Published in final edited form as:

Womens Health Issues. 2019 ; 29(1): 23–30. doi:10.1016/j.whi.2018.10.002.

The Role of Time-Use Behaviors in the Risk of Obesity among Low-Income Mothers

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Abstract

Objectives—Childrearing responsibilities create additional demands on women’s time and effort, especially in low-income families. We explore whether childrearing demands and differences in time use increase the risk of overweight and obesity for women in different income brackets.

Methods—We use data for women ages 18–55 from the 2006–2008 and 2014–2015 American Time Use Surveys ($N=17,914$). We predict whether women engage in particular activities using logistic regression and, among those who do particular activities, we predict the minutes spent in various activities using ordinary least squares models. We also predict women’s risk of overweight or obesity using logistic regression. All models examine conditional relationships between income level and motherhood status.

Results—Replicating prior research, we find a greater risk of overweight and obesity for mothers with low ($OR=1.66$, $p<.001$) and sub-poverty ($OR=1.93$, $p<.001$) incomes compared to mothers with moderate/upper incomes and all childfree women. Motherhood and income status jointly predict women’s time use, but including these time-use behaviors in models of overweight and obesity does not attenuate the significantly higher risks for mothers with low and sub-poverty incomes.

Conclusions—Mothers experiencing economic hardship are at greater risk of overweight and obesity relative to other women. Additional research is warranted, however, because differences in time use do not explain this important health disparity.

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The rise in adult obesity is among the most well-documented population health trends of the 20th century. Among American women, roughly 36% have obesity and another 28% have overweight (Flegal, Carroll, Kit, & Ogden, 2012). This is concerning, as obesity is associated with cardiovascular disease (Lavie, Milani, & Ventura, 2009), certain cancers (Renehan, Tyson, Egger, Heller, & Zwahlen, 2008), and reduced life expectancy—especially for women (Masters et al., 2013).

Prior work identifies multiple behavioral predictors of women's risk for overweight and obesity, and the prevalence of these behaviors has also shifted over time. First, women's engagement in physical activity has declined, while time in sedentary behavior has increased (Archer et al., 2013a; 2013b). Further, the consumption of prepared meals and food-away-from-home has increased (Smith, Ng, & Popkin, 2013), which likely raised women's risk for obesity because such foods typically contain more calories, sugar, and sodium than homemade meals (Wolfson & Bleich, 2015).

These historical shifts in behavior are embedded within larger macroeconomic shifts. Since the late 1970s, women have increased their paid work hours (Spain & Bianchi, 1996), and prior research demonstrates the importance of rising employment for declines in women's housework (Bianchi, Milkie, Sayer, & Robinson, 2000). Reductions in meal preparation are also linked to women's employment given increased time constraints (Cawley & Liu, 2012). These simultaneous historical trends reinforce the importance of assessing the social factors that place women "at risk for health risk behaviors" (Glass & McAtee, 2006).

Moen and Chermak's (2005) model of "strategic selection" details how historically- and institutionally-grounded gendered norms create unequal life course opportunities and constraints, which lead to gendered differences in health behaviors and risks. They note that gender is central to systems of resource distribution and socialization, particularly in relation to men's and women's paid work and unpaid family responsibilities. Traditional norms emphasized parenting roles for women's fulfillment (Friedan, 1963) and employment roles for men's. These traditional gender systems, while outdated, continue to shape women's and men's life course trajectories, such that women experience more frequent family-related disruptions to employment (Damaske & Frech, 2016), higher poverty rates (National Women's Law Center, 2015), and more – and more intense – childrearing responsibilities, though this can vary by social class (Clawson & Gerstel, 2014).

Moen and Chermak's (2005) strategic selection model emphasizes women's performance of multiple, interlocking roles that, in turn, create different time and effort demands. A key distinction is whether or not women are caring for children. Traditional gender norms and modern intensive parenting norms (Hays, 1996) stress the importance of mothers prioritizing their children, which creates unique social and economic pressures on mothers.

We speculate that these demands limit mothers' options for managing their health relative to childfree women. Mothers indicate that childcare activities limit their time to eat nutritious meals and exercise (Welch et al., 2009). Indeed, Zick and colleagues (2011) found that the number of children in a woman's care was inversely associated with her minutes of daily exercise, net of socioeconomic status and family structure. Additionally, women report less

sleep as the number of children increases (Burgard & Ailshire, 2013; Zick et al., 2011). Together, these behavioral differences indicate that caring for children may be a risk factor for obesity (Anic et al., 2010; Bjorvatn et al., 2007; Lauderdale et al., 2009).

We build on the strategic selection model by highlighting the importance of stratified economic resources for women's health and health behaviors. Like most preventable conditions, women's risk for obesity is inversely associated with household income (Sanchez-Vaznaugh, Kawachi, Subramanian, Sanchez, & Acevedo-Garcia, 2009). Household income is also correlated with behaviors associated with weight. For example, low income is associated with reduced physical activity and greater sedentary behavior (Rhodes, Mark & Temmel, 2012), greater food insecurity (Sarlo-Lahteenkorva & Lahelma, 2001), and poor diet quality (Beydoun & Wang, 2008).

We hypothesize that caregiving roles and economic austerity intersect to create cumulative health disadvantages among women (Willson, Shuey & Elder, 2007). We argue that the intersection of economic hardship and childrearing responsibilities impacts mothers' health by depleting access to material resources and limiting discretionary time. This view is consistent with findings from Martin and Lippert (2012), who found that mothers experiencing poverty and food insecurity in the Panel Study of Income Dynamics (PSID) were more likely to have overweight or obesity relative to childfree women with sub-poverty incomes, mothers with moderate/upper incomes, and all men. In other words, women's risk for obesity is not a simple function of poverty *or* motherhood, but the combination of the two.

Several behavioral patterns could underlie this risk. First, these patterns may be partially rooted in food management practices. Traditional norms define food management – shopping, storing, and cooking food – as women's work (Monsivais, Aggarwal, & Drewnowski, 2014) and mothers spend more time preparing meals than childfree women (Sayer, 2005). Food management practices become difficult in the face of economic hardship. Qualitative research demonstrates that mothers engage in “shielding” behaviors with their children in response to material hardship: low-income mothers prioritize their children's food security before their own when household food resources are limited. This “managed practice” may include maternal meal skipping or the adoption of energy-dense diets – risk factors for obesity – in order to allocate food options viewed as healthier to children (DeVault, 1991; Stevens, 2010; Wright, Maher, & Tanner, 2015).

To reduce food expenses, low-income households also consume fewer meals away from home versus high-income households (Smith, Ng, & Popkin, 2013). The relationship between food preparation time and weight is unclear. Low-income mothers' greater time spent in meal preparation could provide greater control over the nutritional profile of meals, and meals prepared at home feature smaller portions, fewer calories, and less salt and sugar than restaurant meals (Wolfson & Bleich, 2015). In fact, one time-use study found that women's time in food preparation was negatively associated with body mass (Zick et al., 2011). On the other hand, given the relative costs of “healthy” and “unhealthy” foods today, “budget diets” are typically higher in fat, sodium, and carbohydrates (Drewnowski, 2010), which may expose low-income mothers to energy-dense diets.

Second, differences in physical activity by motherhood and economic standing could generate greater risks for overweight and obesity among mothers with insufficient income. Physically-active lifestyles are often supported through costly gym memberships, personal training, and fitness classes. Even the most spartan exercise regimen requires some equipment, like walking shoes, that may be luxury purchases for women with limited incomes. Given these costs, it is unsurprising that exercise frequency is positively correlated with socioeconomic status (Stringhini et al., 2010). However, exercise also makes claims on one's time, and women frequently report that time pressures interfere with fitness (Welch et al., 2009). Thus, we expect poverty to be negatively associated with exercise – especially among mothers.

In sum, many studies have investigated links between the rise in women's obesity and other historical changes, like women's increasing work hours, changing diets, and declining physical activity. These studies show that poverty and motherhood independently predict health behaviors linked to body weight, but it is unclear whether motherhood and poverty are *jointly* associated with such behaviors. We speculate that mothers with less income face time and financial constraints that interfere with their ability to live healthy, active lives. In turn, these behaviors could partially explain the greater risk for overweight and obesity for mothers with sub-poverty incomes as documented previously (Martin & Lippert, 2012).

To our knowledge, no study has explored the relative contribution of these health behaviors for the observed, conditional relationship between poverty and motherhood for the risk of overweight and obesity. We study these patterns using data from the American Time Use Survey (ATUS) with three main aims. Given our use of a different data set, we first attempt to replicate findings indicating a heightened risk for overweight/obesity among mothers with low incomes documented in the PSID (Martin & Lippert, 2012). Second, we assess whether we observe similar, heightened risks of poor health behaviors among mothers at or below the poverty line relative to mothers with moderate/upper income and childfree women. Specifically, we examine women's time spent in meal preparation, physical activity, sleep, and watching television. Third, we assess whether associations among motherhood, poverty, and overweight/obesity are partially explained by differences in these time-use behaviors.

Materials and methods

We use data from the 2006–2008 and 2014–2015 waves of the nationally representative ATUS, the years for which we can calculate individuals' body mass index (BMI) via the Eating and Health Module (Bureau of Labor Statistics 2017). Time diary data have the advantage of providing detailed estimates of time spent in activities (Zick et al., 2011). Technical details of ATUS sample selection and the Eating and Health Module are available from the Bureau of Labor Statistics (2017). Data were extracted from ATUS-X (Hofferth et al., 2013) and include women ages 18–55 to correspond with childrearing ages. The study uses de-identified secondary data and was exempt from IRB review at the University of La Verne.

Missingness is relatively minor. We omitted observations with missing data on the analytic variables ($n=2708$ observations; 13% of all original ATUS observations), with most

missingness coming from weight status ($n=1721$ observations). There was minor item non-response for household income ($n=824$ observations) and urban residence ($n=163$ observations). The final analytic sample is 17,914 women.

Dependent Variables

The first dependent variable is a binary measure of overweight/obesity (reference = normal/underweight). BMI was based on self-reports in the Eating and Health Module and calculated as $\text{weight(kg)} / [\text{height(m)}]^2$ (Centers for Disease Control 2017). We used CDC-based cutoffs to determine weight categories: <25 as normal/underweight; $25-29.9$ as overweight; and $30+$ as obese. Results are robust to alternative BMI categorizations, namely (1) exclusion of women with underweight ($n=402$), (2) exclusion of both women with underweight and women with BMI $40+$ ($n=1358$), and (3) predicting overweight and obesity separately. Our final models collapse overweight and obesity categories to improve statistical power and because both are associated with health risks over the life course (National Center for Health Statistics, 2008; Stommel & Schoenborn, 2010).

We also predict four time-use behaviors related to body weight: physical activity, food preparation, watching television, and sleeping. Given the complexity of measuring physical activity, we utilize three measures: (1) time in sports/exercise activities generating metabolic equivalents (METs) of more than 6, (“vigorous” physical activity; NIH 2018, WHO 2018), (2) generating between 3 and 6 METs (“moderate” physical activity; NIH 2018, WHO 2018), and (3) generating at least 2.5 METs (“total” physical activity; NIH 2018). For most time-use behaviors, we create two indicators to capture a woman’s activity: (1) a dichotomous indicator for whether the woman performed the activity, given the low participation rates for many activities, and (2) among those who performed the activity, a count of the total minutes spent in each activity. For sleep, we create a dichotomous measure of limited nighttime sleep, equal to 1 if the woman sleeps less than 6 hours at night in accordance with the threshold for risk shown in prior studies (Anic et al., 2010; Bjorvatn et al., 2007). Supplementary models utilized a three-category measure of sleep duration (<6 hours, 6 to <9 hours, 9+ hours) to test for potential nonlinear relationships (Anic et al., 2010; Chaput et al., 2007), but we found no significant association between excess sleep (i.e., 9+ hours) and the risk of having overweight or obesity (results available upon request).

Independent Variables

Key independent variables include household income and motherhood. We utilize the following ATUS-created household income categories: (1) “moderate/upper income,” =1 when household income was at least 185% of the poverty line [reference]; (2) “low income,” =1 for household income $< 185\%$ but $\geq 130\%$ of the poverty line; and (3) “poor,” =1 for household income $< 130\%$ of the poverty line. The 185% and 130% cutoffs link to eligibility requirements for means-tested government programs such as WIC and SNAP (USDA, 2017a; 2017b). Motherhood status is a binary indicator (=1 for women who report having a socially- or biologically-related child under the age of 18 living in the household, =0 otherwise).

Controls

Fully-adjusted models include age, marital status, education, urban residence, region, race/ethnicity, immigrant status, employment status, year, and timing of survey administration (weekend/weekday). Education includes categories of less than high school (or GED), high school diploma, some college, and college degree. Race/ethnicity includes categories for white, black, Hispanic, and other. Employment status includes categories for full-time employment, part-time employment, out of the labor force, and unemployed (and looking for work).

Supplementary models further adjust for SNAP participation, as this has previously been linked to obesity risk (Larson and Story 2011). Our key findings are statistically and substantively identical regardless of whether we control for SNAP participation. We report the more parsimonious model, but results are available upon request.

Analysis

We first predicted whether women had overweight or obesity. Model 1 is an additive, logistic regression model including household income, motherhood status, and controls. Model 2 is a conditional logistic regression model, with an interaction between household income and motherhood status. We next predicted whether women spent any time in each time-use behavior using logistic regression. For those who did the activity, we then predicted their minutes in each activity using OLS regression. Preliminary t-tests indicated that all but two of the time-use behaviors and model covariates (day of the week and watching any television) were significantly different between mothers and childfree women. Therefore, we estimated separate models for mothers and childfree women, and focused on income differences within these two groups. To compare coefficients across mothers and childfree women, we estimated a fully-interacted model and conducted Wald tests. Finally, we explored whether time-use behaviors helped explain the conditional association between household income and motherhood for the risk of overweight/obesity. To capture potential nonadditive associations resulting from low participation rates for many activities, we include both binary indicators for participating in each activity and a measure of activity minutes. Preliminary analyses revealed these two measures are differentially related to income and body weight. To address the possibility of correlated errors across time-use measures, we tested models using seemingly unrelated regression; these models produced identical results, so we report on our original linear and logistic regression results. Models were weighted to be representative of the U.S. population using the Eating and Health Module weights provided by ATUS and estimated in Stata 13.

Results

Sample demographics are shown in Appendix Table 1. Descriptive statistics for the key independent and dependent variables are shown in Table 1. Fifty-three percent of the sample had overweight or obesity. With respect to categories of motherhood and household income, the modal group was childfree women with moderate/upper-income (36%) followed by mothers with moderate/upper-income (34%), mothers living with poverty (14%), childfree women living with poverty (7%), mothers with low income (6%), and childfree women with

low income (4%). Sixteen percent of women in the sample engaged in physical activity, 65% in food preparation, and 76% in watching television. Among those engaging in each activity, on average, women spent 74 minutes per day in physical activity, 54 minutes preparing food, and 167 minutes watching television. For the years studied, these averages are fairly consistent with those found in the ATUS sample overall (ATUS 2007, 2008, 2009, 2015, 2016), although women in our sample spent less time exercising (approximately -0.4 hours) and watching television (approximately -0.6 hours). Approximately 13 percent of women slept less than six hours at night.

We estimated the additive associations between motherhood and low income for having overweight/obesity in Model 1 of Table 2. The odds of overweight/obesity were significantly greater for women with low income (OR=1.36, $p<.001$) and poverty (OR=1.51, $p<.001$) compared to women with moderate/upper income. In contrast, motherhood was not significantly associated with risk of overweight/obesity.

Second, we estimated the conditional relationships between motherhood and household income for the odds of having overweight/obesity. Similar to Martin and Lippert's (2012) results, we found the risk of overweight/obesity was greatest for mothers with low (OR=1.47, $p<.05$) and sub-poverty (OR=1.50, $p<.01$) incomes but absent for moderate/upper-income mothers and all childfree women.

Table 3 presents results predicting mothers' and childfree women's time use. We focus our discussion on mothers. Columns 1–4 show odds ratios for whether women spent any time in physical activity, food preparation, television, and sleeping fewer than 6 hours per night. Results indicate that mothers with low ($p<.05$) and sub-poverty ($p<.001$) incomes were approximately 30–40% less likely than mothers with moderate/upper income to do any physical activity. However, mothers with low (OR=1.38, $p<.01$) and sub-poverty (OR=1.64, $p<.001$) incomes were more likely to have spent some time in food preparation. Income status does not appear to differentiate the likelihood of watching television or sleeping fewer than 6 hours per night.

Columns 5–9 of Table 3 report results for models estimating the amount of time spent in each activity conditional on spending any time doing that activity. Among mothers who did some physical activity (of various intensities), only their time spent in vigorous physical activity significantly differed by household income; mothers with sub-poverty income engaged in approximately 5 fewer minutes ($p<.05$) than mothers with moderate/upper income. Among mothers who did some food preparation, mothers with sub-poverty income spent the most time preparing food – approximately eight more minutes ($p<.001$) than mothers with moderate/upper income and five more minutes ($p<.05$) than mothers with low income. For television time, mothers with sub-poverty income watched significantly more television ($b=20.36$, $p<.001$) than mothers with moderate/upper income. Notably, childfree women with sub-poverty income ($b=34.52$) watched significantly more television than their counterparts with children ($p<.05$).

Our final analyses explored whether these behaviors partially explained the differences in overweight/obesity by income and motherhood status. The top two rows of Table 4 replicate

the base model, stratified by motherhood status, displaying the original odds ratios for overweight/obesity according to household income. Panels 1 through 4 include measures of each time-use behavior individually, whereas Panel 5 includes all time-use behaviors. In Panel 5, we do not include the minutes of physical activity because the variance inflation factor was 2.7, indicating possible multicollinearity.

We first focus on physical activity in Panel 1. Although engagement in physical activity was negatively associated with the risk of overweight/obesity ($OR=0.62$, $p<.001$), physical activity did not significantly attenuate the relationship between income and risk of overweight/obesity among mothers. For example, the predicted probabilities of having overweight/obesity do not vary significantly by physical activity levels; regardless of whether a woman's activity was relatively low (at the 10th percentile) or high (at the 90th percentile), the predicted probability for having overweight/obesity is .49 for mothers with moderate/upper incomes, .61 for mothers with low incomes, and .64 for mothers with sub-poverty incomes. In Panels 2 and 3, neither time in food preparation nor time watching television were significantly associated with the risk of overweight/obesity for mothers. In Panel 4, sleeping fewer than six hours a night was strongly related to an increased risk of overweight/obesity ($OR=1.38$, $p<.001$), such that the predicted probability of having overweight/obesity is approximately 0.08 lower among mothers who sleep more than 6 hours (i.e., for mothers with moderate/upper income : 0.48 vs. 0.56; with low income: 0.60 vs. 0.68; with sub-poverty income: 0.64 vs. 0.71). Yet accounting for mothers' sleep duration did not attenuate the associations between income and overweight/obesity among mothers. Finally, Panel 5 provides the results for the model including all time-use variables. As before, mothers reporting any physical activity and having slept more than six hours were at lower risk of overweight/obesity, but these variables did not attenuate the relationships initially shown in Table 2. Figure 1 depicts marginal-mean predicted probabilities of overweight/obesity with controls and adding time-use behaviors.

Discussion

We had three aims: (1) To replicate findings from the PSID reported by Martin and Lippert (2012) using the ATUS; (2) To assess whether the interactions between motherhood and poverty were associated with time-use behaviors linked to body weight; and (3) To assess whether differences in time-use behaviors helped explain the greater risk of overweight/obesity among mothers with low and sub-poverty incomes. For Aim 1, we found evidence consistent with Martin and Lippert (2012) in the ATUS data. For Aim 2, we found that mothers with low and sub-poverty incomes were less likely to engage in physical activity but more likely to perform food preparation than their counterparts with moderate/upper incomes. Among those who spent time in these activities, we found significant differences in the amount of time spent in vigorous activity, food preparation, and television viewing between mothers with sub-poverty incomes and mothers with moderate/upper incomes. For Aim 3, we found that time-use patterns did not partially explain the greater risk of overweight/obesity among mothers with low incomes.

Drawing on the strategic selection model by Moen and Chermak (2005), we expected that women who were "parenting under the poverty line" would face material deficits and time

constraints to care for their own health. Demands upon mothers with low income to uphold traditional, gendered roles of domestic caretaking while managing household scarcity have been shown to negatively impact dietary behaviors (DeVault, 1991; Stevens, 2010; Wright et al., 2015), and potentially increase overweight/obesity risks (Martin & Lippert, 2012). We expected that these same material hardships and time constraints would correlate with lower engagement in physical activity and increase mothers' time spent watching television and preparing meals. This was partially true: mothers with sub-poverty incomes spent more time in meal preparation than mothers with moderate/upper incomes, while income did not differentiate time in meal preparation for childfree women. However, adjustments for mothers' time in these behaviors did not attenuate the associations between motherhood, income, and overweight/obesity.

A limitation of this study is its cross-sectional nature. Research has indicated a lagged effect of health behaviors on later weight (Spiegelman & Flier, 2001), but we are unable to test this possibility or whether time-use behaviors and BMI are simultaneously determined (e.g., Zick et al., 2011). Second, we lack dietary information. Although there is a lack of consensus about the underlying causal dynamics, prior research documents correlations between poor health and dietary practices such as meal skipping and all-day fasting – practices resource-constrained mothers frequently perform (DeVault, 1991; Stevens, 2010; Wright et al., 2015).

Implications for Practice and/or Policy

A contribution of this study is the replication of the conditional association between motherhood and poverty and risk of overweight/obesity. Now, two studies relying on different, nationally-representative data sources find a greater risk of overweight/obesity among mothers with low income. This heightened risk, however, does not appear to result from differences in time-use behaviors, like preparing meals, watching television, exercising, and sleeping.

Other pathways need further investigation, particularly mothers' differential exposure to various stressors. Prior research demonstrates a link between chronic stress and overweight/obesity (Drapeau et al., 2003; Garasky et al., 2009; Roberts et al., 2007). Further, stress exposure, as measured by cortisol levels, is related to women's work and family experiences; time spent at work (and away from home) is associated with lower cortisol, while a lack of workplace resources is associated with higher cortisol (Damaske, Smyth, & Zawadzki, 2014; Damaske, Zawadzki, & Smyth, 2016). Thus, unemployment or precarious employment, coupled with childcare responsibilities, could undergird the greater risk of overweight/obesity among mothers with limited resources. In addition, some scholars hypothesize that food assistance programs – designed to supplement dietary resources for families with low income – increase risk of obesity. We do not emphasize these results given our theoretical orientation, but our results were consistent irrespective of model adjustments for SNAP assistance.

Conclusions

The combination of motherhood and poverty is associated with an elevated risk for overweight/obesity in two nationally-representative samples. Yet this association is not attributable to differences in time spent in meal preparation, physical activity, sedentary behaviors, or sleep available in the ATUS files. Future research is needed to identify the mechanisms connecting motherhood and poverty to a heightened risk for overweight/obesity.

Acknowledgments

Funding Statement:

The work of Adam M. Lippert was partially supported by the National Institutes of Health [grant number NIA 5R01AG040248-05].

Appendix Table 1.: Sample Descriptive Statistics—Means and Percentages for Demographic Characteristics, ATUS, Sample Weighted

	Mean (SE)	Range
Weight Category		
Under/Normal Weight	47%	
Overweight	27%	
Obesity	26%	
Poverty Category		
>185% Poverty Line	69%	
>130 and <185% Poverty Line	10%	
<130% Poverty Line	21%	
Children in Household		
1+	54%	
2+	31%	
3+	12%	
Age	37.07 (0.06)	18–55
Married	55%	
Weekend Observation	29%	
Immigrant	9%	
Education		
Less than High School	10%	
High School Diploma	26%	
Some College	30%	
College or More	34%	
Race/ethnicity		
Non-Hispanic White	65%	
Non-Hispanic Black	13%	
Hispanic	15%	

	Mean (SE)	Range
Non-Hispanic, Other Race	7%	
Employment Status		
Employed Full Time	54%	
Employed Part Time	19%	
Out of the Labor Force	21%	
Unemployed	6%	
Region		
Northeast	17%	
Midwest	25%	
South	36%	
West	21%	
Urban Residence	85%	
<i>N</i>	17914	

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Figure 1.

Predicted Probabilities of Having Overweight/Obesity by Motherhood and Poverty Status, with Controls and Time-Use Behaviors

Notes: Estimates are shown as fitted predicted marginal mean probabilities of having overweight/obesity. Models are weighted using the Eating and Health Module sample weights and adjust for respondent age, marital status, education, race/ethnicity, citizenship, employment, urban residence, weekend day, and year.

Table 1.

Descriptive Statistics—Sample Means and Percentages for Time-Use and Key Predictor and Outcome Variables, ATUS, Sample Weighted

	Mean (SE)	Range
Weight Status		
Under/Normal Weight	47%	
Overweight/Obesity	53%	
Motherhood by Poverty Status		
Childfree and Moderate/Upper Income	36%	
Childfree and Low Income	4%	
Childfree and Sub-poverty Income	7%	
Mother and Moderate/Upper Income	34%	
Mother and Low Income	6%	
Mother and Sub-poverty Income	14%	
Any Physical Activity	16%	
Minutes in Total Physical	73.56 (52.58)	1–240
Activity		
Minutes in Moderate Physical Activity	43.80 (52.35)	0–180
Minutes in Vigorous Physical Activity	14.98 (23.60)	0–65
Any Food Preparation	65%	
Minutes Preparing Food	54.38 (43.35)	1–210
Any Television Viewing	76%	
Minutes in Television Viewing	167.01 (129.31)	1–625
Nighttime Sleep < 6 Hours	0.13	
<i>N</i>	17914	

Notes: Estimates are weighted using the Eating and Health Module sample and replicate weights using *svy* procedures in Stata 13. These are the applicable weights because the BMI measures come from the Eating and Health Module.

Table 2.

Odds Ratios from Logistic Regression Models Predicting Having Overweight/Obesity

	Model 1		Model 2	
	OR	95% CI	OR	95% CI
Mother	1.07	.97, 1.18	.96	.86, 1.07
Low Income	1.36 ***	1.18, 1.57	1.09	.84, 1.42
Sub-poverty Income	1.51 ***	1.33, 1.72	1.18	.95, 1.47
Mother × Low Income	--		1.47 *	1.09, 1.99
Mother × Sub-poverty Income	--		1.50 **	1.17, 1.92
Age	1.03 ***	1.03, 1.04	1.03 ***	1.03, 1.04
Married	1.10 *	1.00, 1.22	1.10 +	1.00, 1.22
Education (less than high school omitted)				
High School Diploma	.98	.82, 1.17	.98	.82, 1.17
Some College	.83 *	.70, .99	.84 *	.70, 1.00
College or More	.50 ***	.42, .60	.50 ***	.42, .60
Race/ethnicity (Non-Hispanic White omitted)				
Non-Hispanic Black	2.67 ***	2.33, 3.06	2.65 ***	2.31, 3.03
Hispanic	1.63 ***	1.42, 1.88	1.61 ***	1.40, 1.85
Non-Hispanic, Other	.81 *	.67, .99	.82 +	.67, 1.00
Race				
Employment Status (full time omitted)				
Part Time	.74 ***	.65, .83	.75 ***	.66, .84
Out of the Labor	.85 **	.76, .95	.86 *	.77, .97
Unemployed	.92	.74, 1.15	.92	.74, 1.15
Non-immigrant	1.60 ***	1.34, 1.91	1.63 ***	1.37, 1.94
Urban Residence	.81 **	.72, .92	.82 **	.72, .92
Year (2006 omitted)				
2007	1.14 +	1.00, 1.29	1.14 *	1.00, 1.30
2008	1.17 *	1.03, 1.33	1.17 *	1.03, 1.33
2014	1.25 **	1.09, 1.43	1.25 **	1.09, 1.43
2015	1.27 **	1.11, 1.46	1.28 ***	1.11, 1.47
Constant	.24 ***	.18, .34	.25 ***	.18, .34
N	17914		17914	

Notes: Models are weighted using the Eating and Health Module sample weights.

+ p<.10;

* p<.05;

** p<.01;

***
p<.001

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Key Odds Ratios and Coefficients from Logistic and Linear Regression Models Predicting Time-Use Behaviors

Logistic Regression Results for Any Activity Occurrence				Minutes in Specific Activities Conditional on Any Activity				
1. Any Physical Activity	2. Any Food Preparation	3. Any Television Time	4. Less than Six Hours Sleep	5. Min. Physical Activity	6. Min. Moderate Activity	7. Min. Vigorous Activity	8. Min. Food Preparation	9. Min. Television Time
OR (95% CI)	OR (95% CI)	OR (95% CI)	OR (95% CI)	b (SE)	b (SE)	b (SE)	b (SE)	b (SE)
<i>Panel 1. Mothers</i>								
Low Income	.72 [*] (.57, .93)	1.12 (.93, 1.35)	1.08 (.84, 1.37)	-6.25 (4.80)	2.19 (4.85)	-2.65 (2.52)	3.28 ⁺ (.191)	10.23 ⁺ (544)
Sub-poverty Income	.60 ^{***} (.48, .76)	1.00 (.85, 1.18)	1.15 (.92, 1.43)	-5.16 (4.67)	2.48 (4.58)	-5.19 [*] (2.19)	8.16 ^{***} (.183)	20.36 ^{***} (5.35)
<i>Panel 2. Childfree Women</i>								
Low Income	.81 (.55, 1.19)	1.25 (.92, 1.70)	1.25 (.89, 1.78)	1.13 (9.13)	-7.78 (7.38)	-5.22 (3.85)	2.94 (321)	8.57 (9.60)
Sub-poverty Income	.65 [*] (.46, .92)	1.04 (.80, 1.38)	1.03 (.73, 1.44)	-13.41 (8.72)	1.69 (9.57)	-7.36 [*] (3.03)	4.91 (3.40)	34.52 ^{***} (9.07)

Notes: Omitted category is moderate/upper income. Models adjust for respondent age, marital status, education, race/ethnicity, citizenship, employment, urban residence, weekend day, and year. Models are weighted using the Eating and Health Module sample weights. Minutes of activity are estimated on the sample reporting more than zero minutes of activity. Sample sizes are as follows: physical activity, Nmothers=1,753, Nchildfree=1,049; food preparation, Nmothers=8,517, Nchildfree=3,198; television viewing, Nmothers=9,012, Nchildfree=4,631.

⁺The difference between mothers with low incomes and mothers with sub-poverty incomes is statistically significant.

⁺⁺The difference between mothers with sub-poverty incomes and childfree women with sub-poverty incomes is statistically significant.

⁺p<.10;

^{*}p<.05;

^{**}p<.01;

^{***}p<.001

Table 4.

Select Odds Ratios from Logistic Regression Models for Having Overweight/Obesity Controlling for Time-Use Behaviors (N = 17,914)

	Mothers		Childfree Women	
	OR	95% CI	OR	95% CI
<i>Baseline Results from Model 1</i>				
Low Income	1.66 ***	1.42, 1.95	1.04	.80, 1.36
Sub-poverty Income	1.93 ***	1.66, 2.23	1.02	.80, 1.30
<i>Panel 1. Adding Time in Physical Activity</i>				
Low Income	1.64 ***	1.40, 1.93	1.03	.79, 1.35
Sub-poverty Income	1.88 ***	1.62, 2.18	.99	.78, 1.27
Any Physical Activity	.62 ***	.49, .77	.67 *	.48, .94
Minutes Physical Activity	1.00	1.00, 1.00	1.00	.99, 1.00
<i>Panel 2. Adding Time in Food Preparation</i>				
Low Income	1.67 ***	1.42, 1.96	1.04	.80, 1.36
Sub-poverty Income	1.94 ***	1.67, 2.25	1.02	.80, 1.30
Any Time in Food Preparation	1.02	.89, 1.17	.98	.81, 1.18
Minutes Food Preparation	1.00	1.00, 1.00	1.00	1.00, 1.00
<i>Panel 3. Adding Time Watching Television¹</i>				
Low Income	.31 ***	.21, .41	.01	-.15, .17
Sub-poverty Income	.40 ***	.31, .49	.00	-.15, .15
Any TV Time	.03	-.05, .12	.13 *	.01, .26
Minutes TV Time	.00 +	-.00, .00	.00 *	.00, .00
<i>Panel 4. Adding Nighttime Sleep < 6 hours</i>				
Low Income	1.66 ***	1.42, 1.95	1.04	.80, 1.36
Sub-poverty Income	1.92 ***	1.66, 2.22	1.02	.80, 1.30
Less Than 6 Hours Sleep at Night	1.38 ***	1.17, 1.62	1.10	.88, 1.37
<i>Panel 5. Multifactorial Model²</i>				
Low Income	1.64 ***	1.39, 1.92	1.01	.77, 1.32
Sub-poverty Income	1.88 ***	1.62, 2.18	.97	.76, 1.24
Any Physical Activity	.63 ***	.55, .72	.62 ***	.51, .75
Any Food Preparation	1.02	.89, 1.16	.96	.79, 1.15
Any Television Time	1.08	.94, 1.24	1.29 *	1.04, 1.59
Minutes Food Preparation	1.00	1.00, 1.00	1.00	1.00, 1.00
Minutes Television Time	1.00	1.00, 1.00	1.00 *	1.00, 1.00
Less Than 6 Hours of Nighttime Sleep	1.37 ***	1.16, 1.61	1.10	.88, 1.38

Notes: Omitted category is moderate/upper income. Models are weighted using the Eating and Health Module sample weights and adjust for age, marital status, education, race/ethnicity, citizenship, urban residence, employment, weekend day, and year.

¹ Models run as probit for convergence reasons. Coefficients reported.

² Models omit minutes in physical activity due to collinearity with any physical activity (VIF=2.72). Omitting minutes of physical activity does not change model fit.

⁺ p<.10;

^{*} p<.05;

^{**} p<.01;

^{***} p<.001

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