifies "a lack of money for food" as the cause of the hardship, ruling out food hardship caused by fasting or time constraints.

Each active duty service member was assigned a food security status based on the number of food hardships reported. (See Bickel et al. (2000) and Coleman-Jensen et al. (2021) for a discussion of USDA's food security classification system and the coding of responses to the food insecurity questions). Service members were classified as food-secure if they reported fewer than two food hardships in the preceding 12 months. A service member who reported two or more food hardships was classified as food insecure. Food insecure service members can be further classified as having low or very low food security. Low food secure service members reported two to four hardships, while those with very low food security reported five or six hardships.

Constructing a Civilian Adult Comparison Group for Active Duty Service Members

To compare food insecurity among the active duty military and civilian adult populations, the authors used data from the 2018 and 2020 Current Population Survey Food Security Supplement (CPS-FSS) administered in December of their respective years. The authors constructed a sample of civilian adult respondents to the CPS-FSS that are demographically and economically equivalent in gender, age, race and ethnicity, marital status, parental status, educational attainment, spouse's employment status if married, and geographic region of residence to compare with the sample of active duty service members. The authors restricted the civilian adult sample to those between the ages of 17 and 65, employed full time (working 35 or more hours a week), with at least a high school diploma (or equivalent), and not serving in the armed forces on active duty to ensure that they were demographically equivalent to active duty service members. The CPS-FSS is an annual large-scale national survey that is representative at the national and State levels of the civilian, noninstitutionalized population after weighting. Because the CPS-FSS and SOFS-A are collected during similar time periods, it is unlikely that seasonality affected comparisons of military and civilian food insecurity.

The food insecurity measures in the CPS-FSS are constructed based on civilians' reports of food hardships in the last 12 months, which are collected using the USDA's Household Food Security Survey Module (HFSSM). The HFSSM—unlike the SFFSSM, which is administered in the SOFS-A—collects information on food hardships through inperson and phone interviews using 18 questions. While the six questions used in the SFFSSM overlap with the HFSSM, the food insecurity measures based on the HFSSM are more precise because more information about a household's food hardships is collected, leading to more accurate food security status classifications. To facilitate the authors' comparisons of food insecurity between military and civilian adult populations, they used only the food hardship questions that overlap between the HFSSM and SFFSSM to construct food insecurity measures for the civilian adult sample. They followed the food security status classification rules for active duty service members based on the SFFSSM.

As a first step in the construction of the civilian adult sample, the authors included adult respondents to the CPS-FSS between the ages of 17 and 65, have at least a high school diploma or equivalent level of education, are employed full time (working 35 or more hours per week), and are not active duty armed forces members. The criteria for inclusion in this baseline (unadjusted) sample were designed to mimic the requirements for active military service. Active duty service members were excluded from the military sample if they currently live outside the continental United States.

However, as shown by the sample summary statistics in table 1, even after the imposition of the sample inclusion criteria, the unadjusted demographic profiles of active duty service members and civilian adults remained considerably different with regard to gender, age, race and ethnicity, marital status, parental status, educational attainment, spouse's employment status, and geographic region of residence.

[5] The SOFS-A is administered to active duty service members who live on or off a military installation. While food is provided to service members at times when they are working or living on an installation, this does not necessarily mean that all food needed by the service members or their families is provided.

Table 1

Summary statistics for the U.S. military and civilian adult[1] samples, 2018 and 2020

	Military		Civilian adults			
			Unadjusted		Adjusted	
	Mean (percent)	Standard error	Mean (percent)	Standard error	Mean (percent)	Standard error
Gender						
Female	16.8	0.327	42.8***	0.329	16.8	0.682
Male	83.2	0.327	57.2***	0.329	83.2	0.682
Age						
17 to 19 years old	6.3	0.336	0.3***	0.039	6.3	1.007
20 to 22 years old	19.5	0.478	1.8***	0.096	19.5	1.593
23 to 25 years old	17.1	0.414	4.4***	0.148	17.1	0.949
26 to 28 years old	14.0	0.335	7.0***	0.180	14.0	0.655
29 to 31 years old	11.0	0.266	7.8***	0.185	11.0	0.479
32 to 34 years old	9.5	0.219	7.8***	0.182	9.5	0.404
35 to 37 years old	8.3	0.188	7.9	0.179	8.3	0.350
38 to 40 years old	6.2	0.150	7.7***	0.177	6.2	0.261
41 to 43 years old	3.6	0.105	7.0***	0.167	3.6	0.160
44 to 46 years old	2.2	0.073	7.1***	0.170	2.2	0.102
47 to 49 years old	1.2	0.050	7.6***	0.174	1.2	0.054
50 to 65 years old	1.0	0.042	33.7***	0.308	1.0	0.032
Race and ethnicity						
White, non-Hispanic	57.2	0.463	64.3***	0.335	57.2	1.309
Black, non-Hispanic	13.2	0.372	13.1	0.259	13.2	0.951
Other race, non-Hispanic	11.1	0.309	8.9***	0.197	11.1	0.820
Hispanic	18.5	0.411	13.6***	0.245	18.5	1.058
Marital status						
Married	58.0	0.499	50.2***	0.332	58.0	1.268
Unmarried	42.0	0.499	49.8***	0.332	42.0	1.268
Parental status						
At least one child	41.9	0.446	37.9***	0.323	41.9	1.250
No child	58.1	0.446	62.1***	0.323	58.1	1.250
Educational attainment						
High school diploma	25.4	0.495	22.9***	0.281	25.4	1.109
Some college	46.7	0.497	28.1***	0.298	46.7	1.342
College degree	17.0	0.276	30.4***	0.306	17.0	0.641
Professional degree	10.9	0.155	18.6***	0.256	10.9	0.451
Spouse's employment status						
Unemployed	3.7	0.176	1.0***	0.064	3.7	1.135
Employed or out of the labor force	96.3	0.176	99.0***	0.064	96.3	1.135
Region						
Living in Northeast	4.1	0.207	17.0***	0.257	4.1	0.246
Living in South	54.8	0.503	38.7***	0.326	54.8	1.250
Living in Midwest	6.7	0.246	22.1***	0.273	6.7	0.315
Living in West	34.4	0.476	22.2***	0.267	34.4	1.148
Number of adults		23,444		31,977		31,977

Note: Means and standard errors were estimated using weighted data for military personnel and civilian adults from the 2018 and 2020 Status of Forces Survey of Active Duty Members and Current Population Survey Food Security Supplement, respectively. Statistical differences from the military population are indicated by the following:

* Significant at the 0.05 level ** Significant at the 0.01 level *** Significant at the 0.001 level

[1] The civilian adult population consists of adults between the ages of 17 and 65, have at least a high school diploma or equivalent level of education, are employed full time, and are not serving in the military on active duty. In addition, the civilian adult population is adjusted to match the military population based on gender, age, race and ethnicity, marital status, parental status, education attainment, individual and spousal employment status, and region of residence.

Source: USDA, Economic Research Service using data from U.S. Department of Defense, Office of People Analytics, Status of Forces-Active Duty Members and U.S. Department of Commerce, Bureau of the Census, Current Population Survey Food Security Supplement.

To address the remaining differences in the demographic profiles of the military and civilian samples, the authors employed iterative proportional fitting (i.e., raking; Deville et al., 1993). This was based on the use of the demographic variables listed in table 1 to adjust the demographic profile of the unadjusted civilian adult sample to match the demographic profile of the military sample by iteratively adjusting the civilian adult (personal) CPS-FSS sampling weights until the demographic profiles of both samples align. The resulting sample served as the study's adjusted civilian adult sample, which was used for the primary analyses of food insecurity. In table 1, the demographic profile of the adjusted civilian adult sample closely resembled that of the military sample. All analyses based on the military and civilian adult samples used person weights that accounted for survey nonresponse bias in SOFS-A and CPS-FSS, respectively.[6] Any differences in prevalence rates in this report are statistically significant at the 95-percent confidence level or better unless noted otherwise.

Estimating Measurement Error in Food Insecurity Measures

Differences in the prevalence of food insecurity among the military and civilian adult populations could be driven by differences in their food environments, individual and household characteristics, and economic resources or by measurement error. Given the lack of information on food insecurity measurement for the military population, the authors focused on examining the psychometric properties of active duty subjects' food insecurity measures. These captured the validity, reliability, and comparability of the questions used to construct food insecurity measures for the military population—and how these differed from food insecurity measures for the civilian adult population. This allowed the authors to determine the extent of measurement error in food insecurity measures for the military population. To do so, the authors restricted the military and adjusted civilian adult samples to include only those with complete responses to the food insecurity questions. Additionally, service members and civilian adults with extreme raw scores (i.e., the count of affirmed food insecurity questions, 0 or 6 based on the SFFSSM) were excluded from the measurement analyses because individuals with these raw scores were not identified in the Conditional Maximum Likelihood (CML) Rasch measurement model (Nord, 2012).

The authors used the CML Rasch measurement model—the standard measurement model used by USDA, ERS to develop and continually reevaluate U.S. food insecurity measures—to estimate the severity of the food insecurity questions and food insecurity measures separately for active duty service members and civilian adults, using the measurement samples.[7] The measurement model severity parameters captured the relative severity of the SFFSSM questions, which are located on an underlying continuous scale that captures increasing levels of the severity of food insecurity experienced by adults and their households. Individuals affirm the questions until their food insecurity is less than the severity of food insecurity captured by a question. Bias in the authors' estimates of the prevalence of food insecurity (and very low food security) among active duty service members because of measurement error in their food insecurity measures relative to civilian adults can be calculated using the multistep iterative procedure developed by Nord (2012) and refined by Rabbitt and Coleman-Jensen (2017). The steps below describe the process the authors used to measure food insecurity. A similar process was repeated for very low food security.

1. Calculate a reference distribution across the food security status raw scores using data for all active duty service members and use this distribution to obtain prevalence estimates of food insecurity.

2. Determine the initial value for the food insecurity threshold using the midpoint of the mean Rasch scores (i.e., an estimate of the adult's latent severity of food insecurity) associated with raw scores 1 and 2.

[6] CPS-FSS and SOFS-A person weights are survey weighting variables that indicate how many individuals in the total national civilian, noninstitutionalized and military populations, respectively, are represented by each survey respondent.

[7] For more details on food insecurity measurement methodology, see Nord (2012) or Rabbitt & Coleman-Jensen (2017).

3. Calculate the proportion of civilian adults in each raw score group with "true" severity higher than the initial value of the threshold using the Rasch scores and the normal distribution, which is assumed to have a mean equal to the Rasch scores and standard deviation equal the standard deviation estimated for the Rasch scores for each raw score group. Adults in raw score group 0 are assumed to be food secure, and adults with a raw score of 6 are calculated as if their raw score is 5.5.

4. Weight the proportion of "truly" food-insecure adults in each raw score group by the proportion of the reference distribution with that raw score.

5. Iteratively adjust the severity threshold until the "true" prevalence is equal to the measured (observed) prevalence. The threshold at convergence represents the threshold at which there is zero bias associated with measurement error.

6. Repeat step 3 using the active duty service members' Rasch scores.

7. Weight the proportion of "truly" food insecure in each raw score group by the proportion of the reference distribution with that raw score. The weighted sum of raw score groups represents the "true" prevalence of food insecurity among active duty service members, using the threshold at which the bias associated with measurement error is zero for civilian adults.

8. Calculate the bias for food insecurity among active duty service members relative to civilian adults by taking the difference between the measured and true prevalence of food insecurity among active duty service members.

Comparing the Prevalence and Severity of Food Insecurity Among the Military and Civilian Adult Populations

In 2018 and 2020, 74.7 percent of active duty service members were food secure, meaning they had consistent and dependable access to enough food for an active, healthy life (table 2). The remaining 25.3 percent of active duty service members were food insecure. Food insecure service members had difficulty in the last 12 months meeting their food needs and the needs of their family members, if applicable, because of a lack of economic and other resources for food. Among service members experiencing food insecurity, approximately 41.5 percent reported experiencing very low food security (10.5 percent of the entire sample). Active duty service members with very low food security generally reported disruptions in their eating patterns and reduced food intake for themselves or for their family members, if applicable.

Table 2
Prevalence of food insecurity and very low food security among the U.S. military and civilian adult[1] populations, 2018 and 2020

	Military		Civilian			
			Unadjusted		Adjusted	
	Mean (percent)	Standard error	Mean (percent)	Standard error	Mean (percent)	Standard error
Food security status						
Food insecurity	25.3	0.479	7.3***	0.182	10.1***	1.180
Very low food security	10.5	0.355	2.5***	0.108	3.6***	1.060
Number of adults		23,444		31,977		31,977

Note: Means and standard errors were estimated using weighted data for military personnel and civilian adults from the 2018 and 2020 Status of Forces Survey of Active Duty Members and Current Population Survey Food Security Supplement, respectively. Statistical differences from the military population are indicated by the following:

* Significant at the 0.05 level ** Significant at the 0.01 level *** Significant at the 0.001 level

[1] The civilian adult population consists of adults between the ages of 17 and 65, have at least a high school diploma or equivalent level of education, are employed full time, and are not serving in the military on active duty. In addition, the civilian adult population is adjusted to match the military population based on gender, age, race and ethnicity, marital status, parental status, educational attainment, individual and spousal employment status, and region of residence.

Source: USDA, Economic Research Service using data from U.S. Department of Defense, Office of People Analytics, Status of Forces-Active Duty Members and U.S. Department of Commerce, Bureau of the Census, Current Population Survey Food Security Supplement.

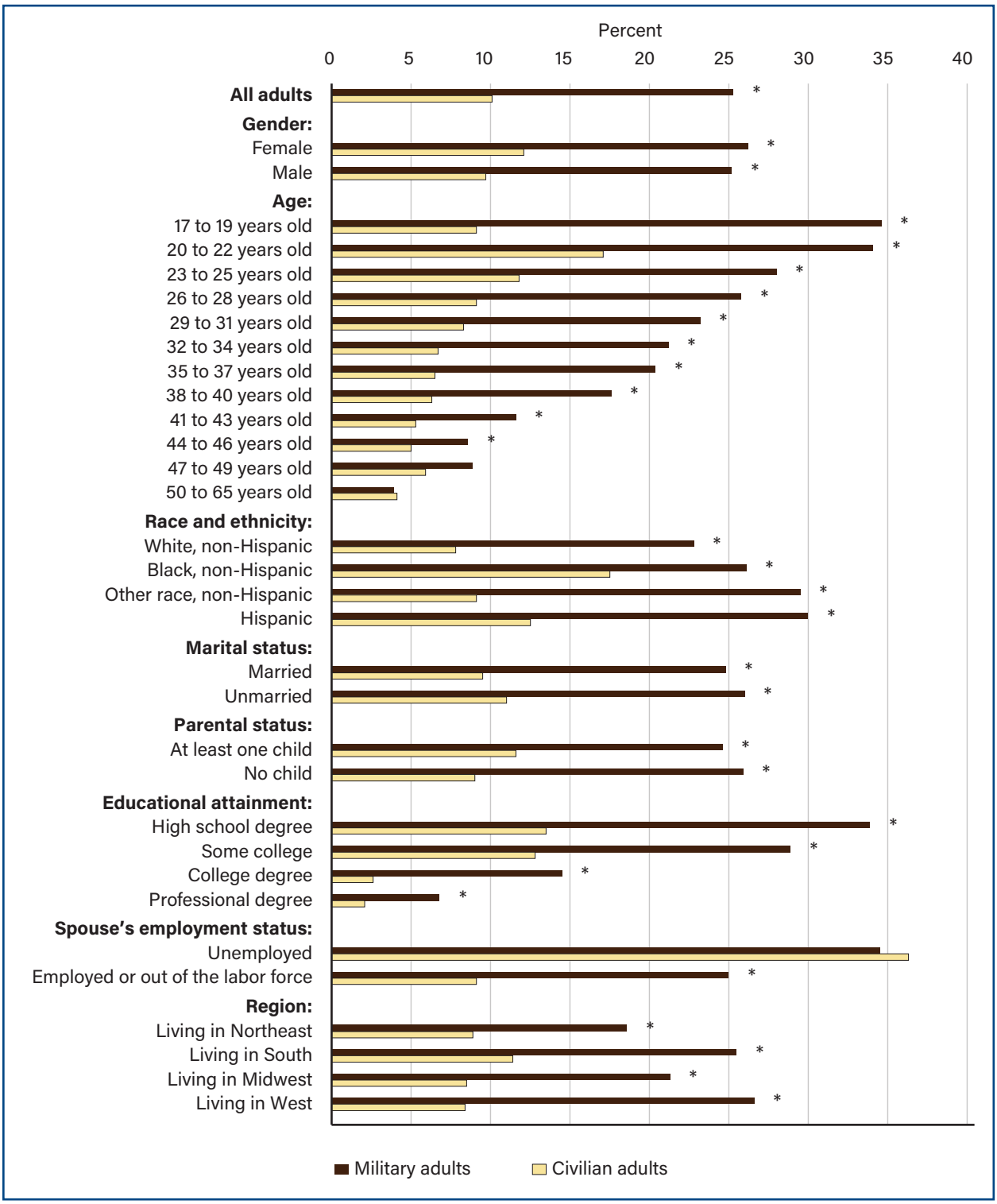
During 2018 and 2020, 89.9 percent of civilian adults were food secure. An estimated 10.1 percent of civilian adults were food insecure at some point in the last 12 months in this same period. While most food insecure civilian adults experienced less severe forms of food insecurity, 3.6 percent had very low food security during this period.

Active duty service members were more likely to be food insecure than civilian adults in 2018 and 2020 (25.3 percent versus 10.1 percent). Moreover, when they were food insecure, active duty service members were more likely to experience the most severe form of food insecurity, very low food security (10.5 percent versus 3.6 percent for civilians).

The authors found a similar pattern in examining differences in food insecurity among active duty service members and civilian adults by selected characteristics, including gender, age, race and ethnicity, marital status, parental status, educational attainment, employment status of one's spouse if married, and region of residence (figure 1). All active duty service member subpopulations were more likely to experience food insecurity than the corresponding civilian adult subpopulations, with the exception of those aged 47 or older or with an unemployed spouse if married, who had statistically similar risks for food insecurity when compared with civilian adults aged 47 and older or with an unemployed spouse. (See appendix table B.1 for estimates of the prevalence of food insecurity among the military and civilian adult populations by the characteristics described above.)

Figure 1

Prevalence of food insecurity among the military and adjusted civilian adult populations by selected household characteristics, 2018 and 2020



Note: * The difference between military and adjusted civilian adult populations is statistically significant at the 5-percent level or better. The civilian adult population consists of adults between the ages of 17 and 65, have at least a high school diploma or equivalent level of education, are employed full time, and are not serving in the military on active duty. In addition, the civilian adult population is adjusted to match the military population based on gender, age, race and ethnicity, marital status, parental status, educational attainment, individual and spousal employment status, and region of residence.

Source: USDA, Economic Research Service using data from U.S. Department of Defense, Office of People Analytics, Status of Forces-Active Duty Members and U.S. Department of Commerce, Bureau of the Census, Current Population Survey Food Security Supplement.

Food insecurity prevalence rates among the military population were statistically significantly below the national average for the military (25.3 percent) for the following groups of active duty service members in 2018 and 2020 (in descending order of food insecurity prevalence):

- Identifying as White, non-Hispanic (22.8 percent),
- Living in the Midwest (21.3 percent),
- Between the ages of 32 and 34 (21.2 percent),
- Between the ages of 35 and 37 (20.4 percent),
- Living in the Northeast (18.6 percent),
- Between the ages of 38 and 40 (17.6 percent),
- With a college degree (14.5 percent),
- Between the ages of 41 and 43 (11.6 percent),
- Between the ages of 47 and 49 (8.9 percent),
- Between the ages of 44 and 46 (8.6 percent),
- With a professional degree (6.8 percent), and
- Between the ages of 50 and 65 (3.9 percent).

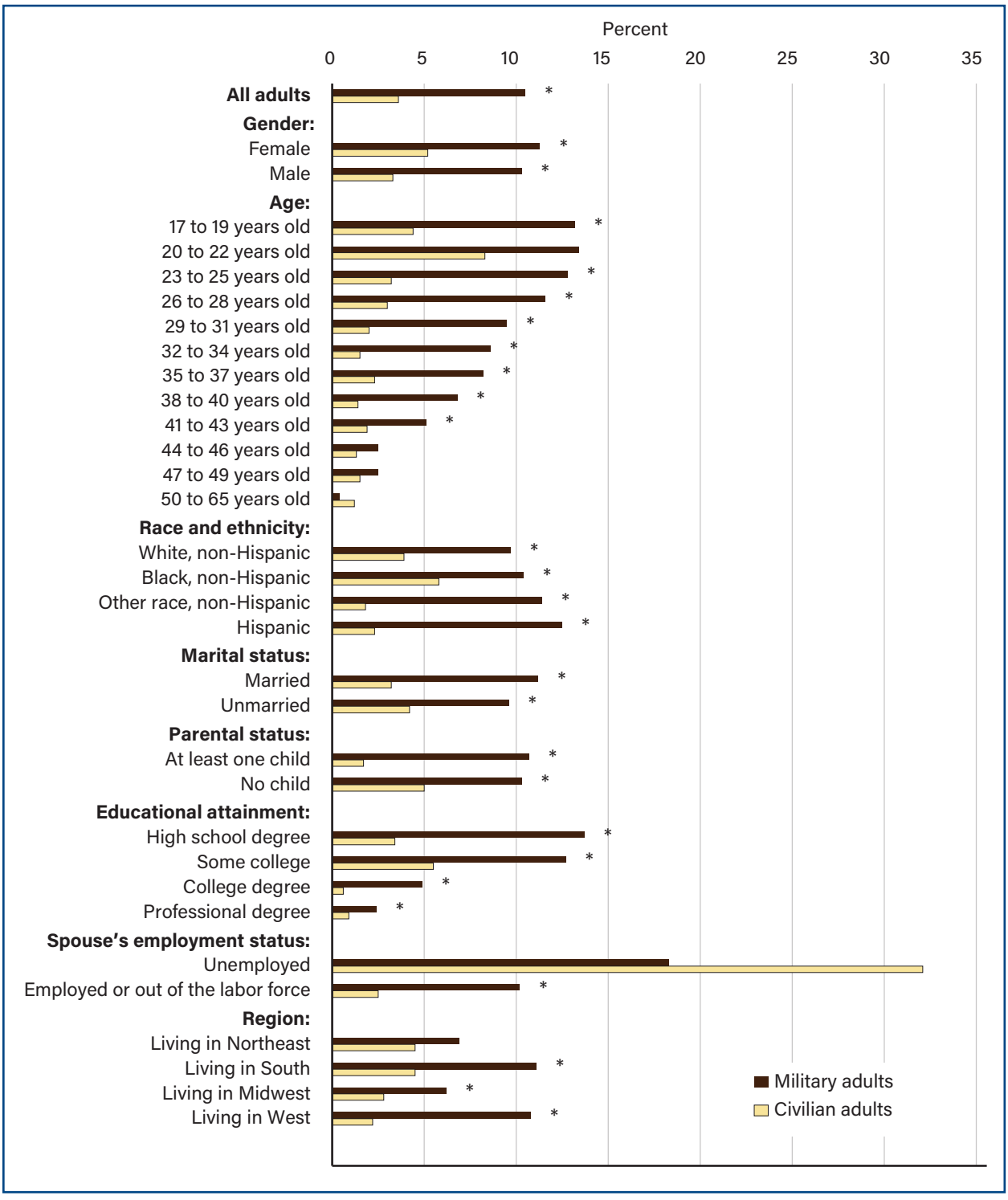
In 2018 and 2020, the prevalence of food insecurity among the military population was statistically significantly above the national average for the military (25.3 percent) for the following groups of active duty service members (in descending order of food insecurity prevalence):

- Between the ages of 17 and 19 (34.6 percent),
- With an unemployed spouse (34.5 percent),
- Between the ages of 20 and 22 (34.1 percent),
- With a high school diploma or equivalent (33.9 percent),
- Hispanic (30.0 percent),
- Identifying as other race, non-Hispanic (29.5 percent),
- With some college (28.9 percent), and
- Between the ages of 23 and 25 (28.0 percent).

The prevalence of very low food security, like the prevalence of food insecurity, for selected subpopulations defined by gender, age, race and ethnicity, marital status, parental status, educational attainment, employment status of one's spouse if married, and region of residence was generally higher among active duty service members than civilian adults with a few exceptions (figure 2). All active duty service member subpopulations were more likely to experience the most severe form of food insecurity—very low food security—than their corresponding civilian adult subpopulations with a few exceptions. These included active duty service members aged 20 to 22 and 44 or older, living in the Northeast, or with an unemployed spouse, who had statistically similar risks for experiencing very low food security when compared with civilian adults from these subpopulations. (See appendix table B.2 for estimates of the prevalence of very low food security among the military and civilian adult populations by the characteristics described above.)

Figure 2

Prevalence of very low food security among the military and adjusted civilian adult populations by selected household characteristics, 2018 and 2020



Note: *Difference between military and civilian adult populations is statistically significant at the 5-percent level or better. The civilian adult population consists of adults who are between the ages of 17 and 65, have at least a high school diploma or equivalent level of education, are employed full time, and are not serving in the military on active duty. In addition, the civilian adult population is adjusted to match the military population based on gender, age, race and ethnicity, marital status, parental status, educational attainment, individual and spousal employment status, and region of residence.

Source: USDA, Economic Research Service using data from U.S. Department of Defense, Office of People Analytics, Status of Forces-Active Duty Members and U.S. Department of Commerce, Bureau of the Census, Current Population Survey Food Security Supplement.

Very low food security prevalence rates were statistically significantly below the national average for the military (10.5 percent) for the following groups of active duty service members in 2018 and 2020 (in descending order of very low food security prevalence):

- Between the ages of 32 and 34 (8.6 percent),
- Between the ages of 35 and 37 (8.2 percent),
- Living in the Northeast (6.9 percent),
- Between the ages of 38 and 40 (6.8 percent),
- Living in the Midwest (6.2 percent),
- Between the ages of 41 and 43 (5.1 percent),
- With a college degree (4.9 percent),
- Between the ages of 44 and 46 (2.5 percent),
- Between the ages of 47 and 49 (2.5 percent),
- With a professional degree (2.4 percent), and
- Between the ages of 50 and 65 (0.4 percent).

The prevalence of very low food security among the military population was statistically significantly above the national average for the military (10.5 percent) for the following groups of active duty service members in 2018 and 2020 (in descending order of very low food security prevalence):

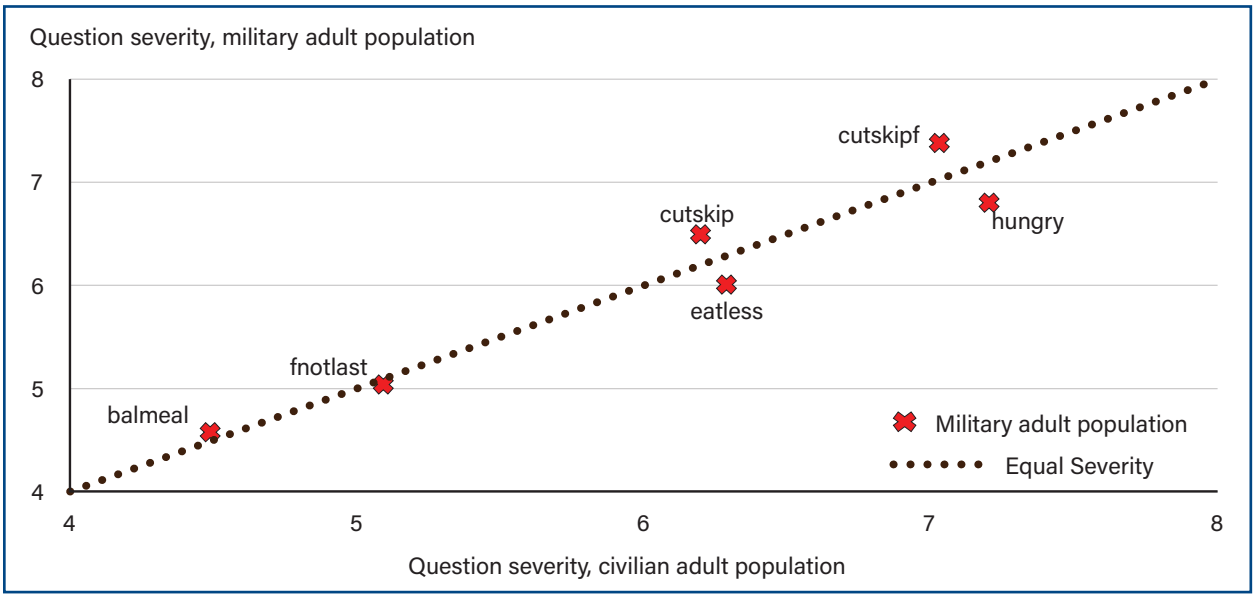
- With an unemployed spouse (18.3 percent),
- With a high school diploma or equivalent (13.7 percent),
- Between the ages of 20 and 22 (13.4 percent),
- Between the ages of 23 and 25 (12.8 percent),
- With some college (12.7 percent), and
- Identifying as Hispanic (12.5 percent).

Assessing the Extent of Measurement Error in Military Food Insecurity Measures

Figure 3 contains estimates of the severity of the food insecurity questions for active duty service members and civilian adults. The relative severity of the questions was compared to determine whether food insecurity measures for the military and civilian adult populations were directly comparable. By doing so, the authors assessed whether the questions measured food insecurity in the same way for these populations. Questions that are below the equal severity line—the line that indicates when a question captured the same level of the severity of food insecurity for active duty service members and civilian adults—captured greater levels of the severity of food insecurity for active duty service members than civilian adults. When this occurred, active

duty service members were less likely to affirm a question than civilian adults because they must experience a greater level of food insecurity than civilian adults to do so. Therefore, any resulting differences in responses to the food insecurity questions by the military and civilian adult populations would be due to measurement error, not differences in their underlying food insecurity. The opposite is true for questions located above the equal severity line.

Figure 3
Estimated severity of the food insecurity questions among the U.S. military and civilian adult[1] populations



balmeal = Couldn't afford to eat balanced meals; cutskip = Adult(s) cut size of meals or skipped meals; cutskipf = Adult(s) cut size or skipped meals in 3 or more months; eatless = Respondent ate less than felt he/she should; fnotlast = Food bought didn't last, and (I/we) didn't have money to get more; hungry = Respondent hungry but didn't eat because couldn't afford food; losewt = Respondent lost weight; whlday = Adult(s) did not eat for a whole day; whldayf = Adult(s) did not eat for whole day in 3 or more months; worried = Worried food would run out before (I/we) got money to buy more. (For complete wording of questions, see appendix A "Six-Item Short Form Food Security Survey Module Questions.")

[1] The civilian adult population consists of adults between the ages of 17 and 65, have at least a high school diploma or equivalent level of education, are employed full time, and are not serving in the military on active duty. In addition, the civilian adult population is adjusted to match the military population based on gender, age, race and ethnicity, marital status, parental status, educational attainment, individual and spousal employment status, and region of residence.

Note: Severity of food insecurity questions were estimated using a Rasch measurement model, separately for the military and civilian adult populations, using data from the 2018 and 2020 Status of Forces Survey of Active Duty Members and Current Population Survey Food Security Supplement, respectively. See appendix A for the wording of the food insecurity questions.

Source: USDA, Economic Research Service using data from U.S. Department of Defense, Office of People Analytics, Status of Forces-Active Duty Members and U.S. Department of Commerce, Bureau of the Census, Current Population Survey Food Security Supplement.

Differences in the measured severity of the food insecurity questions between the military and civilian adult populations can occur because food insecurity manifests differently for these groups or because of artificial elements in the measurement process, such as differences in the implementation of the food insecurity questions (i.e., measurement error). Any measurement error present is particularly problematic if the food insecurity questions affected are located near the thresholds used to classify adults into a food security status category on the underlying food insecurity scale. Any changes in the relative ordering in the severity of the questions may indicate measurement error. Comparisons of the magnitude and ordering of the severity of these questions suggest that the food insecurity measures in the SOFS-A were generally comparable to those found in the CPS-FSS.

Table 3 contains the authors' estimates of the measured and true prevalence of food insecurity and very low food security for active duty service members. The findings suggest that the prevalence of food insecurity was biased downward by 2.1 percentage points for active duty service members relative to civilian adults. Unlike the prevalence of food insecurity, the prevalence of very low food security was overestimated by 1.4 percentage points in the military population compared with the civilian adult population.

Table 3
Bias for the estimated prevalence of food insecurity and very low food security for the U.S. military relative to the civilian adult population[1] due to differences in their responses to the food insecurity questions

		True prevalence		Bias, measured versus true		Bias, civilian versus military	
Food security category	Measured prevalence	Civilian measures	Military measures	Civilian measures	Military measures	Percent of all adults	Percent of observed prevalence
	- - - - - - - - Percent - - - - - - - -			- - Percentage points --		- - - Percent - - -	
Food insecurity	25.33	25.33	27.42	0.00	-2.08	-2.08	-8.21
Very low food security	10.50	10.50	9.05	0.00	1.44	1.44	13.75

Note: CML Rasch measurement models estimated separately for active duty service members and civilian adults using weighted data from the 2018 and 2020 Status of Forces Survey of Adult Members and Current Population Survey Food Security Supplement, respectively. Calculations are based on the observed distribution across raw score groups of all active duty service members. The "true" prevalence rates are based on thresholds selected to equate the true and measured prevalence for active duty service members based on the methods outlined in Nord (2012) and Rabbitt and Coleman-Jensen (2017). Zero bias for active duty service members is an artifact of this specific selection of the threshold. Military measures are estimates of the Rasch scores and their standard errors based on the military sample. Civilian measures are estimates of the Rasch scores and their standard errors based on the civilian sample.

[1] The civilian adult population consists of adults between the ages of 17 and 65, have at least a high school diploma or equivalent level of education, are employed full time, and are not serving in the military on active duty. In addition, the civilian adult population is adjusted to match the military population based on gender, age, race and ethnicity, marital status, parental status, educational attainment, individual and spousal employment status, and region of residence.

Source: USDA, Economic Research Service using data from U.S. Department of Defense, Office of People Analytics, Status of Forces-Active Duty Members and U.S. Department of Commerce, Bureau of the Census, Current Population Survey Food Security Supplement.

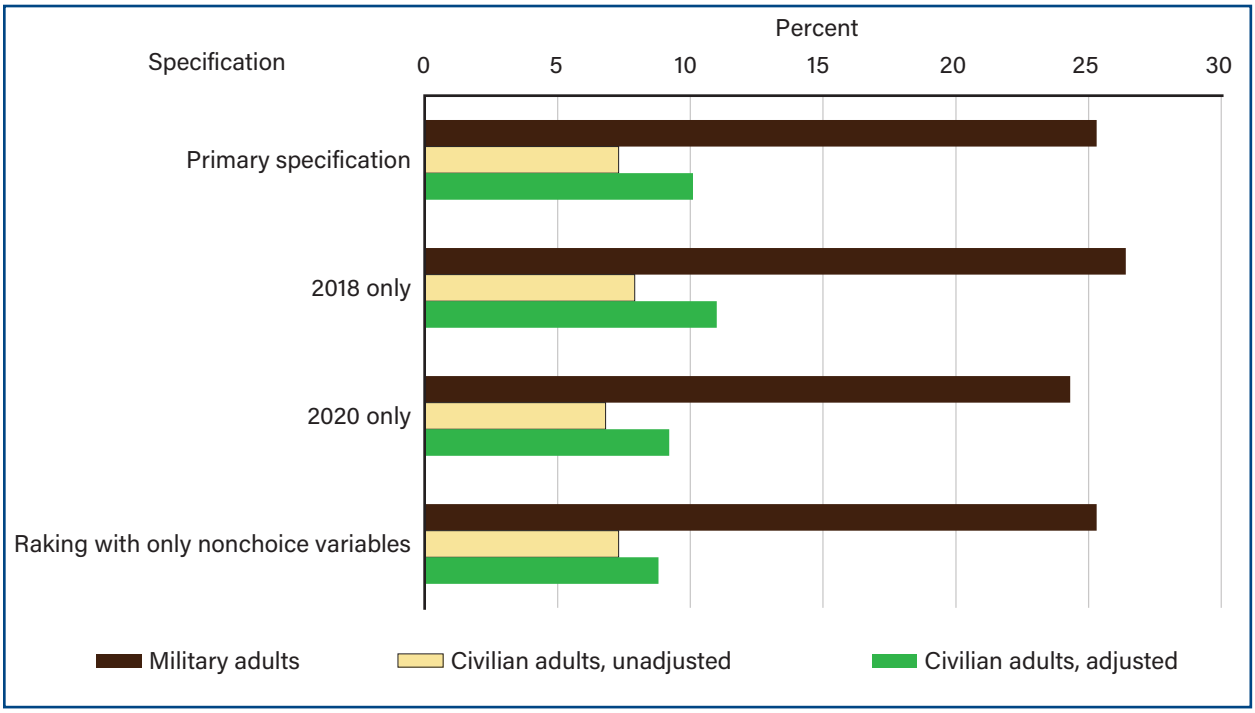
Sensitivity Analyses

Given the finding that the prevalence of food insecurity was 2.5 times higher among the military population compared with a demographically and economically equivalent civilian adult population in 2018 and 2020, the authors explored the sensitivity of this finding in relation to assumptions about which demographic and economic variables were used to construct a civilian adult population that is observationally equivalent to the military population and the onset of COVID-19. Therefore, the authors repeated the analyses but made the following changes to the data and methodology:

1. To explore the impact of including variables that reflect the choices made by service members and civilian adults, the authors constructed a civilian adult sample that is demographically equivalent to the military population using only variables that are largely outside the control of an individual: gender, age, and race and ethnicity.

2. To explore the impact of the onset of COVID-19 on the comparison of food insecurity among the military and civilian adult populations, the authors constructed separate civilian adult samples that are demographically and economically comparable to the military population for 2018 and 2020.

Figure 4
Prevalence of food insecurity for the military and civilian adult populations under different data and methodological approaches



Note: The prevalence of food insecurity was estimated using weighted data for military personnel and civilian adults from the 2018 and 2020 Status of Forces Survey of Active Duty Members and Current Population Survey Food Security Supplement, respectively, for the primary specification and specification based on raking with only nonchoice variables (gender, age, and race and ethnicity used to adjust civilian adult population). All other specifications used gender, age, race and ethnicity, marital status, parental status, educational attainment, employment status of the spouse, and region of residence to adjust the civilian adult population to be observationally equivalent to the military population.

Source: USDA, Economic Research Service using data from U.S. Department of Defense, Office of People Analytics, Status of Forces-Active Duty Members and U.S. Department of Commerce, Bureau of the Census, Current Population Survey Food Security Supplement.

Figure 4 contains comparisons of food insecurity prevalence estimates for the military and civilian adult populations based on the different assumptions the authors could make about the data and methodology described above. These sensitivity analyses revealed that the finding that food insecurity was more prevalent among the military population than a demographically and economically similar civilian adult population was not sensitive to the choice of which years of data were used to construct the samples or the variables used to make the civilian adult sample observationally similar to the military sample.

Discussion and Conclusion

The primary objective of this report was to compare food insecurity among active duty service members and civilian adults. To do so, the authors used data from the 2018 and 2020 Status of Forces Survey of Active Duty Members (SOFS-A) and the Current Population Survey Food Security Supplement (CPS-FSS). The findings showed that the prevalence of food insecurity was 2.5 times higher among the active duty military population compared with a demographically and economically equivalent civilian population of adults

(in terms of gender, age, race and ethnicity, marital status, parental status, educational attainment, spousal employment status if married, and geographic region of residence) who were nonelderly (aged 17 to 65), have at least a high school education, were not serving in the military on active duty, and were employed full time. The authors' findings showed 25.3 percent food insecurity for the military versus 10.1 percent for an equivalent sampling of civilians.

The estimates of the prevalence and severity of food insecurity among the military population presented in this report are useful for military leaders, DoD, USDA programs, and policymakers. First, the finding that food insecurity and very low food security are more prevalent among the military population compared with the civilian adult population provides important context to the potential risk for, and severity of, food insecurity experienced by the military. Second, the detailed food insecurity and very low food security prevalence estimates in this report provide important insights into which active duty service members are the most likely to experience food insecurity. Similar to prior studies of food insecurity among the civilian population, the authors found that active duty service members who are younger, identify as Hispanics or from other races (non-Hispanic), have lower education, and have a spouse who is unemployed were at an elevated risk for food insecurity in 2018 and 2020.

The authors' estimate of the prevalence of food insecurity among active duty service members aligns with prior studies of military food insecurity at single military installations (Beymer et al., 2021; Rabbitt et al., 2022; Wax & Stankorb, 2016). Estimates of the prevalence of food insecurity range from 15 percent (Wax & Stankorb, 2016) to 33 percent (Beymer et al., 2021; Rabbitt et al., 2022). However, it is important to note that estimates provided by Beymer et al. (2021) and Rabbitt et al. (2022) were for marginal food insecurity and are based on a two-question food insecurity screener. As a result, marginal food insecurity is a less severe form of food insecurity that includes any indications of food hardship. Therefore, these estimates will always be higher than the prevalence of food insecurity. In addition, it is important to note that Wax & Stankorb (2016), Beymer et al. (2021), and Rabbitt et al. (2022) used easy-to-access samples drawn from single U.S. Army installations that are neither representative of the entire military population nor directly comparable to the civilian adult population.

The second objective of this report was to examine the psychometric quality of food insecurity measures constructed from reports of food hardships by active duty service members. While the USDA's food insecurity measures have been extensively tested across many civilian subpopulations (Bickel et al., 2000; Nord, 2012; Rabbitt & Coleman-Jensen, 2017), no studies have documented the quality of these measures for the military population. Using the standard measurement techniques for food insecurity measurement developed by USDA, ERS over the past 25 years, the authors found that food insecurity measures for the military population are like those for the civilian adult population. The food insecurity questions generally capture similar levels of the severity of food insecurity between both populations, suggesting food insecurity is manifested in the same ways in the military and civilian adult populations. However, the authors found evidence that some differences in response behavior to the food insecurity questions induces modest bias in comparisons of military and civilian adult food insecurity. Comparisons of the prevalence of food insecurity between these populations may be biased downward by as much as 2.1 percentage points. Therefore, the prevalence of food insecurity among the military population may be as high as 27.4 percent in 2018 and 2020 after accounting for this source of measurement error. Comparisons based on the more severe form of food insecurity, very low foods security, may be biased upward by as much as 1.4 percentage points. As a result, the prevalence of very low food security among the military population may be as low as 9.1 percent in 2018 and 2020 after accounting for measurement error.

The psychometric analyses in this report provide important insights into the quality and reliability of food insecurity measures that were constructed based on active duty service members' reports of the behaviors and experiences they encountered while attempting to meet their food needs, conveyed through their responses to the food insecurity questions in the SOFS-A. These analyses demonstrate that active duty service members

interpret the food insecurity questions in the SOFS-A as intended and, in a way, comparable to the civilian adult response. Therefore, the military responses can be used to construct measures of food insecurity that are comparable to those constructed by USDA, ERS for the civilian, noninstitutionalized population in the CPS-FSS, with appropriate adjustments for differences in the demographic profiles of the military and civilian adult populations. Therefore, the food insecurity measures within the SOFS-A can be reliably used for monitoring food insecurity among the military population.

Several limitations to the authors' comparisons of military and civilian adult food insecurity should be noted in considering the findings. First, some important differences exist between the two surveys in how food insecurity is measured. The CPS-FSS employs screening techniques to reduce respondent burden, while the SOFS-A does not. In a recent study, Ahn, et al. (2020) found that the decision to implement screening in online food insecurity surveys can affect the estimated prevalence of food insecurity. The incidence of food insecurity dropped by 20 percent when the authors implemented USDA's screening procedures in the CPS-FSS. However, even if this result carried over to the SOFS-A, the prevalence of food insecurity would still be higher among the military population than the civilian adult population.

Second, while the authors were able to use the same set of food insecurity questions for the military and civilian respondents to construct comparable measures for the analyses, it is important to note that the CPS-FSS collects all 18 questions as opposed to the SFFSSM in the SOFS-A. The collection of additional information on food expenditures and food insecurity may have better prepared civilian adult participants in the CPS-FSS to respond to the food insecurity questions compared with active duty service members in the SOFS-A.

Third, the SOFS-A is administered online and the CPS-FSS is administered using inperson and phone interviews, depending on the respondent's month in the sample. Therefore, the CPS-FSS estimates may be more susceptible to social desirability bias and may provide a more conservative estimate of food insecurity.[8]

Fourth, the response rate for the SOFS-A is significantly lower (12 percent) than the response rate for the CPS-FSS (62 percent) in 2018 and 2020. Although person weights are used to approximate the military population's demographic profile, nonresponse bias likely impacts the results.

Finally, the analyses do not account for several additional demographic and socioeconomic characteristics related to food insecurity, such as overall household income, wages, more detailed geographic location, and health status of service members and civilian adults. These variables were not available in the SOFS-A and/or the CPS-FSS dataset and, therefore, could not be used in the analyses. Thus, it is possible that the estimated food insecurity gap between the military and civilian adult populations in this report might be misstated.

Given the lack of information on food insecurity among active duty service members, future research could utilize the SOFS-A food insecurity data to provide new insight into the extent, causes, and consequences of food insecurity among the military population. SOFS-A data on application to and participation in USDA's nutrition assistance programs, private food assistance programs, and the use of DoD commissaries by service members also create an opportunity for researchers to evaluate the effectiveness of these programs and resources in ameliorating military food insecurity. The USDA, ERS Food Access Research Atlas could also be linked with DoD data on the location of commissaries and the SOFS-A to examine the food environment of active duty service members and how it impacts their food security. In addition, the development of a regular report on military food insecurity could be valuable to those seeking to regularly monitor military food insecurity and assess progress toward potential goals aimed at ameliorating food insecurity among the military.

[8] Social desirability bias can impact food security estimates if respondents mask their experiences related to food insecurity because of concern about how others will perceive them, such as if respondents conceal their true experiences related to food insecurity by providing answers to the food-security questions in a manner they believe others determine to be appropriate.

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Appendix A: Six-Item Short Form Food Security Survey Module Questions

1. "The food that (I/we) bought just didn't last, and (I/we) didn't have money to get more." Was that **often, sometimes**, or never true for (you/your household) in the last 12 months?
2. "(I/we) couldn't afford to eat balanced meals." Was that **often, sometimes**, or never true for (you/your household) in the last 12 months?
3. In the last 12 months, since last (name of current month), did (you/you or other adults in your household) ever cut the size of your meals because there wasn't enough money for food? (**Yes**/No)
4. (If yes to question 3) How often did this happen—**almost every month, some months but not every month**, or in only 1 or 2 months?
5. In the last 12 months, did you ever eat less than you felt you should because there wasn't enough money for food? (**Yes**/No)
6. In the last 12 months, were you hungry but didn't eat because there wasn't enough money for food? (**Yes**/No)

Note: "Affirmative" responses are indicated in **bold** (Bickel et al., 2000).

Appendix B: Detailed Food Security Statistics by Selected Characteristics

Table B.1
Prevalence of food insecurity by selected demographic and economic characteristics for the U.S. military and civilian adult[1] populations, 2018 and 2020

	Military		Civilian adults			
			Unadjusted		Adjusted	
	Mean (percent)	Standard error	Mean (percent)	Standard error	Mean (percent)	Standard error
Gender						
Female	26.2	1.192	9.9	0.320	12.1	1.144
Male	25.2	0.523	5.4	0.208	9.7	1.404
Age						
17 to 19 years old	34.6	2.685	13.7	4.341	9.1	3.830
20 to 22 years old	34.1	1.481	11.4	1.736	17.1	5.257
23 to 25 years old	28.0	1.253	12.5	1.236	11.8	1.718
26 to 28 years old	25.8	1.170	9.9	0.852	9.1	1.299
29 to 31 years old	23.2	1.139	8.8	0.743	8.3	1.105
32 to 34 years old	21.2	1.041	7.9	0.685	6.7	1.024
35 to 37 years old	20.4	1.010	7.4	0.654	6.5	1.004
38 to 40 years old	17.6	1.005	8.6	0.701	6.3	0.815
41 to 43 years old	11.6	1.030	7.6	0.649	5.3	0.800
44 to 46 years old	8.6	1.072	6.9	0.647	5.0	0.767
47 to 49 years old	8.9	1.320	7.0	0.636	5.9	0.927
50 to 65 years old	3.9	0.924	5.2	0.250	4.1	0.434
Race and ethnicity						
White, non-Hispanic	22.8	0.594	5.1	0.167	7.8	1.798
Black, non-Hispanic	26.1	1.448	15.4	0.819	17.5	2.605
Other race, non-Hispanic	29.5	1.438	6.4	0.562	9.1	2.741
Hispanic	30.0	1.214	10.6	0.599	12.5	2.216
Marital status						
Married	24.8	0.583	4.4	0.198	9.5	1.903
Unmarried	26.0	0.806	10.3	0.304	11.0	1.036
Parental status						
At least one child	24.6	0.621	9.6	0.335	11.6	1.314
No child	25.9	0.690	5.9	0.210	9.0	1.810
Educational attainment						
High school diploma	33.9	1.204	11.8	0.467	13.5	1.927
Some college	28.9	0.725	10.4	0.407	12.8	2.238
College degree	14.5	0.666	3.9	0.245	2.6	0.316
Professional degree	6.8	0.493	2.9	0.261	2.1	0.467

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Table B.1

Prevalence of food insecurity by selected demographic and economic characteristics for the U.S. military and civilian adult[1] populations, 2018 and 2020—continued

	Military		Civilian adults			
			Unadjusted		Adjusted	
	Mean (percent)	Standard error	Mean (percent)	Standard error	Mean (percent)	Standard error
Spouse's employment status						
Unemployed	34.5	2.371	11.4	2.143	36.3	19.054
Employed or out of the labor force	25.0	0.489	7.3	0.183	9.1	0.719
Region						
Living in Northeast	18.6	2.143	6.3	0.455	8.9	2.120
Living in South	25.5	0.664	8.3	0.311	11.4	2.027
Living in Midwest	21.3	1.688	7.1	0.382	8.5	1.304
Living in West	26.6	0.804	6.8	0.338	8.4	0.986
Number of adults		23,444		31,977		31,977

Note: Means and standard errors were estimated using weighted data for military personnel and civilian adults from the 2018 and 2020 Status of Forces Survey of Active Duty Members and Current Population Survey Food Security Supplement, respectively. Statistical differences from the military population are indicated by the following:

* Significant at the 0.05 level ** Significant at the 0.01 level *** Significant at the 0.001 level

[1] The civilian adult population consists of adults between the ages of 17 and 65, have at least a high school diploma or equivalent level of education, are employed full time, and are not serving in the armed forces on active duty. In addition, the civilian adult population is adjusted to match the military population based on gender, age, race and ethnicity, marital status, parental status, educational attainment, individual and spousal employment status, and region of residence.

Source: USDA, Economic Research Service using data from U.S. Department of Defense, Office of People Analytics, Status of Forces-Active Duty Members and U.S. Department of Commerce, Bureau of the Census, Current Population Survey Food Security Supplement.

Table B.2

Prevalence of very low food security by selected demographic and economic characteristics for the U.S. military and civilian adult[1] populations, 2018 and 2020

	Military		Civilian adults			
			Unadjusted		Adjusted	
	Mean (percent)	Standard error	Mean (percent)	Standard error	Mean (percent)	Standard error
Gender						
Female	11.3	0.903	3.3	0.190	5.2	0.957
Male	10.3	0.385	1.8	0.124	3.3	1.263
Age						
17 to 19 years old	13.2	1.982	9.7	3.915	4.4	1.970
20 to 22 years old	13.4	1.103	4.5	1.099	8.3	5.076
23 to 25 years old	12.8	0.977	3.1	0.589	3.2	0.939
26 to 28 years old	11.6	0.899	3.8	0.546	3.0	0.639
29 to 31 years old	9.5	0.810	2.9	0.478	2.0	0.424
32 to 34 years old	8.6	0.749	2.6	0.411	1.5	0.383
35 to 37 years old	8.2	0.703	2.4	0.373	2.3	0.771
38 to 40 years old	6.8	0.690	2.4	0.385	1.4	0.327
41 to 43 years old	5.1	0.716	3.0	0.430	1.9	0.466
44 to 46 years old	2.5	0.595	2.2	0.361	1.3	0.281
47 to 49 years old	2.5	0.709	2.4	0.395	1.5	0.389
50 to 65 years old	0.4	0.271	1.8	0.145	1.2	0.193

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Table B.2

Prevalence of very low food security by selected demographic and economic characteristics for the U.S. military and civilian adult[1] populations, 2018 and 2020—continued

	Military		Civilian adults			
			Unadjusted		Adjusted	
	Mean (percent)	Standard error	Mean (percent)	Standard error	Mean (percent)	Standard error
Race and ethnicity						
White, non-Hispanic	9.7	0.431	1.9	0.104	3.9	1.809
Black, non-Hispanic	10.4	1.083	5.3	0.503	5.8	1.316
Other race, non-Hispanic	11.4	1.116	2.5	0.364	1.8	0.472
Hispanic	12.5	0.923	2.6	0.305	2.3	0.654
Marital status						
Married	11.2	0.462	1.0	0.096	3.2	1.784
Unmarried	9.6	0.548	3.9	0.193	4.2	0.587
Parental status						
At least one child	10.7	0.466	2.5	0.186	1.7	0.370
No child	10.3	0.509	2.4	0.132	5.0	1.782
Educational attainment						
High school diploma	13.7	0.889	4.0	0.281	3.4	0.603
Some college	12.7	0.555	3.6	0.243	5.5	2.206
College degree	4.9	0.398	1.2	0.147	0.6	0.152
Professional degree	2.4	0.362	0.9	0.153	0.9	0.291
Spouse's employment status						
Unemployed	18.3	2.082	3.9	1.343	32.1	20.057
Employed or out of the labor force	10.2	0.359	2.4	0.108	2.5	0.292
Region						
Living in Northeast	6.9	1.292	2.0	0.260	4.5	1.993
Living in South	11.1	0.503	2.6	0.181	4.5	1.889
Living in Midwest	6.2	0.956	2.5	0.230	2.8	0.895
Living in West	10.8	0.599	2.5	0.214	2.2	0.419
Number of adults		23,444		31,977		31,977

Note: Means and standard errors were estimated using weighted data for military personnel and civilian adults from the 2018 and 2020 Status of Forces Survey of Active Duty Members and Current Population Survey Food Security Supplement, respectively. Statistical differences from the military population are indicated by the following:

* Significant at the 0.05 level ** Significant at the 0.01 level *** Significant at the 0.001 level

[1] The civilian adult population consists of adults between the ages of 17 and 65, have at least a high school diploma or equivalent level of education, are employed full time, and are not serving in the armed forces on active duty. In addition, the civilian adult population is adjusted to match the military population based on gender, age, race and ethnicity, marital status, parental status, educational attainment, individual and spousal employment status, and region of residence.

Source: USDA, Economic Research Service using data from U.S. Department of Defense, Office of People Analytics, Status of Forces-Active Duty Members and U.S. Department of Commerce, Bureau of the Census, Current Population Survey Food Security Supplement.