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How Older Households Manage Food Insecurity with Food Production Activities

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Abstract

Household food insecurity is a concern in the US given the negative effects associated with food insecurity. An interesting finding is that elderly households tend to be more food secure than younger households, even though many are on fixed income. A relevant question is what might elderly households be doing that is resulting in greater food security? One potential explanation is that in retirement, elderly households can invest in more time intensive activities that provide greater food security. In this study, we combine time use diaries with food security surveys to examine whether time spent on food production is associated with lower levels of food insecurity for elderly households. The data show that time spent in meal preparation and eating is increasing with older age cohorts. At the same time, food insecurity is declining steadily with older households. Grocery shopping and non-grocery food shopping do not show any relevant trends. Comparing households above and below 70 years of age, we find that time spent in food production does not explain differences in household level food insecurity.

Introduction

Household food insecurity (FI) presents a major nutritional problem in the US that is associated with numerous health outcomes for children and adults (Gundersen and Ziliak 2015). Limited household income generally reduces food access and therefore increases FI (Nord 2014). As such, we might expect that elderly households would have higher rates of FI as they are often retired or have more restricted incomes. It is therefore puzzling that the rate of FI for elderly households is lower than younger households (Nord 2003; Coleman-Jensen et al 2016).

Despite these reported findings for elderly households, there is growing concern that the rate of FI will increase as the Baby Boom generation reaches retirement age (Gualtieri and Donley 2016). In fact, from 2001 to 2016, the share of marginal food insecure, food insecure, and very low food secure seniors increased by 27%, 45%, and 100% respectively (Ziliak and Gundersen 2018). Such large increases in FI are likely to create a major public health challenge if they continue as FI is associated with poorer health outcomes for the elderly (Gundersen and Ziliak 2017). As the elderly cohort continues to grow in numbers, a variety of alternative solutions will be important for addressing FI among the elderly (Everhardt et al 2018). A relevant question is what have older adults been doing to maintain their FI at lower rates than the overall population? The primary aim of this study is to examine whether engaging in certain food production activities (FP) helps elderly households to manage their food insecurity (FI).

People who are food secure tend to spend more money on food (Coleman-Jensen et al 2016). As such, we might expect the elderly to lack sufficient resources to be food secure. A remarkable finding in the literature is that although food expenditures decline sharply at retirement, food consumption remains relatively unchanged. Hurst (2008) attributes this largely to retirees spending much more time on food production, such as preparing meals and shopping,

than non-retirees. Aguiar and Hurst (2005) explain how retired households substitute time to maintain both the quality and quantity of food they consume. Further, Aguiar and Hurst (2007) show how the elderly increase their shopping time to obtain lower prices for identical products. Even as budget constraints become tighter, retired household have more time to engage in activities that can improve their health, including investing in their meal preparations (Godard 2016). Still, these results do not address how elderly households manage their food security as they continue to age. There are several reasons why this may be a concern.

First, as households get older it becomes more challenging to engage in physical activities. If elderly households become less mobile, they may become less able to manage activities that reduce their food insecurity. To this point, Lee and Frongillo (2001) found that functional impairments in the elderly were significantly related with FI. To exacerbate this problem, retired households with restricted incomes may not be able to substitute away from producing their own meals to paying others to produce meals for them. Second, retired households may lose the incentive to invest in the quality of their diet as their income from pension and retirement benefits is not dependent on their health status (Godard 2016). As a result, we might expect a loss in diet quality in retirement. Further, elderly households may lack the skills necessary to manage their food security into retirement, particularly on restricted incomes, making food production overly taxing. Finally, retired households may face greater depression and social isolation resulting in less investment in food production activities.

As retirement age and life expectancy continue to rise, elderly households may have to manage their food production over more years. Understanding what strategies elderly households are using to manage their food security as they get older, and which strategies are most effective, is vital to identifying potential ways to better support elderly households at risk for FI.

Becker (1965) was the first to identify the importance of time-use as an input in household production. Building on this, Vickery (1977) highlights the need of both money and time for households to produce basic needs, such as food and nutrition. To this point, she notes that income-support programs alone are insufficient for providing adequate nutrition. Several authors have continued to investigate time-use as an input for producing nutrition (see Davis 2014 for a summary). Davis and You (2011, 2013) emphasize the importance of time over money in achieving the Thrifty Food Plan, which serves as the benchmark for adequate nutrition.

To date, however, only a few studies have explicitly examined the relationship of FI and FP activities. Beatty et al (2013) considered how FI affects FP activities using a CPS sample that included all ages. (Importantly, they examined the reverse effect that we are considering). They do not identify a causal model, only the correlation of the two variables. They found that for single households, food insecurity is associated with 20 percent more time in meal preparation and 13 percent less time eating. For married households, food insecurity is associated with 17 percent less time eating and 14 percent less time in grocery shopping. Everhardt (2018) examined whether gardening and other nutritional activities could reduce food security using an intervention approach for a small sample of women. They found that the intervention statistically reduced food insecurity for the treated group.

There are 2 primary objectives of this research project that all seek to help better understand households with food insecure seniors. First, we aim to describe how food insecurity (FI) and food production activities (FP) change as elderly households age. Second, we compare how FP are related to FI across different types of elderly households (e.g. retired or working, single member or couple households, etc.).

Research Methods

Objective 1: Describe how food insecurity (FI) and food production activities (FP) change as elderly households age.

To better understand how the relationship of FP and FI, we examine how FP and FI change for elderly households as they get older. Similar to Aguiar and Hurst (2007), we estimate a linear specification:

$$(1)\ y_{it} = \alpha + \beta X_{it} + \gamma Age\ cohorts + \delta_s + \phi_t + \varepsilon_{it},$$

where the dependent variable (*y*) is FI or FP for each person. Following Beatty et al (2013), FP is calculated as the *total time* spent per day doing food production activities, including: meal preparation, grocery shopping, non-grocery food shopping, and eating time. For this analysis, FI will be measured using a discrete indicator for being food secure or food insecure. We include a matrix of various socio-demographic and control variables (*X*) for respondent *i* in year *t*. *Age cohorts* are dummy variable indicators identifying 5-year age cohorts from age 20 to 85 and older[1]. δ_s and ϕ_t identify state and year effects and ε_{it} is an error term.

For FI, we estimate equation (1) as a probit model and then predict the probability of being food insecure for each age cohort. For FP, we estimate equation (1) using ordinary least squares and then predict time use for each age cohort[2]. For both the FI and FP estimates, we plot the predicted values over age cohorts to demonstrate the change in FI and time use as households get older. To account for different household structures and the effect this has on food

[1] The Current Population Survey data used in this study top codes age 85 and older as 85.

[2] We also estimate the FP models using a negative binomial specification, but the results do not change significantly.

production, we separately estimate models for single headed households, which includes people who are divorced and widowed, and married couples.

Finally, to identify and association between time use and food security, we estimate the linear relationship as:

(2) $FI_{it} = \alpha + \beta X_{it} + \gamma Age\ cohorts + \boldsymbol{\theta FP} + \delta_s + \phi_t + \varepsilon_{it}.$

This provides us with an initial understanding of the relationship of time use and managing household food security for both married and single households 55 years and older.

Objective 2: Compare how FP are related to FI across different types of elderly households

The purpose of this objective is to understand if and how time spent on food-related activities contributed to the gap in FI between elderly households above and below 70 years of age. To this end, we divide households into mutually exclusive groups based on the age of the head of the household. We then estimate linear probability models for each group. For each group, FI is regressed on relevant demographic characteristics including education, race/ethnicity, age, use of food assistance programs in the past 30 days, gender, poverty, family size, marital status, veteran status, presence of children, income, time spent on four food-related activities and functions of those characteristics. The estimated coefficients from the linear probability models give the association of the characteristic to the probability of being food insecure. We want to understand how these contributions to food insecurity differ for households above and below 70 years of age. As households age, events can occur which may lead to changes in time use. For example, as households retire, they may spend more time on food-related activities or the time that they spend on food-related activities may be less productive, as it can often take longer to accomplish tasks as an individual gets older.

To separate the association of the amount of time spent versus the returns to time spent and their contributions to the gap in FI between households above and below 70, we conduct an Oaxaca-Blinder decomposition on the linear probability models. We first conduct an aggregate decomposition into the overall composition and structure effects. The composition effect measures the extent to which changes in the levels of the covariates between the two groups contributes to the gap in probability of food insecurity while the structure effect measures the extent to which the relationship of the covariates with food insecurity is different between the two groups. We then decompose the composition and structure effects into the contribution by each variable.

Data

This research project uses the Bureau of Labor Statistics' Current Population Survey (CPS) from 2003 – 2018 in conjunction with the American Time Use Survey (ATUS) and Food Security Supplement (FSS). Both data sets were obtained from IPUMS (Flood et al 2020, Hofferth et al 2020). The ATUS provides a 24-hour diary of all activities by survey respondents, including activities related to food acquisition production. We focus on four key activities: meal preparation, grocery shopping, purchasing food (not groceries), and eating time. The FSS includes an eighteen-item questionnaire that classifies respondents' level of food security as: food secure, marginal food insecurity, food insecurity, and very low food security.

Both the ATUS and FSS draw a subsample from the CPS so records can be linked across surveys. By combining the ATUS and FSS subsamples, we identify specific time-use activities of households along with their level of FI. Further, the CPS provides an extensive list of socio-demographic variables. Because of the timing of the surveys, the FSS surveys for households in

year t are matched with ATUS surveys in year t + 1. To focus on household decision makers, the matched sample includes respondents who identify as a household head or spouse of a household head. In Table 1, we see there are anywhere from 9 – 14 thousand ATUS survey households each year and 89 – 121 thousand FSS survey households each year. Roughly 2 – 3 thousand households are in both surveys each period for a total sample of 47,135 matched households

There are two key challenges with the ATUS data. First, the data only report time use for the survey respondent, but no other members of the households. In the case of married couples, spousal time use is likely to be a significant factor to consider. Following a similar approach to You and Davis (2019) we use observed survey responses to impute time use behavior or non-survey respondent spouses. First, we estimate the probability of person *i* engaging in some activity *j* on day *d*, using the data for the respondents *r* such that we obtain: $Pr^r(t_{ijd} > 0|X)$, where *t* is time in the activity and *X* are covariates. Then we predict non-zero time spent on activities by survey respondents for each day: $E^r(t_{ijd}|t_{ijd} > 0, X)$. Importantly both Pr^r and E^r are gender specific. Then using these estimates we calculate spousal time use as: $E^s(t_{ijd}|X) = Pr^r(t_{ijd} > 0|X) \times E^r(t_{ijd}|t_{ijd} > 0, X)$, where *s* is the unobserved spouse of the same gender as the observed survey respondent. We sum the calculations for each day of the week to obtain 1 week of time use activities for each married household.

The second concern is that both married and single households only report time use for 1 day of the week. As such, we are not clear if zero time reported indicates that the survey respondent doesn't do the activity at all or if the survey respondent didn't happen to do the activity on the day they were surveyed. An example is grocery shopping where most people do some grocery shopping, but not necessarily every day. Again, we use observed household time use of survey respondents to impute time use of the other 6 days of the week for all households.

We do this separately for married and single households. Specifically, imputed time use by day is calculated as: $E^r(t_{ijd}|X) = Pr^r(t_{ijd} > 0|X) \times E^r(t_{ijd}|t_{ijd} > 0, X)$. This results in 6 predictions for the unobserved days of the week. We then sum the 1 observed day of the week with the predicted 6 other days of the week.

Objective 1 relies on the FSS and ATUS data separately to estimate equation (1) and the matched FSS and ATUS data to estimate equation (2). Objectives 2 and 3 rely solely on the matched data sets. Both the FSS and ATUS are designed to be representative of the US population. Accordingly, we weight these samples. The matched data set does not have prescribed weight to make the data representative. For our analysis in Objective 1, we use an unweighted sample and a weighted sample, using the FSS weights since the dependent variable is the food insecurity indicator. Objectives 2 and 3 use the unweighted matched data.

Given that only a fraction of the FSS is matched to the ATUS and that the matched sample is not constructed to be representative of the U.S. population, we compare key demographic variables across the samples to determine the generalizability of our results. First, we compare all 3 data sets to, by marital status, across the entire sample (age 20 – 85+). The FSS and ATUS data are based on the household member that responds to the survey. The matched sample is based on the household head who responded to *both* the ATUS and FSS surveys. The share of food insecure households is similar between the FSS and matched sample for both married and single households (Table 2).[3] The matched single households are older than both the FSS and ATUS samples and have smaller family sizes. The matched households also tend to

[3] The CPS ranks households as food secure, low food secure, and very low food secure. We categorize all households who are not food secure as food insecure to create a binary indicator.

have a higher share of households with an advanced degree and the single matched households tend to be less likely to be employed. Finally, the time use variables in the ATUS and matched samples are relatively similar.

Results

Objective 1

Food Security Supplement Data

We estimate equation (1) with food insecurity as the dependent variable using a logit specification, controlling for state and year fixed effects and age cohorts. We then plot the predicted food insecurity for each age cohort (Figure 1). The cohorts on the x-axis begin at age 20 – 25 for cohort 1 and increase at 5-year increments to age 85+ at cohort 13. The red line indicates roughly the time of retirement eligibility for many households. As can be seen (top panel), the probability of food insecurity decreases over each age cohort at a steady rate. Further, the confidence intervals suggest the decline is statistically different across cohorts. While this general trend has been seen in previous work (Ziliak and Gundersen 2018) this provides a greater contrast over time and across household types. Comparing married and single households (bottom panel), we see that the early decline is driven largely by married households, suggesting some benefits to food security of marriage. Single households grow in their food insecurity from age 20 until cohort 5 (age 40 – 45) and then become less food insecure over time. Importantly, food insecurity does not seem to be driven by retirement eligibility.

American Time Use Survey Data

We then estimate equation (1) with our food production variables as the dependent variable using ordinary least squares and plotting the predicted weekly time use for each activity in minutes. Time spent on meal preparation (Figure 2, top left panel) reveals households peak in their meal prep in their mid 30's and again after retirement. Importantly, the time spent in meal prep declines significantly for the 85+ cohort, perhaps an indication of increasing physical challenges. When we divide the sample into married (bottom left panel) and single households (bottom right panel), we see that both groups increase in their meal preparation time as they head into retirement and beyond. This trend could indicate that increased meal preparation results in greater food security as an investment strategy or that it is required to maintain food security as households get older. More importantly, this shows that elderly households are spending more time to produce food, which could be risky if meal prep is an integral determinant of household food security. That is, if households are dependent on meal prep for food security then suddenly become less capable of meal prep, this could have an impact on their food security. These data also show that after splitting households into married and unmarried groups, we end up with very different implications.

We see that across all households, time spent eating increases as well, but then declines significantly for the last cohort (Figure 3). Again, this decline in eating time is no longer present when we disaggregate the data into married and single households. For both single and married households, we see a steady increase in time spent eating as households get older. This could be that households have limited physical capabilities and require more time. Alternatively, it could also indicate greater access to meals. That is, households that miss a meal will spend less time eating on average. In either case, this suggests an important correlation between eating and food security.

Time spent grocery shopping increases around retirement age, however the confidence intervals are larger than time spent on other activities (Figure 4). This is likely because the imputation for grocery shopping results in a large number of zeros due to the low tendency for daily shopping trips. When we disaggregate the data by household type, we see that grocery shopping increases primarily in single households. This is a similar result to Aguiar and Hurst (2008) who find that older households spend more time shopping after retirement, while looking exclusively at male household heads. Again, this finding could indicate the need for greater shopping to maintain food security, which can be a potential risk factor.

Finally, we find that time spent on food purchases (not grocery shopping) increases slightly over time but has large variation within cohorts (Figure 5). This does not indicate that such food purchases do not impact household food security. However, with such variance, it may be unlikely to be a significant factor.

Matched Data

We next examine the matched data, i.e. households that were in both the FSS and ATUS samples. With respect to meal preparation time, we see similar trends in both the single and married households as we did with the ATUS sample (Figure 6, top left and bottom left panels). Specifically, the time spent preparing meals increases steadily for singles and increases after retirement for married households. We further disaggregate these data by food secure and food insecure households to examine what role meal preparation might have in maintaining food security (Top right and bottom right panels). For single households, meal preparation takes up a significantly larger amount of time for food insecure households in almost every age group. This could represent the fact that lower income households must substitute away from buying meals

(i.e. more expensive prepared meals) to preparing their own food. For married households, there is less evidence of food insecure households spending more time on meal prep, particularly once these households reach retirement age.

The trends for eating time for single and married households in the matched sample are also similar to the ATUS data (Figure 7, top left and bottom left panels). Again, time spent eating increases for singles and married households. After disaggregating the data into food secure and insecure households, we see that eating time is significantly larger for food secure households, both single and married (top right and bottom right panels). As previously discussed, this may indicate access to adequate nutrition, i.e. not having to skip meals.

Time spent grocery shopping is noisier in the matched sample than the ATUS sample (Figure 8, top left and bottom left panels). In particular, there are no discernable trends over age cohorts, for either single or married households. Further, time spent grocery shopping is not statistically different for food secure and food insecure households (top right and bottom right panels). Similar to the ATUS data, time spent on non-grocery food purchases reveals no trends over age cohorts or between food insecure and food secure households (Figure 9).

Time use and Food Security

We estimate equation (2) using a logit model to examine the relationship of time use and food security. We only include households where the head is 55 years and older. There are two measures of food security in the FSS data that are relevant to our study: household food security and adult food security. The latter, as defined, focuses strictly on the food security of adults in the household, which may be a more relevant comparison for elderly households. We estimate

models using both measures. As previously mentioned, we do not have weights designed for the matched data set, so we estimate models using the FSS weights and without weights as well.

In our specification, we include covariates that might affect food security including: household food expenditures, home ownership, educational attainment (of survey respondent), metro/nonmetro, number of children and family size. In addition to state and year fixed effects we control for whether the time use survey was completed on a weekday or holiday. We calculate the marginal effects of each variable and report all our specifications in Table 3.

Across the different estimates, two measures of wealth and income, employment status and home ownership, are negatively associated with food insecurity, as might be expected. At the same time for single households, children are associated with higher food insecurity, in certain specifications.

When we look at the time use variables, we see that meal preparation is associated with higher food insecurity, but primarily in single households. This is consistent with what we see in Figure 6 as well. This results suggests a 1 unit increase in meal prep time for single households (weighted model with household food security) results in 0.03% increase in food insecurity. Put another way, 10 hours of meal preparation per week is associated with a 0.3% increase in food insecurity. Eating time is negatively associated with food insecurity across all models. Looking at the same weighed model with household food security, a 1 unit increase in meal prep is also associated with a 0.03% decrease in food security. Importantly, these results are only correlations. It's still not clear if such time use explains differences in food security across elderly households.

Objective 2

We start by estimating linear probability models for households with heads 70 and above and between 55 and 70. Our key variables of interest are those related to the amount of time spent on food-related activities. From the linear probability models, it appears that time spent eating is associated with decreased food insecurity for the above 70 group and that this relationship decreases as the household head ages. We do not detect any other statistically significant associations between time spent on food-related activities and food insecurity. This may be due to the fact that the MS understates or misrepresents changes in time use across ages as discussed above. In general, higher incomes were associated with lower probability of food insecurity; this trend begins at lower income levels for the above 70 versus the below 70 households. Education, being married, and identifying as Hispanic are also negatively associated with food insecurity for both groups. Age is positively associated with food insecurity for the below 70 and negatively associated with it for the above 70, although it is not statistically significant for either group. Identifying as Black is associated with increased food insecurity for both groups. Participating in food-assistance programs is positively associated with food insecurity for both groups, as expected. The magnitude of the association is larger for the younger group.

Estimates and standard errors of the decomposition into the aggregate composition and structure effects are presented in Table 4. There is about a 3.74 percent gap in the probability of food insecurity between households with heads above and below 70. More than 80% of this gap is explained by the differences in levels of covariates, that is the composition effect, which is statistically significant at the 1 percent level. The aggregate structure effect measuring differences between the relationships of the covariates with food insecurity is not statistically significant.

Table 5 presents the detailed decompositions of the composition, structure, and the simultaneous association of differences in both covariate levels and their relationships with food insecurity. Importantly, neither time, the returns to time, or the same for time interacted with age have estimates that are statistically significant. Therefore, we do not detect any contribution of time or time use to the gap in the probability of food insecurity between these two groups. This may be due to the MS displaying a muted trend in food-related time use across age. Differences in the levels of education, percent of households identifying as Black, poverty, and marital status all contribute to the gap in food insecurity. Differences in the levels of income contribute to this gap as well, although they are mitigated by the structure effect. Likewise, participation in food assistance programs contributes to the gap, but is mitigated by the structure effect. An exception is participation in school meals: this appears to mitigate the gap in food insecurity between the two groups. Larger families also appear to mitigate the gap.

Conclusions

Using nationally representative data, we observe several patterns across older households. First, as age cohorts get older, we see a declining trend in the rate of food insecurity. At the same time, we see increases in how much time these households spend in meal preparation and eating time. We also observe that these trends vary by household structure (married vs. single). Using a matched data set, we observe a relationship between meal preparation and eating time and food security status. Further, time use appears to vary based on a household's food security status.

Exploring the link between food production activities and food security further, we decompose the effect of time use on food security. Comparing elderly households above and below 70, we find no difference in how time use effects food security.

Importantly, our analysis faces several challenges that may limit our results. First, our time use data only includes one household member over a 1-day period. Imputing the other days of the week or time use of other household members generates measurement error which may bias or results. Additionally, using our matched sample, we lose a large number of observations. Further, it is not clear what bias our matching process generates. Finally, and most significantly, our analysis of CPS data only includes elderly households that live independently and do not include those in assisted living or that receive consistent home care. As such, the group we evaluate may be more resilient and less likely to face food insecurity. Future research efforts will benefit from investigating these limitations.

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Tables

Table 1. Data Sources

	ATUS yearly		FSS yearly		Merged ATUS and FSS		Merged ATUS + FSS + weat	
Year	**Freq**	**%**	**Freq**	**%**	**Freq**	**%**	**Freq**	**%**
2003	-	-	118,684	6.58	3,335	7.08	1,392	6.78
2004	13,973	7.36	121,229	6.56	3,436	7.29	1,373	6.69
2005	13,038	6.87	119,238	6.43	3,310	7.02	1,505	7.33
2006	12,943	6.82	115,776	6.39	2,972	6.31	1,331	6.48
2007	12,248	6.45	113,216	6.31	3,174	6.73	1,426	6.95
2008	12,723	6.7	109,364	6.19	3,344	7.09	1,489	7.25
2009	13,133	6.92	113,358	6.34	3,449	7.32	1,574	7.67
2010	13,260	6.98	111,616	6.34	3,013	6.39	1,367	6.66
2011	12,479	6.57	108,506	6.27	3,045	6.46	1,386	6.75
2012	12,443	6.55	108,620	6.26	2,859	6.07	1,311	6.39
2013	11,385	6	103,553	6.19	2,883	6.12	1,335	6.5
2014	11,592	6.11	106,342	6.27	2,741	5.82	1,283	6.25
2015	10,905	5.74	97,416	6.11	2,520	5.35	1,067	5.2
2016	10,493	5.53	100,124	6.09	2,554	5.42	1,092	5.32
2017	10,223	5.38	90,083	5.95	2,234	4.74	949	4.62
2018	9,593	5.05	89,665	5.71	2,266	4.81	648	3.16
2019	9,435	4.97	-	-	-	-	-	-
Total	189,866	100	1,726,790	100	47,135	100	20,528	100

Table 2. Summary Statistics

Variables	FSS Married Households	FSS Single Households	ATUS Married Households	ATUS Single Households	Matched Married Households	Matched Single Households
Food Insecure	0.083	0.179	--	--	0.078	0.169
age	50.084	28.869	49.998	39.554	48.653	53.280
family size	3.201	3.249	3.210	2.781	3.265	1.535
HS Grad	0.287	0.185	0.297	0.285	0.230	0.276
College Grad	0.219	0.092	0.224	0.142	0.254	0.186
Advanced Degree	0.132	0.040	0.140	0.068	0.165	0.113
Inc unknown	0.081	0.076	0.056	0.054	0.078	0.072
<$24,999	0.113	0.263	0.111	0.283	0.099	0.384
$24,999-$59,999	0.301	0.323	0.308	0.339	0.286	0.350
$59,999-$99,999	0.250	0.182	0.263	0.181	0.263	0.129
>$100,000	0.255	0.155	0.262	0.143	0.274	0.065
Employed	0.652	0.354	0.668	0.585	0.678	0.559
Metro	0.839	0.858	0.817	0.845	0.851	0.862
Meal Prep (weekly minutes)			501.103	170.936	513.508	205.389
Groc Shop (weekly minutes)			7.099	4.836	7.918	6.852
Non Groc Shop (weekly minutes)			1.227	1.129	1.330	1.257
Eat time (weekly minutes)			834.106	294.091	840.341	366.450
Observations	**712,175**	**986,388**	**91,992**	**97,874**	**11,470**	**17,491**

Table 3. Estimated relationship of time use activities and food insecurity

	Household Food Security					
	Weighted Models			Unweighted Models		
VARIABLES	All Households	Single Households	Married Households	All Households	Single Households	Married Households
employed	-0.0535***	-0.0742***	-0.0339***	-0.0486***	-0.0690***	-0.0332***
	(0.00543)	(0.00832)	(0.00730)	(0.00634)	(0.00820)	(0.00639)
own home	-0.0712***	-0.0851***	-0.0582***	-0.0683***	-0.0833***	-0.0564***
	(0.00531)	(0.00763)	(0.00819)	(0.00618)	(0.00900)	(0.0102)
no. of children	0.00918	0.0344**	0.000463	0.00567	0.0302**	-0.00226
	(0.00720)	(0.0137)	(0.00668)	(0.00710)	(0.0133)	(0.00416)
meal prep	9.66e-05***	0.000301***	1.36e-05	9.74e-05***	0.000277***	1.28e-05
	(1.80e-05)	(5.23e-05)	(1.49e-05)	(9.24e-06)	(8.63e-05)	(9.70e-06)
groc shop	-0.000132	-0.000237	-4.61e-05	-9.02e-05	-0.000134	-7.85e-05
	(0.000116)	(0.000189)	(0.000125)	(0.000111)	(0.000157)	(0.000136)
non-groc shop	4.37e-06	-0.000171	0.000558	-7.25e-05	-0.000182	0.000254
	(0.000679)	(0.00112)	(0.000812)	(0.000434)	(0.00117)	(0.000546)
eat time	-0.000205***	-0.000370***	-0.000290***	-0.000215***	-0.000439***	-0.000319***
	(1.68e-05)	(9.67e-05)	(3.82e-05)	(1.77e-05)	(7.84e-05)	(3.28e-05)
Observations	1,726,756	1,726,751	1,726,225	16,258	8,793	6,895

	Adult Food Security					
	Weighted Models			Unweighted Models		
VARIABLES	All Households	Single Households	Married Households	All Households	Single Households	Married Households
employed	-0.0881***	-0.101***	-0.0730***	-0.0835***	-0.0983***	-0.0712***
	(0.00755)	(0.0114)	(0.0104)	(0.0114)	(0.0198)	(0.00772)
own home	-0.115***	-0.120***	-0.108***	-0.115***	-0.119***	-0.113***
	(0.00732)	(0.00957)	(0.0124)	(0.0115)	(0.0137)	(0.0185)
no. of children	-0.00231	0.0348*	-0.00882	-0.00992	0.0272	-0.0161
	(0.0106)	(0.0193)	(0.0108)	(0.0145)	(0.0180)	(0.0128)
meal prep	0.000110***	0.000501***	6.83e-06	9.38e-05***	0.000444***	-4.27e-06
	(2.29e-05)	(7.50e-05)	(2.22e-05)	(2.30e-05)	(1.00e-04)	(1.46e-05)
groc shop	-0.000241	-0.000514**	-4.16e-05	-0.000191	-0.000413	-7.01e-05
	(0.000150)	(0.000223)	(0.000183)	(0.000119)	(0.000357)	(0.000113)
non-groc shop	-0.000211	0.000558	-0.000590	-0.000243	0.000567	-0.000263
	(0.000846)	(0.00133)	(0.00103)	(0.000565)	(0.00108)	(0.000796)
eat time	-0.000266***	-0.000580***	-0.000400***	-0.000272***	-0.000638***	-0.000406***
	(2.04e-05)	(0.000110)	(5.12e-05)	(3.32e-05)	(0.000141)	(3.45e-05)
Observations	1,725,437	1,726,184	1,726,024	14,939	8,226	6,694

Standard errors in parentheses

*** p<0.01, ** p<0.05, * p<0.1

Table 4. Overall Decomposition of Food Security Differences between Elderly Households Above/Below 70

Variable	**Estimates**
70 years old and above	0.0601 ***
	(0.0007)
Below 70 years old	0.0975 ***
	(0.0007)
Total difference	-0.0374 ***
	(0.0009)
Composition effect	-0.0304 ***
	(0.0087)
Structural effect	0.0124
	(0.0081)
Interaction	-0.0194
	(0.0118)

NB: *** indicates statistical significance at the 1%; ** at the 5%; and * at the 10% level. Standard errors in parentheses.

Table 5. Detailed Decomposition of Food Security Differences between Elderly Households Above/Below 70

Variable	Composition Effect		Structural Effect		Interaction	
High school diploma	0.0004	***	0.0033		-0.0001	
	(0.0001)		(0.0020)		(0.0000)	
Bachelor's degree	0.0026	***	0.0028	***	-0.0007	***
	(0.0002)		(0.0007)		(0.0002)	
Advanced degree	0.0017	***	0.0020	***	-0.0005	***
	(0.0001)		(0.0005)		(0.0001)	
Age	0.0530		-0.4415		-0.1134	
	(0.0697)		(0.3873)		(0.0995)	
Age, squared	-0.0948		0.1995		0.1153	
	(0.0781)		(0.1738)		(0.1005)	
Identify as Black	0.0000	**	0.0000		0.0000	
	(0.0000)		(0.0001)		(0.0000)	
Identify as Hispanic	-0.0001	***	0.0001		0.0000	
	(0.0000)		(0.0004)		(0.0001)	
Received meals delivered to home during past 30 days	0.0022	***	-0.0005	***	-0.0010	***
	(0.0002)		(0.0001)		(0.0002)	
Ate a prepared meal at community center during past 30 days	0.0030	***	-0.0008	***	-0.0017	***
	(0.0002)		(0.0001)		(0.0003)	
Children received a free/reduced cost lunch or breakfast at school during past 30 days	-0.0021	***	-0.0003		0.0002	
	(0.0001)		(0.0004)		(0.0002)	
Female	0.0002	***	-0.0027	***	-0.0003	***
	(0.0001)		(0.0010)		(0.0001)	
Family size	-0.0019	***	0.0579	***	-0.0085	***
	(0.0007)		(0.0085)		(0.0013)	
Family size, squared	-0.0006		-0.0238	***	0.0062	***
	(0.0005)		(0.0035)		(0.0009)	
Below 185% of the poverty threshold * family size	-0.0011	***	0.0129	***	0.0017	***

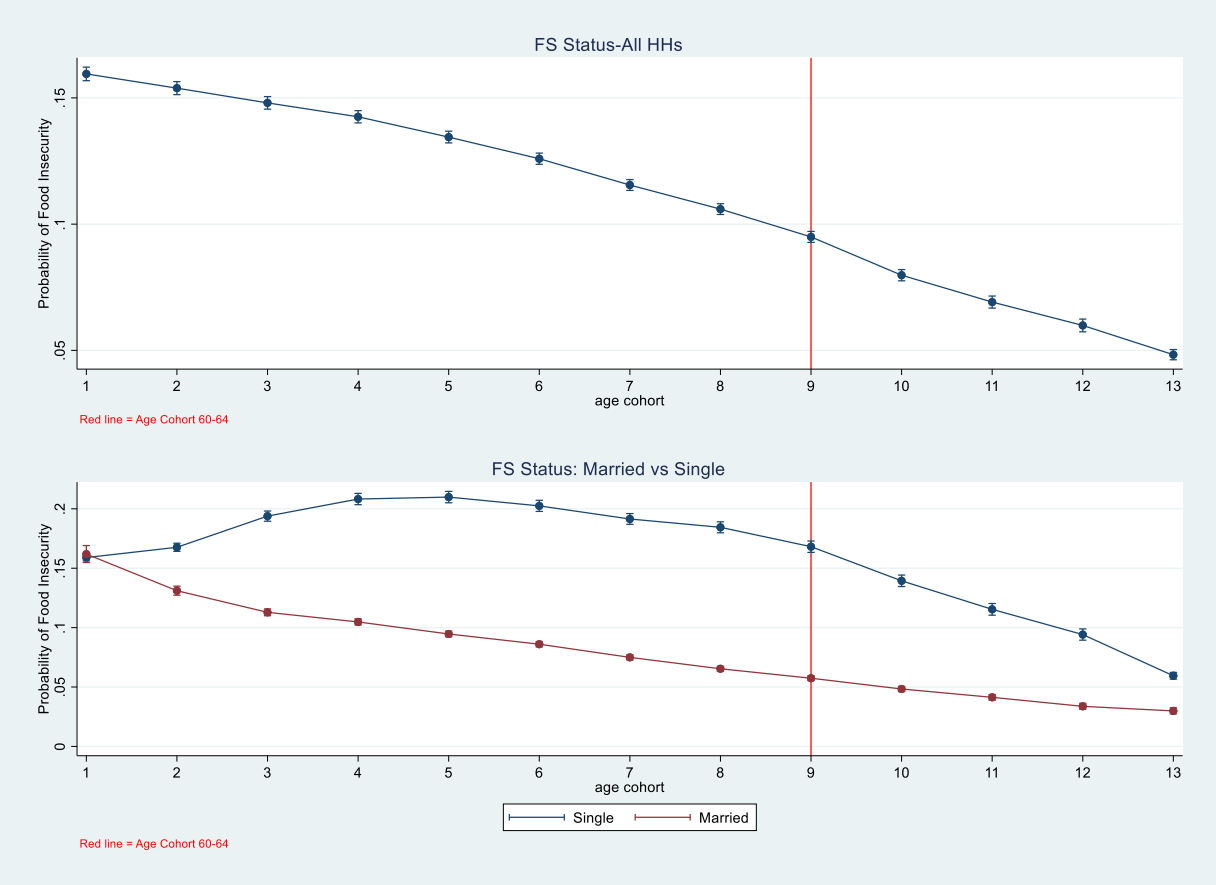
Variable	Composition Effect		Structural Effect		Interaction	
	(0.0001)		(0.0014)		(0.0002)	
Below 185% of the poverty threshold	0.0111	***	-0.0222	***	-0.0092	***
	(0.0005)		(0.0015)		(0.0006)	
Married	0.0028	***	-0.0108	***	0.0023	***
	(0.0004)		(0.0035)		(0.0007)	
Divorced	-0.0022	***	-0.0013		0.0006	
	(0.0003)		(0.0010)		(0.0005)	
Widowed	0.0036	***	-0.0014	***	-0.0050	***
	(0.0010)		(0.0004)		(0.0015)	
Veteran	0.0000		0.0001		0.0000	
	(0.0000)		(0.0004)		(0.0000)	
Received SNAP in past year	-0.0044	***	-0.0037	***	0.0008	***
	(0.0003)		(0.0007)		(0.0002)	
Value of SNAP monthly benefits	0.0007	***	0.0013	**	-0.0005	**
	(0.0001)		(0.0006)		(0.0003)	
Child (under 18) present in household	-0.0005	***	0.0002		-0.0002	
	(0.0002)		(0.0007)		(0.0006)	
Retired	-0.0164	***	0.0009		0.0017	
	(0.0008)		(0.0007)		(0.0014)	
Household income between $7,500 & $12,499	0.0017	***	-0.0014	***	-0.0010	***
	(0.0002)		(0.0003)		(0.0002)	
Household income between $12,500 & $19,999	0.0020	***	-0.0014	***	-0.0011	***
	(0.0002)		(0.0003)		(0.0003)	
Household income between $20,000 & $49,999	0.0005	***	-0.0008	***	-0.0006	***
	(0.0001)		(0.0003)		(0.0002)	
Household income between $50,000 & $74,999	0.0010	***	0.0026	***	-0.0006	***
	(0.0001)		(0.0004)		(0.0001)	
Household income $75,000 and above	0.0070	***	0.0078	***	-0.0040	***

Variable	Composition Effect	Structural Effect	Interaction
	(0.0002)	(0.0006)	(0.0003)
Time spent preparing meals	-0.0002	0.0036	-0.0003
	(0.0002)	(0.0044)	(0.0004)
Time spent on non-grocery shopping	0.0002	0.0005	-0.0002
	(0.0003)	(0.0005)	(0.0003)
Time spent on grocery shopping	0.0001	0.0003	-0.0001
	(0.0001)	(0.0005)	(0.0002)
Time spent eating	0.0006	-0.0043	0.0007
	(0.0004)	(0.0044)	(0.0007)
Time spent preparing meals * age	-0.0004	-0.0025	-0.0003
	(0.0003)	(0.0038)	(0.0005)
Time spent on non-grocery shopping * age	-0.0002	-0.0005	0.0002
	(0.0002)	(0.0005)	(0.0002)
Time spent on grocery shopping * age	0.0000	-0.0003	0.0000
	(0.0001)	(0.0005)	(0.0001)
Time spent eating * age	0.0001	0.0028	0.0001
	(0.0001)	(0.0038)	(0.0001)

NB: *** indicates statistical significance at the 1%; ** at the 5%; and * at the 10% level. Standard errors in parentheses.

Figures

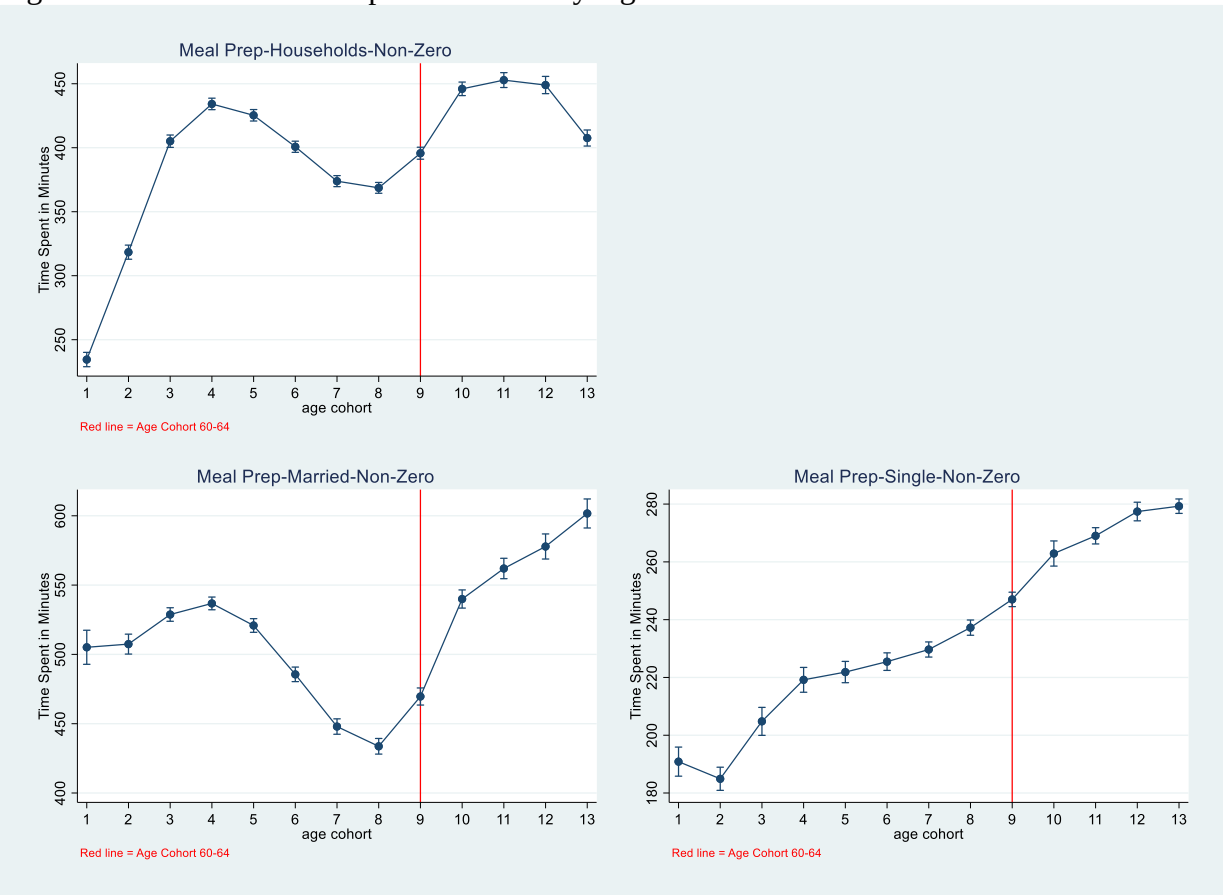
Figure 1. Predicted Food Security Status by Age Cohort.



Note: The age cohorts on the x-axis represent 5 year increments starting at age 20 – 24 (cohort 1) and ending with cohort 85+ (cohort 13).

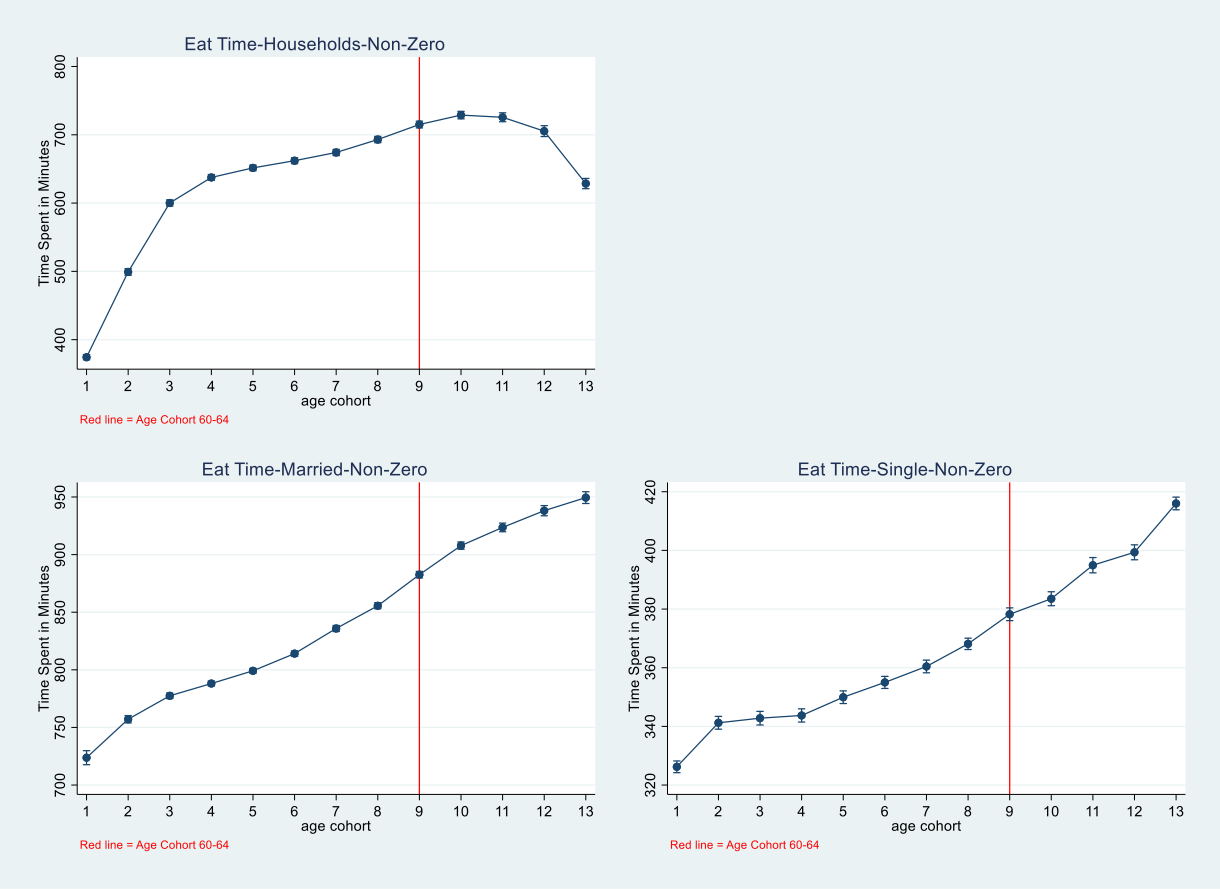
Source: Current Population Survey, Food Security Supplement

Figure 2. Predicted Meal Preparation Time by Age Cohort.



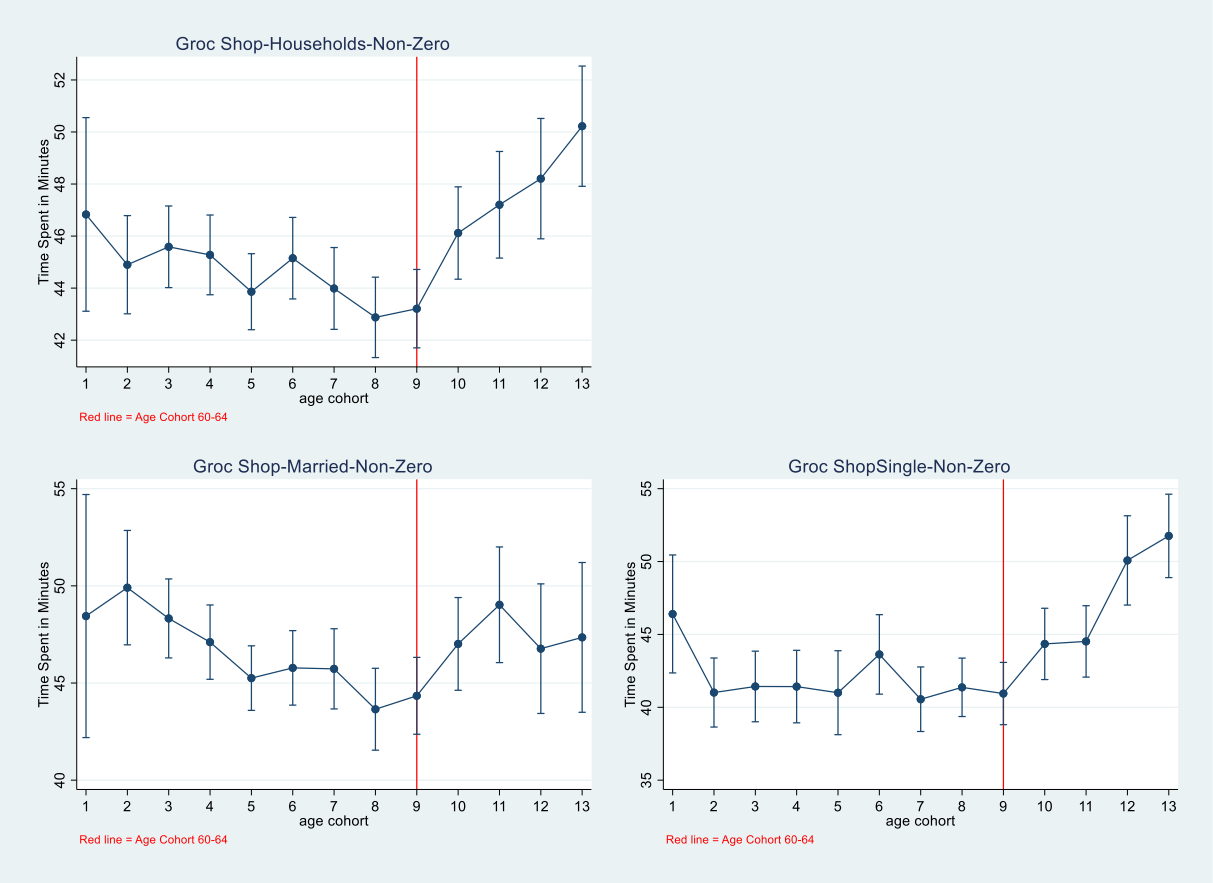
Note: The age cohorts on the x-axis represent 5 year increments starting at age 20 – 24 (cohort 1) and ending with cohort 85+ (cohort 13).
Source: Current Population Survey, American Time Use Survey

Figure 3. Predicted Eating Time by Age Cohort.



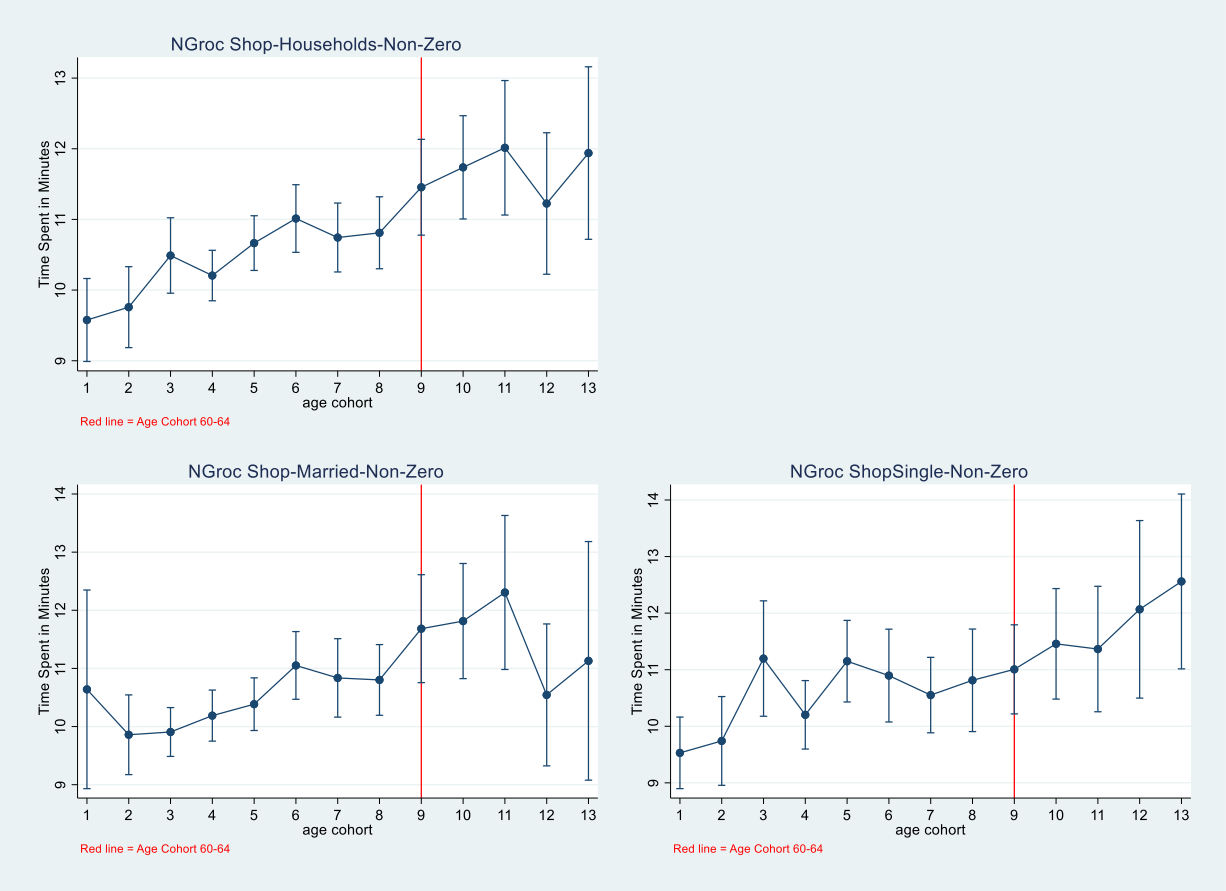
Note: The age cohorts on the x-axis represent 5 year increments starting at age 20 – 24 (cohort 1) and ending with cohort 85+ (cohort 13).
Source: Current Population Survey, American Time Use Survey

Figure 4. Predicted Grocery Shopping by Age Cohort.



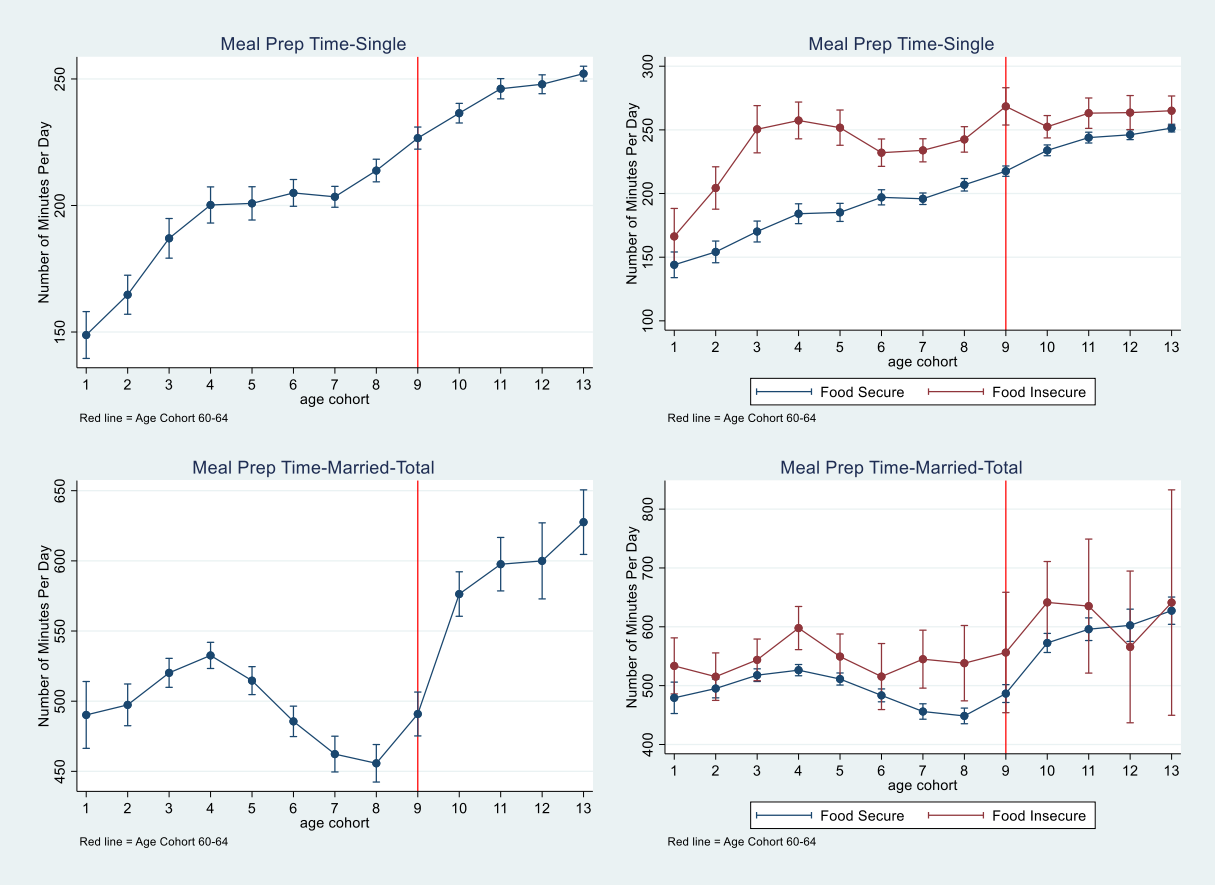
Note: The age cohorts on the x-axis represent 5 year increments starting at age 20 – 24 (cohort 1) and ending with cohort 85+ (cohort 13).
Source: Current Population Survey, American Time Use Survey

Figure 5. Predicted Food Purchases (not groceries) by Age Cohort.



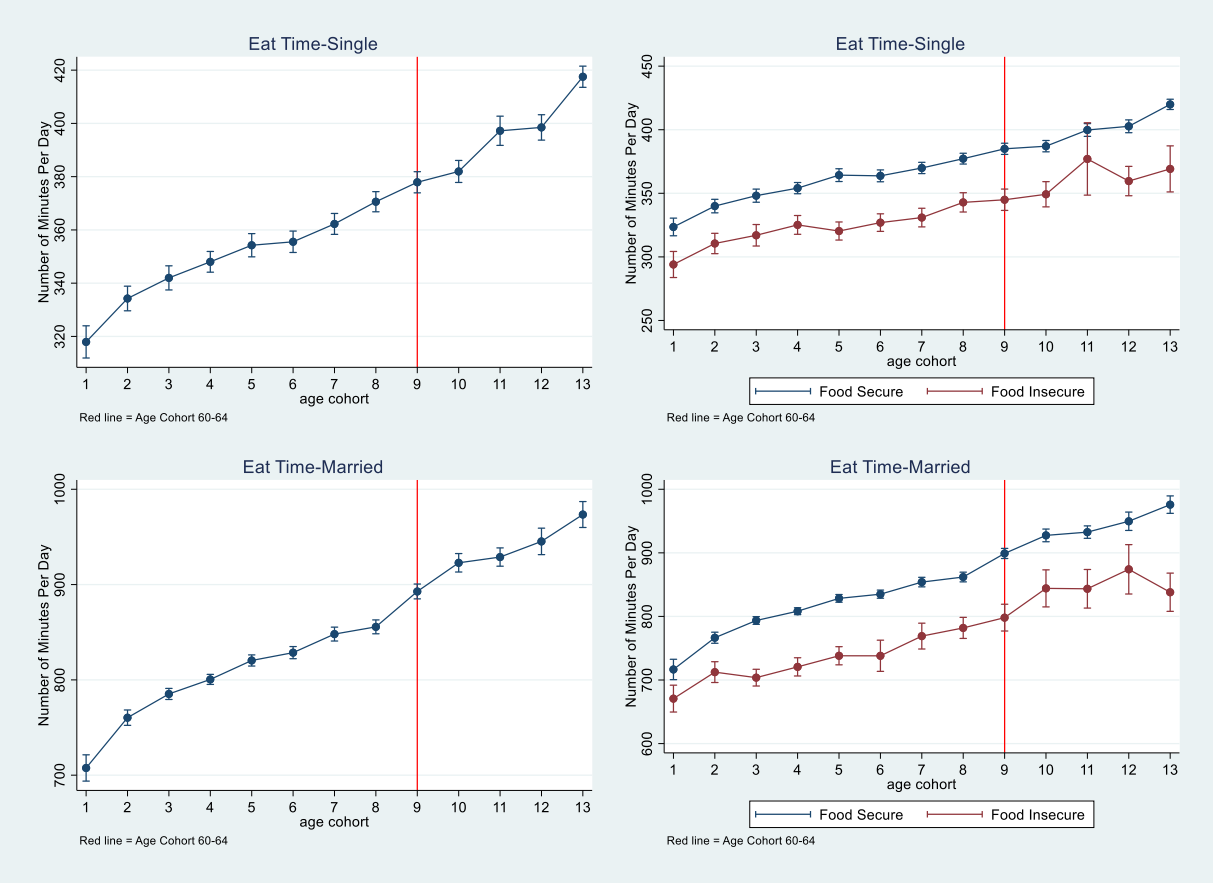
Note: The age cohorts on the x-axis represent 5 year increments starting at age 20 – 24 (cohort 1) and ending with cohort 85+ (cohort 13).
Source: Current Population Survey, American Time Use Survey

Figure 6. Predicted Meal Preparation Time by Age Cohort and Food Security Status.



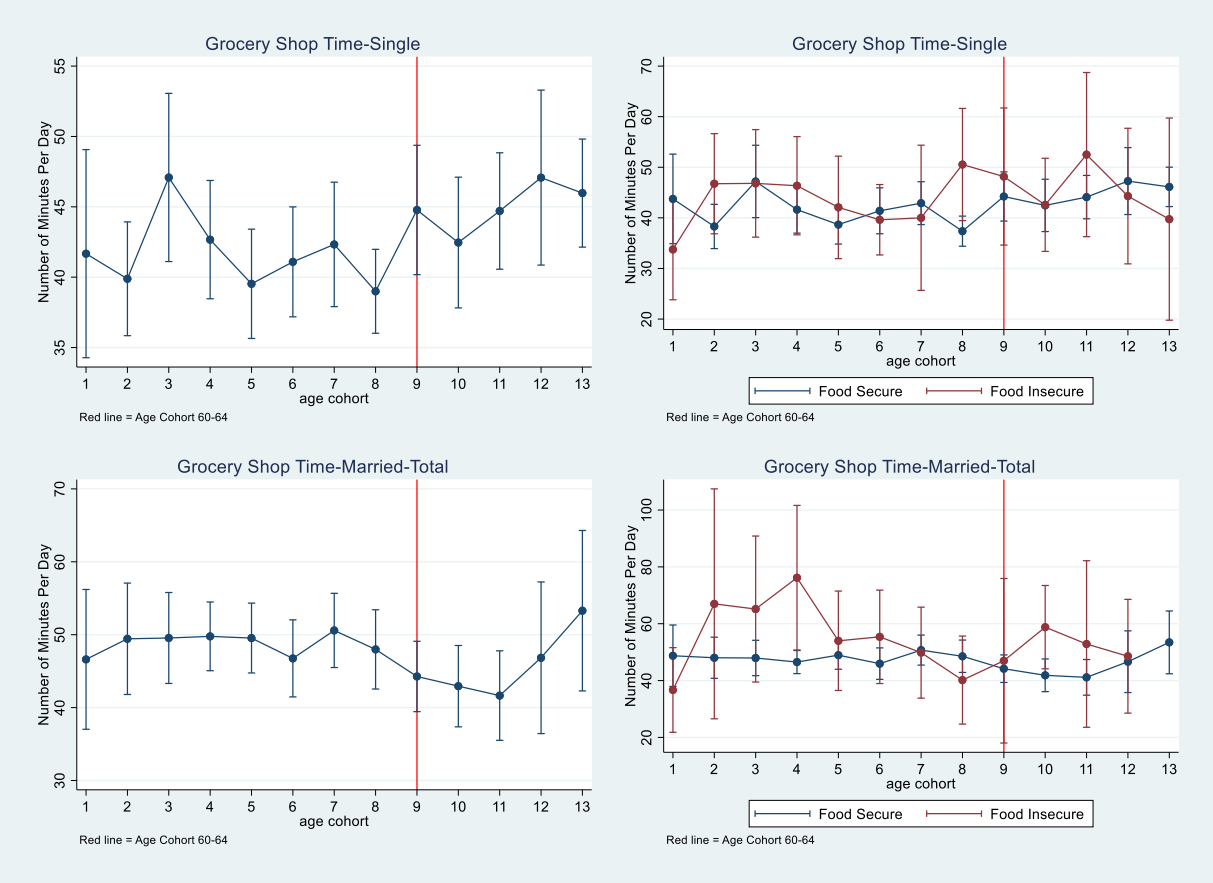
Note: The age cohorts on the x-axis represent 5 year increments starting at age 20 – 24 (cohort 1) and ending with cohort 85+ (cohort 13).
Source: Own matching of American Time Use Survey and Food Security Supplement

Figure 7. Predicted Eating Time by Age Cohort and Food Security Status.



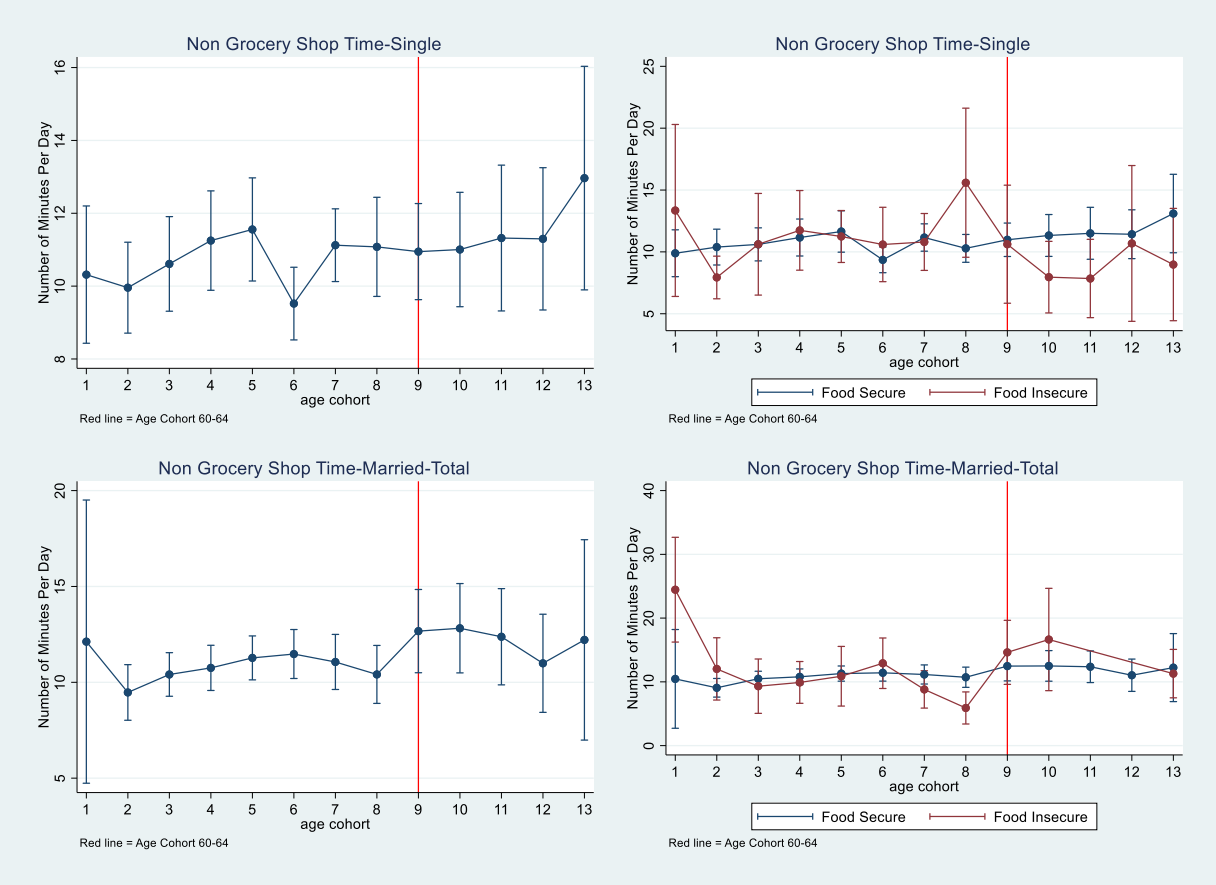
Note: The age cohorts on the x-axis represent 5 year increments starting at age 20 – 24 (cohort 1) and ending with cohort 85+ (cohort 13).
Source: Own matching of American Time Use Survey and Food Security Supplement

Figure 8. Predicted Grocery Shopping Time by Age Cohort and Food Security Status.



Note: The age cohorts on the x-axis represent 5 year increments starting at age 20 – 24 (cohort 1) and ending with cohort 85+ (cohort 13).
Source: Own matching of American Time Use Survey and Food Security Supplement

Figure 9. Predicted Grocery Shopping Time by Age Cohort and Food Security Status.



Note: The age cohorts on the x-axis represent 5 year increments starting at age 20 – 24 (cohort 1) and ending with cohort 85+ (cohort 13).
Source: Own matching of American Time Use Survey and Food Security Supplement