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More Time to Take Care of Oneself

The Impacts of the "Great Recession" and Unemployment for Time Spent in Healthy Behaviors

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Abstract

The "Great Recession," which according to the National Bureau of Economic Research (NBER) spanned December of 2007 to June of 2009, has become a focal point of scholarly discussion (e.g. Hurd and Rohwedder 2010; Isidore 2009). In light of the importance of healthy behaviors for future health outcomes and their possible connection to employment uncertainty, I examine the impacts of the Great Recession on physical activity, health-related self-care, and eating breakfast. To investigate these relationships, I draw on data from the American Time Use Survey (ATUS) to examine patterns of healthy behaviors before and during years marked by the recession while also investigating the impact of being unemployed and living in states with poor economic conditions (as captured by high unemployment rates). Results show that being unemployed is an important predictor of healthy behaviors, whereas state economic conditions and historical time period are not as consistently related to healthy behaviors.

Introduction

The "Great Recession" (beginning in 2008 and lasting through June of 2009 as well as the continued stalled economy for months that followed and its potential impacts on communities, families, and individuals have garnered a great deal of attention in the popular and scholarly media (Aguiar, Hurst, and Karabarbounis 2011; Eckholm 2010; Hurd and Rohwedder 2010; Morrill and Pabilonia 2011; Rampell 2009). This is due, in part, because it is unclear what effects this sustained and particularly severe recession will have on individuals' well-being. Some scholars have begun to investigate how and in what ways the Great Recession is leaving its mark on America and the broader global community (Aguiar et al. 2011; Edwards 2011; Hurd and Rohwedder 2010; Morrill and Pabilonia 2011) but little is known about if and how the Great Recession influences individuals' well-being or health.

Prior research suggests that the stress and strain associated with changes in employment uncertainty may influence individuals' behaviors, including health behaviors (e.g. Jahoda et al. 1971). Health behaviors – like physical activity, eating breakfast, and health-related self-care – are activities that, when individuals engage in them on a regular basis, may influence long-term health outcomes but may also be influenced by the stress and challenges related to being unemployed and living through the Great Recession.

In light of the possible connection between health behaviors and employment uncertainty, I investigate the effects of being unemployed, living in states with poor economic conditions, and being interviewed during the Great Recession on healthy behaviors including exercise, active travel (traveling by bike or on foot), eating breakfast, and health-related self-care. In order to investigate such patterns, I draw on a sample of 33,528 working-aged respondents[1] from the

[1] The analytic sample is limited to respondents between the ages of 23 and 55 because of the unique time demands of college students and the increased probability of retirement or semi-retirement for older respondents.

American Time Use Survey (ATUS) from 2003 to 2010 who completed weekday time diaries. In the following investigation of time spent in healthy behaviors, I find being unemployed is particularly important, increasing time spent in physical activity and health-related self-care as well as increasing the odds of eating breakfast. In contrast, I find that the relationships between state economic conditions and historical time period are not related to healthy behaviors to the same degree.

Background

Health behaviors have become an important focus of health research, in part because the choices individuals make in the present (regarding physical activity, food, and health promotion) have been shown to predict various future health outcomes. Exercise and physical activity are common health recommendations by physicians and public health practitioners because exercise has been linked to decreased mortality, risk of heart disease, hypertension, colon and breast cancer, diabetes, and depression (U.S. Department of Health and Human Services 1996; U.S. Department of Health and Human Services and Services 2010). Though physical activity is often considered to be intentional exercise to improve health and well-being, it is not limited to leisure time activities like running or playing a group sport. Healthy People 2020 (a program sponsored by the U.S. Department of Health and Human Services) also aims to increase walking and biking for transportation in order to increase physical activity and the overall health of the nation. Time spent in health-related self-care is an important indicator of future health outcomes as well, particularly for those with chronic health conditions that can be better managed through regular monitoring, medicating, or physical therapy initiated by the patient (Bodenheimer 2002; Funnell and Anderson 2000; Jonas, Ibuka, and Russell 2011; Russell, Suh, and Safford 2005; Sawicki, Sellers, and W. M. Robinson 2009; Stringer 1998). Lastly, eating breakfast has been linked to

reduced odds of obesity (Ma et al. 2003; Timlin and Pereira 2007) – a growing focus of media and public health attention due to its connections to mortality, heart disease, and diabetes to name a few (U.S. Department of Health and Human Services and Services 2010).

So what influences these important health behaviors? Prior research has shown that health and health behaviors are influenced by changes in the broader economy (Aguiar et al. 2011; Catalano and Dooley 1983; K. K. Charles and DeCicca 2008; Colman and Dave 2011; Edwards 2011; Fagin, Little, and Little 1984; Hurd and Rohwedder 2010; Linn, Sandifer, and Stein 1985; McKee-Ryan et al. 2005; Ruhm 2000; 2003; 2004; 2005; 2007; Strully 2009; Xu and Kaestner 2010). However this relationship remains unclear, in part due to mixed results as well as the multiple ways of measuring different aspects of employment uncertainty. Some research has found that health and health behaviors improve during periods of economic decline or decline during periods of economic growth (Hurd and Rohwedder 2010; Jonas et al. 2011; McKee-Ryan et al. 2005; Ruhm 2000; 2003; 2004; 2005; 2007; Strully 2009; Xu and Kaestner 2010). Other scholarship has found the reverse, that being unemployed, living in states with poor economic conditions, or being interviewed during recessions are related to health declines (Aguiar et al. 2011; Catalano and Dooley 1983; N. Charles and James 2003; Colman and Dave 2011; Fagin et al. 1984; Linn et al. 1985). Despite similar questions and interests, these studies draw on different measures of employment uncertainty. Rather than identifying a single concept of employment uncertainty, it could be argued that these measures capture different levels of exposure to the same phenomenon. Moreover, prior studies fail to consider how different levels of exposure to employment uncertainty may in fact intersect and overlap. Specifically, being unemployed, living in states with poor economic conditions (as captured by high unemployment rates), and being interviewed during a historical time period marked by a recession reflect

different levels of exposure to the stress of an economic downturn and therefore may produce different outcomes. Or, as indicators change (for example as the unemployment rate fluctuates or recessions come and go) studies examining similar phenomenon may arrive at divergent conclusions. In addition to the importance of extending what is understood about employment uncertainty, the effects of the contemporary Great Recession are unclear. Though there is some research that has examined health behaviors for individuals living in economically depressed areas with high unemployment or for the unemployed, prior research has not, to date, examined the overlapping and multiple indicators of economic change during this most recent and particularly notable recession.

I build on and extend the prior literature by examining the following research questions. First, is being unemployed (both recent and longer term) related to time spent engaging in healthy behaviors, including time spent exercising, in active travel, in health-related self-care, as well as eating breakfast? Second, what is the relationship between living in states with poor economic conditions (as captured by state-level unemployment rates) and patterns of healthy behavior? Third, what effect does historical time period (i.e. being asked about health behaviors during the years of the Great Recession as opposed to prior years) have on time spent engaging in healthy behaviors? Fourth, what are the combined effects of actually being unemployed, living in states with poor economic conditions, and being interviewed during the Great Recession on these healthy behaviors?

Several studies have investigated the effects of employment uncertainty on health. However, few have investigated potential mechanisms associated with this relationship. Stress has been identified as one mechanism that influences health outcomes (Pearlin et al. 1981). However, it is unclear how stressful events (such as being unemployed) or conditions (such as

recessionary times) relate to health in this context. One important study that attempted to capture changes in behaviors is the classic study by Jahoda and colleagues (1971). Focusing on the economically depressed area of Marienthal, Austria in 1931, the authors drew on various sources of data to investigate the effects of economic strain for families. Focusing on the male breadwinner and drawing on rudimentary time diary data, the authors found that those unemployed men who were unable to manage the large spans of time no longer filled with the demands of work were more likely to experience negative outcomes. That is, their time diaries were largely empty, and though their time became less constrained, their engagement in things like providing care for their children, home, or self was reduced. Such findings raise the possibility that how individuals allocate their time into different behaviors – healthy or otherwise – may be a key mechanism connecting the relationship between employment uncertainty and health.

Though some research has begun to investigate the importance of the Great Recession for individuals, families, and their well-being (Aguiar et al. 2011; Hurd and Rohwedder 2010; Morrill and Pabilonia 2011), little is known about its immediate or long-term effects. The present study extends prior research in three important ways. First, this analysis contributes to the understanding of the Great Recession. Due to the timeliness of the Great Recession and the continued experience of the economic contraction for many, such knowledge may contribute to the development of policies aimed at addressing current problems as well as responding to or preventing future health concerns.

Second, I investigate the relationships between three intricately linked measures of employment uncertainty – being unemployed, living in states with poor economic conditions as captured by state-level unemployment rates, and being interviewed during a historical time

period marked by a recession. Prior research has focused on single measures of employment uncertainty (Aguiar et al. 2011; Catalano and Dooley 1983; K. K. Charles and DeCicca 2008; Colman and Dave 2011; Edwards 2011; Fagin et al. 1984; Hurd and Rohwedder 2010; Linn et al. 1985; McKee-Ryan et al. 2005; Ruhm 2000; 2003; 2004; 2005; 2007; Strully 2009; Xu and Kaestner 2010). However, being unemployed or living in areas with high unemployment rates are not experienced in isolation from the broader economic environment. Rather, the resources available to the unemployed and the relative assessment of one's social location and responsibility for it is nested within the context of broader employment uncertainty (Wheaton 1978). I expect that being unemployed in economically depressed areas or during an economic recession is experienced differently than being unemployed in an economically thriving area with low unemployment or during a period of economic growth. Similarly, living in an area with high unemployment during a recession is likely to be very different than living in an area with low unemployment at the same point in time.

Third, I draw on time diary data to investigate patterns of time allocation. Though prior research has drawn connections between employment uncertainty and health outcomes, little is known about how this relationship works. My research investigates one way this relationship may work – time spent in healthy behaviors. I draw on the ATUS, which allows a unique look into the time use choices of a nationally representative sample of the working-aged United States population (Abraham et al. 2011). Such information may help clarify how individuals facing an uncertain economic environment may allocate their time towards healthy behaviors and therefore its implications for future health outcomes and policy interventions.

Recessions and Being Unemployed for Health Behaviors

Prior research investigating the effects of employment uncertainty and health outcomes have considered different indictors, including actually being unemployed, living in states with poor economic conditions, and being interviewed during a historical time period marked by a recession. One indicator of employment uncertainty is the historical time period during which the study takes place. Prior research on the Great Depression investigated the relationships between declines in the economic environment and health outcomes but primarily focused on mental health (Elder 1974; Jahoda et al. 1971). These studies showed that those experiencing the most challenges during the Great Depression had poorer mental health outcomes.

More recent research on the Great Recession has investigated the effects of employment uncertainty for self-rated health and other types of health behavior (Aguiar et al. 2011; Hurd and Rohwedder 2010). Hurd and Rohwedder (2010) compare the percentage of respondents reporting fair or poor self-rated health from November of 2008 to April of 2010 and find that after an initial decline, the rate increased somewhat. Despite the timeliness of this survey and its longitudinal nature, it is not clear how self-rated health before the Great Recession compares with during it and it is unclear whether actual health behaviors changed (or not). Moreover, the Hurd and Rohwedder (Hurd and Rohwedder 2010) study does not control for the sample composition and as such it is unclear how much of the change in self-rated health can be attributed to experiences related to the recession. Aguiar, Hurst and Karabarbounis (2011) investigate differences in time use allocation during the Great Recession, including exercise and health care activities using the ATUS from 2003 to 2010. Though there is some evidence that respondents in 2009 and 2010 spent more time in their own medical care than respondents in 2006 and 2005, their measure of health-related self-care includes several additional categories

such as waiting for care and travel related to medical care, which may complicate their findings. These additional time use categories may rise due to reduced financial resources for some respondents (for example increased waiting time because care is provided in emergency rooms rather than by primary care physicians) but may not result in improved health. In addition, it is unclear what effect being interviewed during the recessionary time period may have on exercise. Exercise is grouped with other types of leisure and as such it is not clear how this important type of health behavior has been influenced. In light of these results and based on prior evidence on different time periods, I hypothesize the following:

> *H1:* Respondents who are interviewed during the recessionary time period (2008 through 2010) will be less likely to engage in health behaviors linked with health outcomes including spending less time in exercise, active travel, health-related self-care activities, and be less likely to eat breakfast.

One of the most common indicators of employment uncertainty is state economic conditions as captured by state-level unemployment rates. Scholarship that has investigated the connection between unemployment rates and health behaviors has drawn on several data sources including the ATUS. Contrary to assumptions that high unemployment rates are bad for health behaviors, prior research has found that health behaviors or health outcomes improve as unemployment rates rise (N. Charles and James 2003; Ruhm 2000; 2003; 2005; 2007; Xu and Kaestner 2010). However, this research is limited because it does not account for how such effects may vary for the unemployed (particularly important if the unemployment rate is high) or across historical time periods during which respondents are interviewed. Without controlling for other moderating effects, it is plausible that results can be masked and/or inaccurate.

Ruhm has investigated relationships between several different indicators of population health and changes in unemployment rates including mortality rates of various causes (2000), medical conditions (2003), and coronary heart disease (2007) and found negative relationships

between these measures of health and unemployment rates using data like the National Health Interview Survey and coronary heart disease mortality rates (that is, mortality and morbidity falls as unemployment rates increase). In regards to health behaviors, Ruhm (2005) draws on the Behavioral Risk Factor Surveillance System (BRFSS) data from 1987 to 2000 to investigate patterns of relationships between state-level unemployment rates and several indicators of health behaviors, including obesity, exercise, and smoking. The author finds that increases in state-level unemployment rates were related to decreases in obesity and smoking and increases in physical activity. Yet it is unclear how such results generalize to the broader population experiencing employment uncertainty because the unemployed are excluded (an important group that is likely to be affected) and data is self-reported summary questions, which may be more susceptible to bias than time diary data that does not focus on a particular set of behaviors. Though time diary data is also self-reported, the ATUS does not focus on a single set of outcomes that the respondent is then primed to highlight. Summary self-report survey questions regarding exercise and smoking are susceptible to bias because of the normative expectations around healthy behaviors.

However, not all research has found a countercyclical relationship between health outcomes and measures of employment uncertainty. In fact, several studies find no relationship or both positive and negative relationships between unemployment rates and health. Ruhm (2003) investigated reports of being hospitalized and visits to the doctor drawing on a subset of respondents from select large standard metropolitan statistical areas from the 1972 to 1981 using the National Health Interview Survey. He did not find a statistically significant relationship with yearly average (including both the current and previous year) state-level unemployment rates.

Xu and Kanster (2010) use the Behavioral Risk Factor Surveillance System (from 1984 to 2005) and the National Health Interview Survey (from 1976 to 2001) to look at differences in health behaviors (like physical activity and doctors' visits) by work hours and wages. The authors argue that unemployment rates and industry mix of unemployment determine, in part, work hours and wages. They find that greater work hours (which they posit is an indicator of a stronger economy) are related to less exercise, but no statistically significant findings for visits to the doctor [supporting Ruhm (2003; 2005)]. However, it could be argued that work could have a separate effect for health behaviors apart from changes in the wider economy.

Charles and DeCicca (2008) investigate the relationship between various measures of mental and physical health and quarterly metropolitan statistical area unemployment rates including exercise and body mass index (BMI) and arrive at different conclusions than prior research. Drawing on the National Health Interview Survey for respondents living in large metropolitan statistical areas from 1997 to 2001 the authors find no relationship between unemployment rates and physical exercise. However, the authors do find that BMI increases as unemployment rates increase particularly for those least likely to be employed based on characteristics of the local labor market.

Drawing on ATUS data from before and during the Great Recession (2003-2009), Edwards (2011) also finds no statistically significant relationship between health behaviors and state economic conditions (as measured by monthly state unemployment rates). Edwards (2011) investigated the effects of unemployment rates and various activities including exercise and time spent receiving medical care and finds no statistically significant relationship between health behaviors and unemployment rates. Though such findings are an important indicator of what I may find in my investigation of employment uncertainty and health, this research uses a single

month estimate of unemployment rates regardless of when the interview occurred (the interview may have occurred on the 1st of the month or the 31st of the month but the same monthly state-level unemployment rate would apply) and does not investigate how multiple levels of exposure to the Great Recession may influence the results. That is, the lack of significant findings may reflect the variation in how high unemployment rates are interpreted based on the historical time period during which respondents are interviewed. Moreover, though the author investigates time spent in different behaviors for the employed and unemployed, Edwards (2011) does not compare these differences and is unable to determine how being unemployed influences the effects of unemployment rates on health behaviors. Though there seems to be some evidence that there is little to no relationship between certain health behaviors and employment uncertainty, it is unclear how the unique characteristics and measures used in the above studies have contributed to these divergent results.

Colman and Dave (2011) have extended this prior work to include 2010 and to consider other types of physical activity. The authors use the 2003 to 2010 ATUS data and investigate the relationship between unemployment rates and time spent in exercise as well as physical activity based on metabolic equivalents. In contrast to Charles and DeCicca (2008) and Edwards (2011), they find that though exercise increases as unemployment rates increase, overall physical activity decreases because the unemployed are not engaging in the same amount of physical activity off the job as they were on. Similar to those studies highlighted above, Colman and Dave (2011) do not account for differences in the historical time period when respondents are interviewed or their employment status, which is expected to influence such findings. Though these results stand in contrast to prior research (e.g. K. K. Charles and DeCicca 2008; R. D. Edwards 2011; Ruhm 2005), the uniqueness of the Great Recession and the greater variation in unemployment

rates during this time may likely represent an important shift in the relationship between state economic conditions and health behaviors.

In light of these findings I expect the following:

> *H2:* Living in states with poor economic conditions (as captured by higher rates of state-level unemployment) will be related to more time spent in health behaviors (exercise, active travel, and health-related self-care) as well as increased odds of eating breakfast.

Similar to state economic conditions, a few scholars have investigated the effects of actually being unemployed for health and healthy behaviors (Linn et al. 1985; McKee-Ryan et al. 2005; Strully 2009). Linn, Sandifer, and Stein (1985) examined the effects of being unemployed on mental health assessments and utilization of health services using longitudinal data spanning 1979 to 1984. The authors found that the unemployed had increased visits with a physician. However, a unique population was studied – veterans using Veterans Administration health services – and as such it is not clear if a broader population would respond to unemployment similarly.

A more recent study investigating the effects of being unemployed on engaging in health behaviors for a broader population was completed by Jonas and colleagues (2011). Drawing on the American Time Use Survey from 2003 to 2007 the authors find that the unemployed are least likely to spend time in health-related self-care whereas the employed are most likely. Because this study was done prior to the Great Recession, it is unclear how the recession might be related to health-related self-care. In light of the mixed results of prior work and the dominating role of work for other types of time use, I expect that the increased time availability of the unemployed will give them more time to spend in healthy behaviors. Specifically, I expect the following relationship:

> *H3:* Being unemployed will be related to more time spent in exercise, active travel, health-related self-care, and increased odds of eating breakfast.

Moderating Effects of Being Unemployed, Living in States with Poor Economic Conditions and Being Interviewed during the Recessionary Time Period

The prior studies highlighted above each focus on single indicators of economic strain. In fact, I am aware of no studies that have investigated the effects of being unemployed, living in states with poor economic conditions, and being interviewed during a historical time period marked by a recession for healthy behaviors. However, recessions and being unemployed do not occur in isolation. Rather, each indicator could be expected to interact with the others and moderate their effects. Yet prior research has not investigated how being unemployed may be experienced differently in states with strong economic conditions versus states with weak economic conditions or during a historical period of economic decline versus historical periods of economic growth. It is possible that being unemployed in a state where the unemployment rate is low is more likely to be experienced as a personal failure rather than a sign of a structural problem. Whereas, being unemployed in a high unemployment state may be seen as outside of the control of the individual and therefore a less stressful experience. Similarly, living in a high unemployment state during a recessionary time period may magnify the negative associations and expectations of getting by during the worst of a recession or effectiveness of a future recovery. Prior research has suggested similar patterns. Specifically, being unemployed in an area with more economic opportunities was related to more negative outcomes than was being unemployed in an economically depressed area (Wheaton 1978). Such findings demonstrate the possible moderating effects of each measure of employment uncertainty. In light of this, I expect the following:

> *H4a:* Living in a state with high unemployment or during an economic recession moderates the negative effects of actually being unemployed on healthy behaviors. Specifically, being unemployed in states with higher unemployment rates and/or during

the recessionary time period (i.e. 2008-2010) will be positively related to exercise, active travel, breakfast and health-related self-care activities compared to the employed living in states with lower unemployment rates and/or before the recession (i.e. 2003-2007).

H4b: Living in states with higher unemployment rates in conjunction with being interviewed during the recessionary time period (i.e. 2008-2010) will operate as a magnifier of health behaviors. Specifically, respondents living in states with high unemployment during the recession will be related to less exercise, active travel, and health-related self-care as well as lower odds of breakfast compared to the living in states with lower unemployment rates and being interviewed before the recession (i.e. 2003-2007).

Data & Methods

Data

I draw on data from the American Time Use Survey (ATUS) produced by the U.S. Census Bureau and made available by the Minnesota Population Center for the following analyses (Abraham et al. 2011). The ATUS has been fielded continually since 2003 and is a nationally representative sample of diary days for the noninstitutionalized US population. I use data spanning the Great Recession (2003 to 2010) to examine patterns of time spent in healthy behaviors specifically exercise, active travel, and health-related self-care as well as reports of eating breakfast. The analytic sample is limited to respondents between the ages of 23 and 55[2] whose diary days are Monday through Friday. Exploratory analyses confirmed that weekend and weekday diary days looked notably different and as such analyses were limited to weekdays only so as to focus on those days most impacted by work commitments for the majority of the population.

The ATUS uses time diary methods to collect data for respondents regarding their daily activities from 4:00 AM the morning prior to the survey day until 3:59 AM of the survey day.

[2] Respondents younger than 23 are excluded because of the large proportion of individuals pursuing education, which is expected to alter their time use choices in unique ways. Similarly, respondents older than 55 are more likely to be retired or semi-retired – particularly if they become unemployed – and therefore are expected to have unique time use patterns as well.

Respondents are asked what activity they engaged in, how long they spent doing this activity (down to the minute), and their mode of transport if traveling between locations. Diary days span the four seasons, days of the week, and holidays and are a nationally representative sample of diary days. These data are extremely rich and capture participation, duration, and the sequence of activities. Time use researchers have established the reliability of time diary data and have found it to be more accurate than stylized survey questions[3] when attempting to measure time use (Juster et al. 1985; Juster, Ono, and Stafford 2003; J. P. Robinson and Godbey 1997). It is also less expensive than experiential sampling methodology, while being no less accurate for most activities.

ATUS respondents are randomly selected from all adults over the age of 15 from recently participating households of the Current Population Survey (CPS) and respondents are eligible for participation in the ATUS two to five months following their last month in the CPS. The CPS targets the civilian, non-institutionalized population in the United States. Sample weights assure the final sample is nationally representative after accounting for oversampling. Because the survey is completed over the phone, the population lacks effective coverage of respondents without phones or with intermittent service in the sampling frame (Davern et al. 2004).

Missing data on the health behaviors or indicators of employment uncertainty are not expected to influence the majority of my results in part because of the small proportion of cases missing information for these measures. Less than 2% of the sample is missing data regarding labor force status and there is no missing data for the state economic conditions or historical time period (U.S. Bureau of Labor Statistics 2009). The state economic conditions are identified using state-level unemployment rates from the U.S. Bureau of Labor Statistics and merged to the dataset using state identifiers. Historical time period is based on the year in which the interview

[3] Survey questions that ask respondents the total time spent engaged in an activity during a set time period.

occurred and is answered by the survey interviewer. Data on time spent exercising, in active travel, in health-related self-care, and eating breakfast are potentially more problematic because they are self-reported. However because the survey is not framed as a health survey and the time allocated in the survey must sum to 24 hours, it is less likely that respondents will systematically bias their responses. Because there is no reason to believe that such omissions would be differentially distributed across the population and instead are expected to occur at random, omitted information is expected to weaken, but not bias, my results. In light of this, any significant findings should be interpreted as a conservative estimate. Eating breakfast is a more complicated case. It is possible that respondents may eat breakfast while doing another activity (for example driving to work) and it could be omitted from their time diary because secondary activities (besides secondary childcare) are not captured.[4] Respondents with fewer external demands such as work may be more able to dedicate time to eating breakfast and therefore may bias my results. However, there is reason to believe that more time spent eating is related to better health outcomes and therefore capturing those that dedicate time to breakfast is expected to be a healthy behavior (Hamermesh 2010).

Measures

Measures of Health Behaviors

The four focal dependent variables are time spent exercising, in active travel, and in health-related self-care as well as whether the respondent reports eating breakfast on the diary day. Exercise activities include activities typically identified as leisure time physical activity such as yoga, sports participation, and running. (A full list of exercise activities is shown in the

[4] Secondary eating was captured for a subset of years (2006-2008). However, because these years are prior to the majority of the Great Recession years it is difficult to determine how the recession influenced secondary eating.

Appendix) Regardless of the type of exercise, the duration of all exercise episodes are summed to a single measure of time spent exercising on the diary day.

Time spent engaging in active travel is separated from exercise due to the different opportunities and constraints for participating in this type of physical activity. Active travel, specifically biking or walking to a destination, not only requires a respondent to live in a community where these types of travel are feasible but also that travel distances are acceptable to the respondent and do not conflict with any potential time constraints the respondent may have. In addition, some individuals may depend on walking or biking because of the cost associated with owning a car or taking alternative transportation. In these data, active travel is defined by the destination rather than the respondents' motivation (e.g. walking to the grocery store versus taking a walk) and therefore may be differentially related to employment uncertainty. Active Travel is identified in the coding lexicon as either biking or walking as a means of transport. The duration of all active travel episodes are summed to a single measure of active travel on the diary day.

Health-related self-care captures those activities that are medical in nature including activities such as taking medication, resting because of illness or injury, or receiving treatment from a medical professional. Self-care is not limited to medical care as it includes both receiving care from a provider (alternative and Western medical traditions) as well as care performed by and for the individual respondent and may include activities not normally identified as medical in nature (e.g. meditating for non-religious reasons). Also, it is important to note that the time spent waiting for health care professionals or services and time spent traveling to medical care are not included in this measure. A full list of health-related self-care activities is shown in the

Appendix. The duration of all health-related self-care episodes are summed to a single measure of time spent in health-related self-care on the diary day.

Eating breakfast is a dichotomous measure capturing those respondents who report eating between 4:00 AM and 11:00 AM on the diary day. Though it is possible that respondents may report an alternative activity as primary while they eat what they consider to be their breakfast (for example, driving their children to school while eating a donut and coffee), I am unable to capture secondary eating throughout the years of interest (2008 through 2010). Moreover, setting aside time for breakfast is more likely to reflect eating a balanced breakfast rather than other convenient options.

Measures of Employment uncertainty

Much of the prior research has investigated the effects of economic downturns through a single measure of employment uncertainty – either state economic conditions as captured by unemployment rates or during a historical recessionary time period. However, these indicators may vary in important ways. Figure 1 shows unemployment rates of each state for the months and years included in the following set of analyses (2003 through 2010). The first vertical bar is the beginning and the second bar is the end of the Great Recession according to the National Bureau of Economic Research (2010). As expected, the unemployment rate by state increases after the recession begins and slowly declines as the recession ends. However, there is a great deal of variation in state-level unemployment rates after the Great Recession ends demonstrating that for many the recession may not feel like it is over and that a single measure of employment uncertainty may not accurately capture how employment uncertainty is experienced.

In light of the variation by unemployment rates and time period, I draw on two indicators of economic change – historical recessionary time period and state economic conditions. The

historical time period is captured by comparing respondents in the ATUS interviewed prior to the economic downturn (2003 to 2007) to respondents in the ATUS interviewed during the economic downturn (2008 to 2010) and captures the general climate across the country that is promoted by media and personal interactions during these time periods. Each year during the Great Recession is modeled separately to allow for nonlinear relationships. Respondents interviewed before the recession began (2003-2007) is the comparison group. The state economic conditions are measured with monthly state-level unemployment rates. This measure is constructed by merging monthly state-level unemployment rates from the U.S. Bureau of Labor Statistics to the ATUS data. This measure is meant to capture the local economic climate for the smallest geographic identifier available in the ATUS (i.e. states). From monthly state-level unemployment rates, I construct three-month rolling averages for each state and month that includes the month prior, during, and after the date of ATUS participation. This estimate is then merged to each case to match the state and month of the interview.[5]

The detailed employment status measure, which identifies respondents who are unemployed, is captured from the longitudinal nature of the CPS and ATUS datasets. The CPS is the sampling frame for potential ATUS respondents and as such, respondents' households have participated in the CPS approximately two to five months before being invited to participate in the ATUS. Participants of the CPS are asked about their current employment status and this information is updated upon entry into the ATUS. These data allow me examine differences across respondents that are unemployed (both recently and longer-term), employed, and out of the labor force. This measure of employment status identifies the employed (employed at the time of the ATUS), the recently unemployed (employed at CPS and unemployed at ATUS), the

[5] I also tested a squared term and the natural log of the unemployment rate in the analyses to test for nonlinear effects. These alternative forms were not significant in any of the models. Because they were not significant, I excluded these terms from the analyses and the results described below.

longer-term unemployed (unemployed at CPS and ATUS), and those not in the labor force (out of the labor force at ATUS). Respondents that are employed at the time of the ATUS are the reference group.

Analytic Strategy

Health behaviors like exercise, active travel, and health-related self-care are relatively rare events that may or may not occur on the diary day captured by the ATUS and as such pose some unique challenges for analysis. In light of this, I examine the odds of spending no time in healthy behaviors as well the amount of time spent in each activity using Zero-Inflated Poisson regression models. The first part of the equation estimates the logged odds of "always being zero"[6] while the second part of the equation models the rate of spending time in a particular activity. To aid in their interpretation, I convert the coefficients of the first part of the equation predicting spending no time in a given activity to get odds ratios and estimate marginal effects to predict the amount of time spent in a given activity in minutes for the second part of the equation[7].

Eating breakfast is coded as a dichotomous variable and as such is analyzed using logistic regression. I convert the coefficients to odds ratios to aid in their interpretation. Figures illustrating moderating relationships are converted to predicted probabilities for clarity and to increase comparability across groups (see Buis 2010 for more information).

Influential cases were identified using Cook's D, dbetas, and standardized residuals calculated from un-weighted linear and logistic regression models. If the influence statistics were notably high for a particular case, it was flagged as a potential problem. Once cases were identified, models were rerun without the potentially problematic cases. In instances were the

[6] This is the opposite of the more traditionally used logistic regression.
[7] I use Stata's MARGINS command to predict the marginal effects which can be interpreted as the effect change expected with one unit increase in the independent variable.

results changed in a notable manner, I excluded the cases from the analysis.[8] The models predicting time spent in exercise and active travel had influential cases that were eventually dropped from the analysis.[9]

In order to investigate differences in healthy behaviors, I use multivariate methods to examine detailed employment status, state economic conditions, and historical time period to predict healthy behaviors. Controls included in this model that are not shown in the tables or the discussion are gender, race, immigrant status, life stage, education, marital status/spouses employment status, metropolitan status, region, season, and holiday. Interactions between being unemployed, state economic conditions (as captured by unemployment rates), and historical time period when the survey was collected were also tested in each model. I begin by first testing each of the two-way interactions (which includes the main and interaction effects) and then testing each of the three-way interactions (which includes the main effects, two-way interaction effects, and three-way interaction effects). Only significant interactions are described in the results.

Results

Table 1 includes descriptive statistics for the analytic sample, time use estimates for time spent in exercise, active travel, and health-related self-care, and the proportion of respondents who ate breakfast on the diary day. Only 16% of respondents exercise on the diary day and even fewer (14%) engage in active travel. Little time is actually spent in physical activity on the diary day as well. The mean number of minutes spent exercising is 12 minutes while the mean number of minutes spent in active travel is 4 minutes. However, estimating the average number of minutes Monday through Friday seems more reasonable with respondents spending an average of 60 minutes in exercise and 19 minutes in active travel during this time. Health-related self-

[8] If a variable became or lost statistical significance, I considered this change sufficient to exclude the cases from the analysis for the dependent variable in question.
[9] Four cases were dropped from the exercise model and nine cases were dropped from the active travel model.

care is also a rare event that comprises a small part of each diary day (7% engage in active travel and the average time spent is 7 minutes). The time invested in health-related self-care, though similar to exercise in its rarity, is notable because of the nature of the activities included. Taking medication, meditating, seeing health care professionals (does not include time spent waiting for professionals), and performing exercises or therapy for medical reasons are not typically considered time intensive or regularly performed activities. Though less than 50% of the sample eats breakfast on the diary day (44% to be exact), it is a large proportion of the sample compared to measures of physical activity.

Multivariate Models Predicting Time Spent Exercising

Table 2 shows the Zero-Inflated Poisson regression model predicting the odds of being "always zero" and the rate of spending time in exercise.[10] Here we see that those not in the labor force also have lower odds of being in the "always zero" group – that is they are more likely to spend at least one minute exercising than the employed. Those not in the labor force are 21% less likely to be in the "always zero" group. Also, time spent in exercise is estimated to be approximately 4 minutes more for the recently unemployed and those not in the labor force and 5 minutes more for the long-term unemployed after including the controls. Extending this estimate to a full workweek, the recently unemployed spend approximately 18 more minutes while the long-term unemployed spend 23 more minutes exercising than the employed.

Interactions testing the two-way and three-way moderating effects of being unemployed, living in states with poor economic conditions, and being interviewed during a historical time period marked by a recession were not statistically significant predictors of time spent exercising.

[10] Controls included gender, race, immigrant status, life stage, spouse/partners' employment status, education, region, metropolitan area, and season.

Multivariate Models Predicting Time Spent in Active Travel

Models predicting the rate and odds of spending time in active travel are shown in Table 3. Here we see that the recently unemployed has 31% lower odds of spending no time in active travel while the long-term unemployed has 48% lower odds. This is evidence that those not working are more likely to spend any time in active travel compared to the employed. The recently and long-term unemployed continue to spend more time in active travel than the employed (4 minutes and 5 minutes more respectively) as do those not in the labor force. Respondents interviewed during the recessionary time period also spend more time in active travel than respondents interviewed before the recession with respondents from 2008 and 2009 spending approximately one additional minute in active travel than respondents interviewed before the recession.

Interaction models testing two- and three-way interactions showed significant effects between being unemployed and state economic conditions for time spent in active travel[11]. Figure 2 shows the statistically significant moderating relationships between being unemployed and living in states with poor economic conditions as captured by high unemployment rates. Here we see that the employed spend slightly less time in active travel as unemployment rates are higher or lower but the estimate never exceeds 4 minutes. In contrast, the recently unemployed and the long-term unemployed spend more time as the unemployment rate is higher. The recently unemployed spend more time in active travel at the lowest levels of the unemployment rate – spending nearly 30 minutes on average on the diary day when living in states with 3% unemployment and less than 1 minute when living in states with the highest unemployment rates. The long-term unemployed spend less than 5 minutes in active travel in states with the lowest unemployment rates but, in states with the highest rates of unemployment,

[11] Three-way interactions were not sufficiently informative to be included in this model.

respondents spend nearly 40 minutes in active travel. In sum, we see that the recently and long-term unemployed are differentially affected by differences in state economic conditions.

Multivariate Models Predicting Time Spent in Health-Related Self-Care

Models predicting the rate and the odds of spending time in health-related self-care are shown in Table 4. In the count portion of the model, none of the indicators of employment uncertainty predict the rate of time spent in health-related self-care. However, the detailed employment status and state economic conditions are statistically significant predictors of the odds of spending no time in health-related self-care. The long-term unemployed have 32% lower odds of spending no time while those not in the labor force have 70% lower odds. That is, the long-term unemployed and those not in the labor force are more likely to spend time in health-related self-care. Similarly, living in states with poor economic conditions as identified by higher unemployment rates are related to lower odds of spending no time in health-related self-care. Each additional percentage point of the unemployment rate is related to 4% lower odds of spending no time in health-related self-care.

Interactions testing the two-way and three-way moderating effects of being unemployed, living in states with poor state economic conditions, and being interviewed during a historical time period marked by a recession were not statistically significant predictors of time spent in health-related self-care.

Multivariate Models Predicting Eating Breakfast

Models predicting the odds of eating breakfast are shown in Table 5. Here we see that the long-term unemployed have 22% greater odds of eating breakfast while those not in the labor force have 21% greater odds. In addition, respondents interviewed in 2008 have 10% greater odds of eating breakfast than those respondents interviewed before the recession began.

Interaction models testing two- and three-way interactions showed significant interactions between being unemployed and being interviewed during the Great Recession for the odds of eating breakfast on the diary day.[12] Figure 3 shows the statistically significant relationships converted to predicted probabilities of eating breakfast. Here we see that for the employed interviewed before the recession (the reference group), the predicted probability is about .43. Though the long-term unemployed interviewed before the recession have a greater probability than the employed during this same time period (.44 predicted probability), the recently unemployed interviewed in 2009 and 2010 have higher probability still at .62 and .65 respectively.

Conclusion

Overall, I find that being unemployed is an important predictor of health behaviors and is related to spending more time in exercise, active travel, and health-related self-care as well as an increased likelihood of eating breakfast (supporting H3). Though, in some cases I find that indicators of state economic conditions and historical time period predict health behaviors, they are not as consistent or as large of effects as expected (partially supporting H1 and H2). That being said, state economic conditions as captured by state-level unemployment rates and historical time period work in tandem with being unemployed to predict participation in healthy behaviors. In addition to the direct effects of employment uncertainty, different levels of exposure to employment uncertainty moderated one another. In accordance with H4a the long-term unemployed spend greater amounts of time in physical activity in states with higher unemployment rates and the recently unemployed are more likely to eat breakfast during the recessionary years of 2009 and 2010. However, I find no support for H4b that proposes that

[12] Three-way interactions were not sufficiently informative to be included in this model.

individuals during the recession will be less likely to engage in healthy behaviors when living in states with higher unemployment rates.

One unexpected set of results was the counterintuitive patterns found in the interaction models predicting time spent in active travel. Though the main models predicted increased time spent in active travel as expected, the interaction models were different. The recently unemployed were disadvantaged in ways contrary to the expected relationships laid out in the hypotheses (the recently unemployed spent less time in active travel in higher unemployment states). Though I am unable with this data to investigate the causes of such patterns, the unique reasons that either promote or discourage active travel such as having access to alternative means of transportation and having destinations within a reasonable distance to walk or bike are likely to be impacted by changes in employment uncertainty as well. It is possible that the cost of cars may increase the need to find alternative transportation while closing businesses in neighborhoods may result in having nowhere to go within a reasonable distance of one's home. These changes coupled with socio-demographic characteristics may explain the contradictory findings.

These results demonstrate the importance of examining health behaviors while accounting for various indicators of employment uncertainty. Though many have found that state economic conditions and historical time period are important predictors of time spent in healthy behaviors, it is reasonable to argue that their singular focus may not adequately account for other aspects influencing healthy behaviors – specifically the more proximal effects of being unemployed. That is not to say that state economic conditions or historical time period are not important predictors as well, there is partial evidence here that shows otherwise. Rather, without accounting for the compositional changes of being unemployed it is difficult to completely parse

out whose behaviors are responding to changes in the broader economic climate. It is important to note that these analyses do not account for selection into being unemployed. This is a limitation of my findings and a future extension of this work. Without accounting for those who are more or less likely to become unemployed, particularly during periods of economic change like the Great Recession, the overlap between being unemployed and the broader employment uncertainty is not clear.

Though few studies have been able to investigate with such detail time spent and engagement in healthy behaviors, this study has several additional limitations. First, it is not possible to examine individual level change using the ATUS. Though the continual fielding of the ATUS makes it possible to perform cross-sectional comparisons, I am unable to determine how individuals' behavior changes as the Great Recession unfolded or as individuals transitioned from being employed to being unemployed. Despite this limitation, I am unaware of any studies that investigate change across time using time diary data spanning a recession. Second, the ATUS is self-reported time diary data and it is therefore potentially subject to respondent bias. However, the ATUS does not ask questions focused on particular behaviors that may be preferred such as asking how long a respondent exercises on a given day. Rather, the respondent is asked to recall their day without prior reference to particular activities or topics and therefore they are less likely to include activities that are preferred over the activities that they engage in. Instead, it is more likely that a respondent may exclude activities that are viewed negatively (such as smoking) and therefore may not be good measures of such behaviors. Lastly, these healthy behaviors are only captured on a single diary day and it is possible that those individuals with cyclical health behaviors like exercise may not be fully captured in the data. However, the data is a nationally representative sample of diary days and though some individuals may be

missed on their off day, other respondents on their day for exercise should be captured. Together the full sample is intended to reflect an average diary day and, therefore, the prevalence of a given activity across the population.

Despite such limitations, this study is an important extension of prior research and contribution to understanding the importance of employment uncertainty for healthy behaviors. It demonstrates the importance of being unemployed while also controlling for the state and national economic environment for healthy behaviors and finds that being unemployed is, in fact, related to spending more time in physical activity and health-related self-care, as well as increased odds of eating breakfast. Though this is contrary to assumptions about the negative experiences of being unemployed, it raises important questions about the ability of the *employed* to make time to engage in healthy behaviors. Moreover, when time is tightest, what is the first activity to be sacrificed? As prior research on the importance of family relationships shows (e.g. Bianchi et al. 2006; Hays 1996) in addition to the greedy institution of work (e.g. Acker 1990; L. A. Coser and R. Coser 1974; Moen and roehling 2005; Williams 2000), it seems reasonable that workers may be most likely to sacrifice their own health behaviors. Such findings raise important questions about the role of work for individual health outcomes and behaviors.

Table 1. Descriptive Statistics: Sample limited to respondents aged 24 to 55 from weekday diaries, ATUS 2003-2010.

	Rate	SE	Obs	Weighted Count
Dependent Variables				
Exercising				
% Spending Time Exercising	16.03%	0.003	5,411	45,847,971,909
Time Spent Exercising	12.00	0.261	33,528	683,835,663,217
Time Spent in Active Travel				
% Spending Time in Active Travel	13.78%	0.002	4,606	286,052,297,649
Time Spent in Active Travel	3.80	0.125	33,528	286,052,297,649
Time Spent in Health-Related Self-Care				
% Spending in Self-Care	7.07%	0.002	2,470	20,234,505,405
Time Spent in Self-Care	6.67	0.330	33,528	286,052,297,649
Eating Breakfast	44.16%	0.003	14,624	126,316,340,907
Independent Variables				
Economic Climate				
Detailed Employment Status				
Employed	80.46%	0.003	26,812	230,154,848,863
Unemployed - 2 to 5 months	2.01%	0.001	592	5,739,298,647
Unemployed - at ATUS & CPS	2.96%	0.001	939	8,460,036,296
Out of Labor Force	14.58%	0.002	5,185	41,698,113,842
State-Level Unemployment Rate	6.33	0.016	33,528	286,052,297,649
Recessionary Time Period				
Before the Recession (2003-2007)	0.62	0.003	22,050	177,308,268,704
2008	0.13	0.002	3,690	36,354,562,066
2009	0.13	0.002	3,875	36,080,970,759
2010	0.13	0.002	3,913	36,308,496,119
Socio-demographic Characteristics				
Female	0.51	0.003	18,673	144,999,768,293
Life Stage				
45 or Younger without Children	0.29	0.004	6,916	83,235,462,804
Parent of Child under 18	0.49	0.003	20,200	140,903,196,145
Older than 45 without Children	0.22	0.003	6,412	61,913,638,699
Marital or Partner Status/Spouse's Employment Status				
Spouse/Partner is Not Employed	0.15	0.002	4,365	40,817,608,367
Spouse/Partner Employed Part-Time	0.07	0.002	2,304	19,990,229,320
Spouse/Partner Employed Full-Time	0.45	0.003	14,413	126,329,739,156
No Spouse or Partner	0.33	0.003	11,706	92,530,454,994
Education				
College Degree or More	0.33	0.003	12,180	92,980,501,763
Some College or Associates	0.27	0.003	9,727	76,048,569,117
High School Diploma or Less	0.41	0.003	11,621	117,023,226,769
Controls				
Race				
White	0.68	0.003	23,229	193,221,566,911
African American	0.12	0.002	4,035	33,770,009,166
Hispanic	0.15	0.003	4,545	43,660,737,068
Other	0.05	0.002	1,719	15,399,984,503

Note: Estimates are weighted using the wt06 variable.

Table 1 cont. Descriptive Statistics: Sample limited to respondents aged 24 to 55 from weekday diaries, ATUS 2003-2010.

	Rate	SE	Obs	Weighted Count
Immigrant	0.16	0.003	4,814	45,602,875,726
Region				
Northeast	0.18	0.003	6,104	51,330,852,583
Midwest	0.25	0.003	8,469	70,242,153,502
South	0.35	0.003	11,552	99,741,451,732
West	0.23	0.003	7,403	64,737,839,830
Metropolitan Area				
Suburban	0.58	0.003	19,439	164,387,371,144
Urban	0.25	0.003	8,216	71,710,243,283
Rural	0.17	0.003	5,686	48,201,940,337
Season				
Summer	0.25	0.003	8,096	70,966,112,838
Fall	0.25	0.003	8,024	71,382,658,740
Winter	0.25	0.003	8,784	70,543,276,304
Spring	0.26	0.003	8,624	73,160,249,767
Holiday Diary Day	0.02	0.001	576	4,553,608,507

Note: Estimates are weighted using the wt06 variable.

Table 2. Zero-Inflated Poisson Regression Models Predicting Time (Minutes per Weekday) Exercising, ATUS 2003-2010.

	Model 3						
	Binary[1]			Count[2]			
	OR	Coef.		SE	Marginals	Coef.		SE
Employment uncertainty								
Detailed Employment Status								
Employed (ref.)								
Unemployed - 2 to 5 months	0.87	-0.14		0.14	3.74	0.22	*	0.09
Unemployed - at ATUS & CPS	0.78	-0.25		0.13	4.66	0.20	**	0.06
Out of the Labor Force	0.79	-0.24	***	0.06	4.22	0.17	***	0.04
State Economic Conditions								
Unemployment Rate	1.01	0.01		0.02	-0.24	-0.01		0.01
Time Period								
2003-2007 (ref.)								
2008	0.99	-0.01		0.06	0.36	0.03		0.04
2009	0.92	-0.09		0.09	2.20	0.12	*	0.06
2010	0.94	-0.07		0.09	1.99	0.12	*	0.06
Employment Status								
Employed (ref.)								
Unemployed								
Out of Labor Force								
Constant		0.83	***	0.12		4.51	***	0.08

Notes: N=32,607.*p<.05. **p<.01. ***p<.001. Controls included in the model are gender, race, immigrant status, life stage, spouses' employment status, and education, region, metropolitan area, and season. Models are weighted using wt06 and cases with missing values not imputed by the U.S. Bureau of Labor Statistics are excluded.

[1]The binary portion of the equation predicts the logged odds of spending no time in a given activity. This is the opposite of traditional logistic regression models.

[2]The count portion of the equation predicts the rate of time spent in a given activity.

Table 3. Zero-Inflated Poisson Regression Models Predicting Time (Minutes per Weekday) Engaging in Active Travel, ATUS 2003-2010.

	Model 3							
	Binary[1]				Count[2]			
	OR	Coef.	OR	Coef.	Marginals	Coef.	OR	Coef.
Employment uncertainty								
Detailed Employment Status								
Employed (ref.)								
Unemployed - 2 to 5 months	0.69	-0.38	**	0.14	3.57	0.57	***	0.16
Unemployed - at ATUS & CPS	0.52	-0.66	***	0.11	5.26	0.58	***	0.11
Out of the Labor Force	0.67	-0.40	***	0.06	2.52	0.36	***	0.07
State Economic Conditions								
Unemployment Rate	1.02	0.02		0.02	-0.16	-0.03		0.02
Time Period								
2003-2007 (ref.)								
2008	0.91	-0.09		0.07	0.99	0.22	*	0.09
2009	0.85	-0.16		0.09	1.36	0.25	*	0.11
2010	0.84	-0.17		0.09	1.21	0.20		0.11
Employment Status								
Employed (ref.)								
Unemployed								
Out of Labor Force								
Constant		1.57	***	0.13		3.35	***	0.19

Notes: Model 1 N=33,528, Model 2 N=33,528, Model 3 N=32,610.*p<.05. **p<.01. ***p<.001. Controls included in the model are gender, race, immigrant status, life stage, spouses' employment status, and education, region, metropolitan area, and season. Models are weighted using wt06 and cases with missing values not imputed by the U.S. Bureau of Labor Statistics are excluded.

[1]The binary portion of the equation predicts the logged odds of spending no time in a given activity. This is the opposite of traditional logistic regression models.

[2]The count portion of the equation predicts the rate of time spent in a given activity.

Table 4. Zero-Inflated Poisson Regression Models Predicting Time (Minutes per Weekday) Engaging in Self Care, ATUS 2003-2010.

	Model 3						
	Binary[1]				Count[2]		
	OR	Coef.		SE	Marginals	Coef.	SE
Employment uncertainty							
Detailed Employment Status							
Employed (ref.)							
Unemployed - 2 to 5 months	0.94	-0.07		0.21	-0.61	-0.19	0.25
Unemployed - at ATUS & CPS	0.68	-0.39	**	0.15	1.73	-0.06	0.18
Out of the Labor Force	0.30	-1.19	***	0.06	12.23	0.17	0.09
State Economic Conditions							
Unemployment Rate	0.96	-0.04	*	0.02	0.10	-0.02	0.03
Time Period							
2003-2007 (ref.)							
2008	0.87	-0.14		0.08	2.07	0.11	0.15
2009	1.12	0.11		0.12	-1.45	-0.11	0.17
2010	1.26	0.23		0.12	-1.88	-0.07	0.20
Employment Status							
Employed (ref.)							
Unemployed							
Out of Labor Force							
Constant		3.41	***	0.17		4.46	*** 0.25

Notes: Model 1 N=33,528, Model 2 N=33,528, Model 3 N=32,610. *p<.05. **p<.01. ***p<.001. Controls included in the model are gender, race, immigrant status, life stage, spouses' employment status, and education, region, metropolitan area, and season. Models are weighted using wt06 and cases with missing values not imputed by the U.S. Bureau of Labor Statistics are excluded.

[1] The binary portion of the equation predicts the logged odds of spending no time in a given activity. This is the opposite of traditional logistic regression models.

[2] The count portion of the equation predicts the rate of time spent in a given activity.

Table 9. Logistic Regression Models Predicting Eating Breakfast, ATUS 2003-2010.

	Odds Ratios	Coef.	SE
Employment uncertainty			
Detailed Employment Status			
Employed (ref.)			
Unemployed - 2 to 5 months	1.12	0.11	0.11
Unemployed - at ATUS & CPS	1.22	0.20 *	0.09
Out of the Labor Force	1.21	0.19 ***	0.04
State Economic Conditions			
Unemployment Rate	1.00	0.00	0.01
Time Period			
2003-2007 (ref.)			
2008	1.10	0.10 *	0.05
2009	1.01	0.01	0.06
2010	1.08	0.08	0.07
Employment Status			
Employed (ref.)			
Unemployed			
Out of Labor Force			
Constant		0.01	0.09

Notes: Model 1 N=33,528, Model 2 N=33,528, Model 3 N=32,610. *p<.05. **p<.01. ***p<.001. Controls included in the model are gender, race, immigrant status, life stage, spouses' employment status, and education, region, metropolitan area, and season. Models are weighted using wt06 and cases with missing values not imputed by the U.S. Bureau of Labor Statistics are excluded.

Figure 1. Monthly State-level Unemployment Rate from January 2003 to December 2010

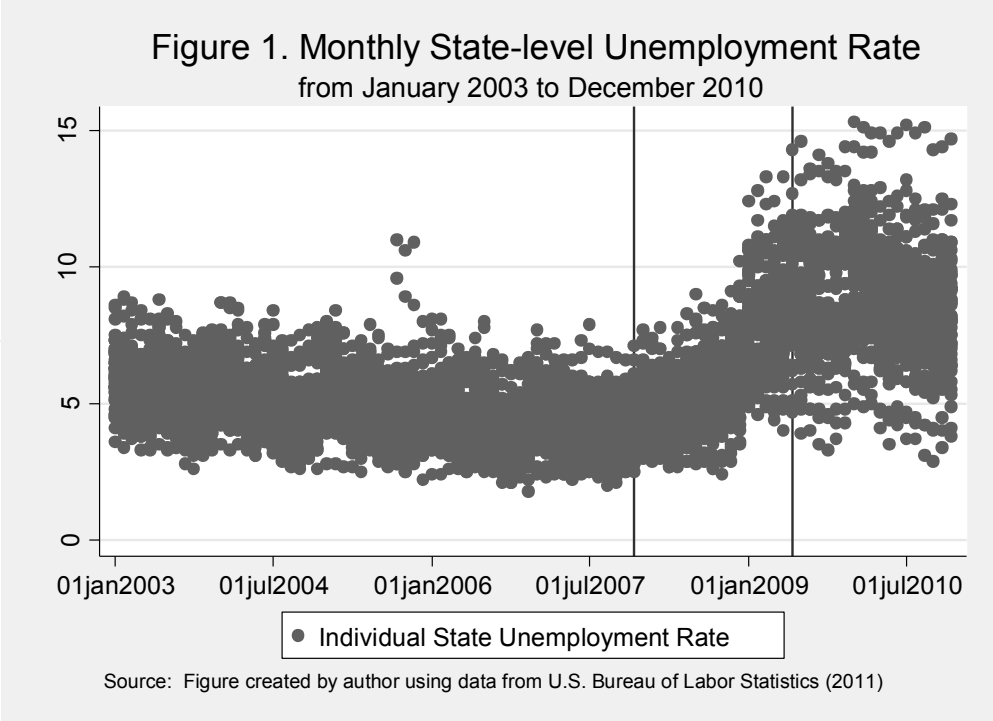


Figure 2. Moderating Effects of Being Unemployed and State economic conditions on Time Spent in Active Travel

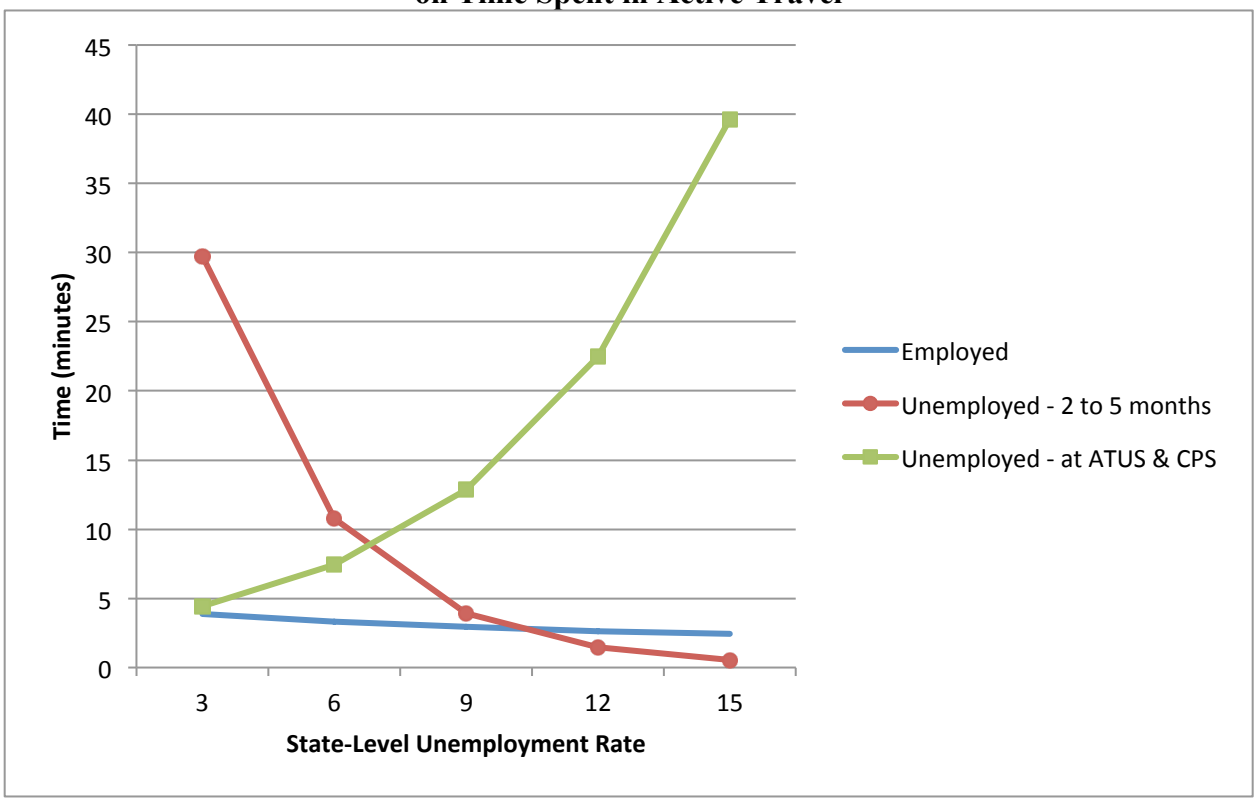
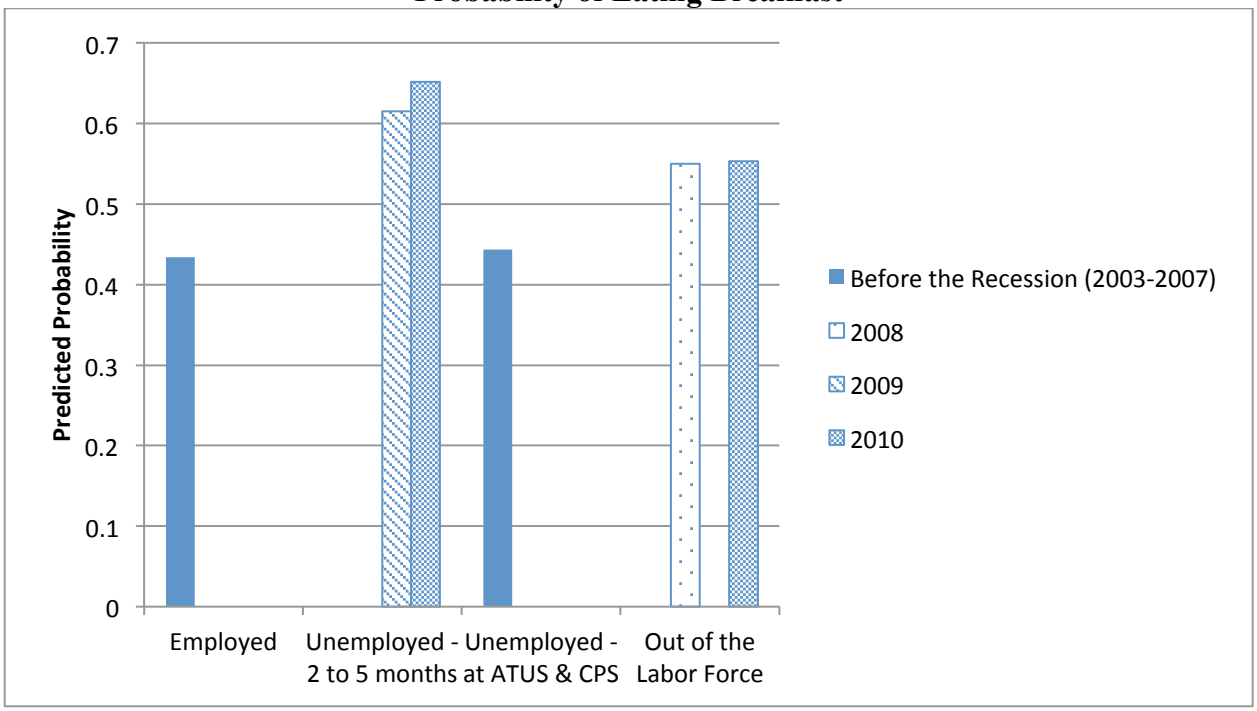


Figure 3. Moderating Effects of Being Unemployed and Historical Time Period for the Probability of Eating Breakfast



Appendix: Activities Included in Exercise and Self-Care

Appendix Table 1. List of Exercise Activities

Included Activities	
Doing Aerobics	Rollerblading
Playing Baseball	Playing Rugby
Playing Basketball	Running
Biking	Skiing, Ice Skating, Snowboarding
Bowling	Playing Soccer
Climbing, Spelunking, Caving	Playing Softball
Dancing	Sports and Exercise as Part of Job
Participating in Equestrian Sports	Using Cardiovascular Equipment
Fencing	Playing Volleyball
Fishing	Walking
Playing Football	Participating in Water Sports
Golfing	Weightlifting or Strength Training
Doing Gymnastics	Working Out, Unspecified
Hiking	Wrestling
Playing Hockey	Doing Yoga
Hunting	Playing Sports with Household Children
Participating in Martial Arts	Playing Sports with Non-Household Children
Playing Racquet Sports	Playing Sports, Not Easily Classified
Participating in Rodeo Competitions	
Excluded Activities	
Playing Billiards	
Boating	
Vehicle Touring or Racing	

List of Activities Included in Self-Care

Appendix Table 2. List of Activities Included in Health-related self-care

Health-related self-care	
Applying ointment	Meditating (not religious)
Bandaging an ankle	Putting ice on injury
Changing oxygen	Resting because of illness
Doing childbirth exercises	Resting because of injury
Doing stress management exercises	Taking cough drops
Dressing a wound	Taking insulin
Exercising or therapy for medical reasons	Taking medicine
Gargling for sore throat	Taking vitamins
Giving oneself a shot	Testing blood sugar level
Giving oneself an injection	
Using Health and Care Services Outside the Home	
Attending group therapy	Paying the doctor
Checking out adult care facility	Purchasing adult daycare
Having a doctor's appointment	Purchasing elder care services
Having a physical	Purchasing hospice/respite care
Having acupuncture	Receiving physical therapy
Having an eye exam	Seeing a chiropractor
Having dental work done	Seeing a psychologist
Having inpatient treatment	Talking to/with a doctor
Having outpatient treatment	Talking to/with a healthcare practitioner
Having wisdom teeth removed	Talking to/with a nurse
Making a co-payment	Talking to/with a pharmacist
Paying for adult care services	Talking to/with a physical therapist
Paying for healthcare services	Talking to/with psychologist
Paying for long-term care	
Using In-Home Health and Care Services	
Hiring someone to look after a household adult	Receiving in-home healthcare

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